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Construction of Preserved Wood Foundations

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General Instruction No. 1
CAN/CSA-S406-92
October 1992

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Preface

This is the second edition of CSA Standard CAN/CSA-S406, *Construction of Preserved Wood Foundations.* It supersedes the first edition, CAN3-S406, published in 1983.

This second edition has been completely reorganized such that the clause numbering follows the normal construction sequence, from site preparation, through construction of the foundation and floor systems, to backfilling and site grading.

The tabulated framing and plywood sheathing requirements have been recalculated based on the latest edition of CSA Standard CAN/CSA-O86.1, *Engineering Design in Wood (Limit States Design).* The stud tables have been expanded to cover three lengths of stud and assumptions for supported floor systems up to 8 m in span. The coverage for size of window openings is increased, and racking due to unbalanced soil loads is addressed.

Provisions have been added to address the use of floor trusses and wood sleeper floors. This edition specifies the use of hot-dipped galvanized or stainless steel nails in all treated wood materials. A table has been added to describe the qualities of native soils when used as backfill material. In general, provisions have been added or modified as appropriate to emphasize the need for installation in full conformance to the design and with the Standard.

This Standard was prepared by the CSA Technical Committee on Construction of Preserved Wood Foundations under the jurisdiction to the Standards Steering Committee on Structures (Design) and was formally approved by these Committees. It was approved by the Standards Council of Canada as a National Standard of Canada.

October 1992

Notes:

(1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*

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Requests for interpretation should

(a) define the problem, making reference to the specific clause, and, where appropriate, include an illustrative sketch;

(b) provide an explanation of circumstances surrounding the actual field condition; and

(c) be phrased where possible to permit a specific "yes" or "no" answer.

Interpretations are published in CSA's periodical Info Update. *For subscription details, write to CSA Sales Promotion,* Info Update, *at the address given above.*

CAN/CSA-S406-92
Construction of Preserved Wood Foundations

1. Scope

1.1
This Standard applies to the selection of materials for, and the fabrication and installation of, preserved wood foundations.

1.2
Specific details are provided for buildings up to two storeys in building height above the foundation and having a building area not exceeding 600 m^2.

1.3
This Standard provides for the optional use of wood sleeper, poured concrete slab, and suspended wood basement floor systems as components of the preserved wood foundation, and for the use of preserved wood foundations enclosing crawl spaces (see Figures A1 and A6).

1.4
The values given in SI (metric) units are the standard. The values given in parentheses are for information only.

Note: *In commercial practice, nails are commonly identified by their length in inches. Lumber sizes are expressed in terms of thickness × width, with metric values* (mm × mm) *referring to standard dry dressed sizes and with imperial values (in × in) referring to nominal nondressed sizes, both in conformance to CSA Standard CAN/CSA-O141.*

2. Definitions

2.1
The following definitions apply in this Standard:

Approved — permitted by the regulatory authority for use.

Backfill height — the height of backfill measured from the top of the footing plate to the exterior grade level at any particular point. In the case of a crawl space with a trenched footing, backfill height is the difference between exterior and interior backfill heights at any particular point.

Cripple stud — those less than full height studs extending between the bottom plate and the lower surface of sill plates of opening for windows, doorways or landings.

End wall — the exterior wall parallel to the floor joists.

Framing strap — a strip of minimum 0.90 mm (24 gauge) thickness galvanized steel used to transfer inward lateral wall loads to the floor system.

Granular drainage layer — the continuous layer of crushed stone or gravel used to drain the bottom of the foundation and to distribute the load from the footing to the soil.

Jack stud — a less-than-full height stud that is nail laminated to a full height stud, used as the bearing support for the end of a lintel or beam to transfer vertical loads to the footing.

Knee wall — an ancillary wall used outside the main foundation wall to support masonry veneer cladding or other loads.

Side wall — the exterior wall perpendicular to the floor joists.

Sill — the horizontal member forming the bottom of the rough frame of openings in walls.

Trimmer stud — see Jack stud.

3. Reference Publications

3.1

This Standard refers to the following publications and where such reference is made it shall be to the edition listed below, including all amendments published thereto:

CSA Standards

B111-1974,
Wire Nails, Spikes and Staples;

CAN/CSA-O80.15-M89,
Preservative Treatment of Wood for Building Foundation Systems, Basements and Crawl Spaces by Pressure Process;

CAN/CSA-O80.201-M89,
Standard for Hydrocarbon Solvents for Preservatives;

CAN/CSA-O86.1-M89,
Engineering Design in Wood;

O121-M1978,
Douglas Fir Plywood;

CAN/CSA-O141-91,
Softwood Lumber;

O151-M1978,
Canadian Softwood Plywood;

O322-1976,
Procedure for Certification of Pressure-Treated Wood Materials for Use in Preserved Wood Foundations;

CAN/CSA-O325.0-92,
Construction Sheathing;

CAN3-O437.0-M85,
Waferboard and Strandboard.

ASTM* Standard
A446-89,
Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.

CGSB† Standards
CAN/CGSB-19.13-M87,
Sealing Compound, One Component, Elastomeric, Chemical Curing;

19-GP-14M-1976,
Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing;

CAN/CGSB-37.2-M88,
Emulsified Asphalt, Mineral Colloid Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings;

37-GP-6Ma-1983,
Asphalt, Cutback, Unfilled, for Dampproofing;

CAN/CGSB-37.16-M89,
Filled Cutback Asphalt for Dampproofing and Waterproofing;

CAN/CGSB-51.34-M86,
Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.

NLGA‡
Standard Grading Rules for Canadian Lumber, 1987.

**American Society for Testing and Materials*
†*Canadian General Standards Board*
‡*National Lumber Grades Authority*

4. Design and Construction Requirements

4.1 General

The design and construction of preserved wood foundations shall conform to the requirements for wood frame construction in the appropriate building code, as well as to the additional requirements of this Standard.

4.2 Equivalents

Materials, systems, equipment, and procedures not specifically described herein or which vary from any specific requirements or design assumptions of this Standard may be used if it can be shown that the material, system, or equipment is suitable on the basis of past performance or on the basis of appropriate tests or evaluation.

4.3 Design Assumptions

Tabular data and figures in this Standard are based upon the general principles provided in CSA Standard CAN/CSA-O86.1, with the following design assumptions:
(a) the preserved wood foundation conforms to the installation requirements of this Standard and to good construction practice;
(b) soil bearing capacity is 75 kPa or more;
(c) clear spans for supported floors are
    (i) 3500 and 5000 mm to centre support; and

(ii) 5000 and 8000 mm, no centre support;

(d) floor live loadings are
   (i) 1.9 kPa for first floor and suspended floor; and
   (ii) 1.4 kPa for second storey floor;

(e) foundation stud lengths are
   (i) 2400 and 3000 mm with wood sleeper or slab floors; and
   (ii) 3000 and 3600 mm with suspended wood floors;

(f) top of granular layer to top of suspended wood floor is 600 mm;

(g) lateral load from soil pressure is equivalent to fluid pressure of 4.7 kPa per metre of depth for average stable soils;

(h) ground snow load is 3 kPa;

(i) basic snow load coefficient is 0.6;

(j) roofs are clear span with 610 mm overhang and all roof loads are carried to the exterior walls;

(k) dead loads are
   (i) roof = 0.50 kPa;
   (ii) floor = 0.47 kPa;
   (iii) wall (with siding) = 0.32 kPa;
   (iv) wall (with masonry veneer) = 1.94 kPa;
   (v) foundation wall = 0.27 kPa;
   (vi) partitions = 0.20 kPa;

(l) modification factors are
   (i) duration of load, K_D
      = 0.65 for lateral soil loads
      = 0.65 for dead load alone
      = 1.00 for live and snow loads (combined with dead loads);
   (ii) system factor, K_H
      = 1.40 for bending and shear
      = 1.10 for compression parallel to grain;
   (iii) service condition, K_S
      = 1.00 for studs and fasteners
      = 0.80 for plywood strength
      = 0.85 for plywood stiffness;
   (iv) preservative treatment factor, K_T = 1.00;
   (v) probability factor to reflect the probability of full design loads on roof and floors at the same time = 0.80; and
   (vi) plywood end use factor, K_F
      = 1.15 for panel bending and planar shear
      = 1.00 for other properties;

(m) allowable deflections, maximum are
      = L/300 for studs
      = L/180 for plywood; and

(n) backfill height around the perimeter of the foundation is uniform or the provisions of Clauses 9.4.4 or 10.4.4 are followed.

Note: *Backfill height is considered uniform when the differences in final grade on opposite sides of a foundation vary in elevation by not more than* 600 mm *(24 in).*

4.4 Other Conditions

For other conditions and more severe loadings than those specified in Clause 4.3,

preserved wood foundations shall be designed in conformance with Part 4 of the building code and CSA Standard CAN/CSA-O86.1, and installed in conformance with this Standard and the design.

Note: *Successful performance under more severe loads may require that members and connections be designed by a qualified structural engineer. See Clause 15.6 and Appendix C for further guidance.*

4.5 Structural Integrity

4.5.1

Walls shall be aligned, plumbed, and squared before they are nailed permanently in place. When required, shear walls shall comply with Clause 9.4.4 or 10.4.4, as appropriate.

4.5.2

To resist inward pressures, exterior foundation walls shall be braced laterally by the floor system at the top of the wall, and at the bottom (see Figure A1) by

(a) a concrete slab floor;
(b) a suspended wood floor;
(c) a wood sleeper floor;
(d) bracing in the case of a crawl space foundation, as specified in Clause 11.2; or
(e) other construction methods, in accordance with Clause 4.2.

4.5.3

Single top plates may be used where the floor joists or floor trusses are not offset more than 50 mm (2 in) to one side of foundation studs. Joints in single top plates shall be located over studs and shall be tied with at least 75 × 150 × 0.9 mm thick (3 × 6 in × 24 ga) galvanized steel straps nailed to each plate with at least three 63 mm (2½ in) nails.

4.5.4

Except where a single top plate is permitted in Clause 4.5.3, a second top plate shall be nailed to the top plate of the wall sections with end joints offset a minimum of two stud spaces from the end joints of the lower top plate.

4.5.5

Minimum fastening requirements shall be as specified in this Standard or in Part 9 of the appropriate building code, whichever is the more restrictive.

5. Materials

5.1 Treated Materials

Except as set forth in Clause 5.2, all lumber and plywood used in a preserved wood foundation shall be treated with preservative in accordance with CSA Standard CAN/CSA-O80.15.

The provisions in this Standard for construction of preserved wood foundations are predicated on the assumption that all lumber and plywood that is required to be treated when incorporated in a preserved wood foundation will be identified as such by a certification mark stamped on the material that confirms that it has been treated in conformance with CSA Standard O322.

Note: *Some preservative-treated wood is treated to requirements less stringent than those specified in Clause 5.1. Such materials are not acceptable for use in the construction of preserved wood foundations.*

5.1.1 End Cut Preservative

The preservative used for field treating cut ends of lumber shall be a copper napthanate preservative solution prepared with a solvent conforming to CSA Standard CAN/CSA-O80.201. The preservative solution shall contain a minimum of 2% copper metal.

Note: *In order to obtain a 2% copper metal solution, a solution containing approximately 17% copper naphthenate by weight is required. It may be obtained from or recommended by the supplier of the treated material.*

5.2 Untreated Materials

Lumber, plywood, and other wood based materials used in the following locations need not be treated:

(a) those portions of exterior walls which are more than 200 mm (8 in) above the adjacent exterior grade;

(b) floor structures more than 300 mm (12 in) above the granular drainage layer or interior ground level of a ventilated crawl space; and

(c) interior columns and partitions above a wood sleeper or suspended wood floor or above a concrete slab floor when separated from the concrete by a dampproofing material.

Note: *These guidelines result in good performance unless there are special conditions conducive to decay.*

5.3 Lumber

Softwood lumber used in the exterior wall as studs or as horizontal structural framing resisting lateral soil loads shall be No. 2 grade or better, graded in accordance with NLGA *Standard Grading Rules for Canadian Lumber;* shall be grade stamped; and shall conform to CSA Standard CAN/CSA-O141. The species shown in Table 1 shall be used where treatment is required in accordance with Clause 5.1.

Note: *Blocking members cut from full length material do not require a grade stamp.*

5.4 Plywood Sheathing

Exterior wall sheathing and preservative treated subfloor shall be unsanded exterior type plywood having at least four plies and shall be limited to the following species: western hemlock, amabilis fir, grand fir, and Coast Douglas fir. All such plywood shall bear markings identifying it as "Hem-Fir" plywood, and shall be

(a) plywood manufactured in accordance with CSA Standard O121; or

(b) plywood manufactured in accordance with CSA Standard O151.

Notes:

(1) *Plywood marked "COFI EXTERIOR DFP-Hem-Fir" contains inner plies of only the following species: western hemlock, amabilis fir, grand fir, and Coast Douglas fir. Outer plies are Douglas fir. This satisfies the requirement of Clause 5.4.*

(2) *Plywood marked "COFI EXTERIOR CSP-Hem-Fir" contains inner or outer plies of only the following species: western hemlock, amabilis fir, and grand fir, except that it may contain inner plies of Coast Douglas fir. This satisfies the requirements of Clause 5.4.*

(3) *Plywood conforming to CSA Standard O121 or CSA Standard O151 but not identified as "Hem-Fir" may contain other species. This does not satisfy the requirements of Clause 5.4.*

5.5 Fasteners

5.5.1 Nails

Nails for fastening treated material which is used either above or below grade shall be hot-dipped galvanized or stainless steel conforming to CSA Standard B111. Nail sizes and dimensions shall conform to CSA Standard B111 for common round wire nails and for spiral nails.

5.5.2 Staples

Staples shall be stainless steel conforming to American Iron and Steel Institute Type 304 or 316 and have a minimum diameter or thickness of 1.6 mm (1/16 in) with a 9.5 mm (3/8 in) crown.

5.5.3 Framing Anchors and Straps

Framing anchors and straps in contact with treated materials shall be galvanized to conform to ASTM Standard A446. Nails for use with framing anchors and straps shall conform to the manufacturer's requirements and to Clause 5.5.1.

5.6 Sealants, Caulking, and Dampproofing Compounds

5.6.1 Sealants and Caulking Compounds

Sealants and caulking compounds shall conform to CGSB Standards
(a) CAN/CGSB-19.13; or
(b) 19-GP-14M.

5.6.2 Dampproofing

Dampproofing shall conform to CGSB Standards
(a) CAN/CGSB-37.2;
(b) 37-GP-6Ma; or
(c) CAN/CGSB-37.16.

5.6.3 Other Compounds

Other sealants or dampproofing may be used provided they are compatible with the preservative-treated lumber and sheathing, as well as the moisture barrier used on the exterior of the preserved wood foundation.

5.6.4 Compounds in Combination

Sealants shall not be used in combination with dampproofing conforming to CGSB Standards CAN/CGSB-37.2 or CAN/CGSB-37.16.

5.7 Moisture and Vapour Barriers

Moisture and vapour barriers shall conform to CGSB Standard CAN/CGSB-51.34.

5.8 Subflooring

Subflooring shall conform to one of the following CSA Standards:
(a) O121;
(b) O141;
(c) O151;
(d) CAN/CSA-O325.0; or
(e) CAN3-O437.0.

Note: *Subflooring may be untreated as permitted in Clause 5.2.*

5.9 Granular Drainage Layer

5.9.1 New Material

Granular material for use in the granular drainage layer beneath a preserved wood foundation shall consist of clean crushed stone or clean gravel which will pass through a

40 mm (1½ in) sieve and contain not more than 10% of fine material that will pass a 4 mm (0.15 in) sieve.

5.9.2 Native Soil

Where the existing native soil is as permeable as the granular drainage material specified in Clause 5.9.1, such soil may be deemed to satisfy the requirements of Clauses 5.9.1 and 7.2.1. Such soil shall also meet the requirement of Clause 4.3(b) or the footings shall be designed to account for the appropriate lower soil bearing capacity.

5.10 Backfill

Native soils having medium or better drainage characteristics as described in Table 2 may be used as backfill material when the backfill must be drained. All backfill material placed within 600 mm (24 in) of the foundation walls shall be free of deleterious debris, frozen clumps, and boulders larger than 150 mm (6 in) in diameter.
Note: *See also Clause 15.*

5.11 Manufactured Drainage Layers

A manufactured drainage layer shall be a durable composite board or mat with a vertical water permeability at least equal to coarse, clean sand and shall be protected from infiltration of soil particles finer than fine sand.

6. Cutting and Machining

6.1 General

Cutting and machining of lumber and plywood should be done prior to treatment. Treated lumber shall not be cut lengthwise or notched. In cases where cutting or boring after treatment is unavoidable, all cuts, holes, and injuries to the surface of treated materials shall be protected by two applications of copper naphthenate preservative. This application shall be by brushing, spraying, or dipping.

6.2 Foundation Wall Studs

Treated foundation wall studs shall not be cut, notched, or bored to accommodate the installation of plumbing, heating services, and other utilities, or for any other reason. Studs may be crosscut to length after initial treatment, in which case they shall be installed with their treated end down.

6.3 Installation of Electrical Services

Installation of electrical facilities should be minimized in the exterior walls of preserved wood foundations. Where duplex outlets and other wiring must be placed in exterior walls, the wiring to service each outlet box shall be run vertically within a single stud space and shall pass through a hole drilled in the top plates. In lieu of the remedial treatment required in Clause 6.1, the hole in the top plate shall be sealed against air circulation.

6.4 Floor Joists, Blocking, and Services

Structural blocking or other floor members required under Clauses 9.7.3, 10.7.3, and 12.3 shall not be cut, removed, or otherwise interfered with for the purpose of installing plumbing, heating and/or air-conditioning ducts and pipes, or for any other reason. Where ducts or pipes are required to service registers at walls sitting parallel to floor joists

and where they cannot be installed between the joists without cutting, removing, or reducing the effectiveness of the blocking, such ducts or pipes shall be located beneath the level of the bottom of the floor joists.

7. Site Preparation

7.1 Excavation

Excavation requirements shall conform to those of the appropriate building code. The foundation excavation shall drain toward the sump location.

7.2 Foundation Drainage

7.2.1 Continuous Granular Drainage Layer

For fully excavated foundations enclosing habitable space, a continuous granular drainage layer of crushed stone or gravel conforming to Clause 5.9 shall be installed under all wood footings and under floors of preserved wood foundations. This layer shall be at least 125 mm (5 in) thick and shall extend beyond the footing plate by at least 300 mm (12 in) (see Figures A2 and A3). Where the layer exceeds 200 mm (8 in) in thickness under the footing plate, it shall be compacted.

7.2.2 Sump

The granular drainage layer shall drain to a sump (see Figures A2, A3, and A4), which in turn shall be provided with positive drainage, by gravity or mechanical means, to a point of final disposal outside the building.

7.2.3 Tile Not Permitted

Perimeter drainage tile or pipe shall not be used with preserved wood foundations.

7.2.4 Drainage Through Concrete Footings

When concrete footings are placed on undisturbed soil, water passages conforming to Clause 8.4.2 shall be incorporated in the footing and shall be placed to ensure drainage from the granular drainage layer outside the footing, through the footing, and into the granular drainage layer below the floor (see Figure A5). Alternatively, all through-footing drainage passages may be connected by piping to the sump.

7.2.5 Drainage of Trenched Footings

The granular drainage layer in trenched footings (see Figure A6) shall be drained when accumulation of water in the trench may result in frost damage (lifting) of the supported structure, in unacceptable wetting of dry expansive soils (see Table 2), or in excessive humidity in enclosed crawl spaces and below floors.

8. Footings

8.1 General

All foundation walls and load bearing columns shall be supported on footings. Except as permitted in Clause 8.3 for wood column footings and Clause 8.4 for concrete footings, all footings shall be placed on a continuous granular drainage layer having a minimum depth below the footing of 125 mm (5 in).

Note: *See also Clause 7 and Figures (Appendix A).*

8.1.1

Where excavation details require the foundation footing to be discontinuous, a beam meeting the requirements of the appropriate building code shall be used to distribute vertical structure loads to footings at either side of any horizontal gap exceeding 1200 mm (4 ft) in length.

Note: *The beam spanning the gap may be a built-up lintel, a plywood web beam, or other (see Figures A7 and A8).*

8.2 Wood Footing Plates for Walls

Wood footing plate sizes shown in Table 3 may be used where the design assumptions of Clause 4.3 apply.

8.2.1

Footing plates consisting of a single wood member shall extend beyond the width of the bottom wall plate to provide a seat for the sheathing but shall project no more than 50 mm (2 in) on either side.

Note: *Composite footing plates consisting of one wood footing plate, or two wood footing plates placed edge to edge, reinforced on the bottom face by plywood at least* 12.5 mm *thick and placed with the face grain perpendicular to the wall may be used in lieu of single footing plates. All footing plates shall extend beyond the width of the bottom wall plate to provide a seat for the sheathing.*

8.2.2

When a knee wall is used to support masonry veneer, the knee wall and main foundation wall shall both be supported on a footing or footings.

8.2.3

Except as required in Clause 8.2.4, wood footing plates shall be butted together at the ends and placed directly on the granular drainage layer. They may extend beyond the line of the wall at corners as shown in Figure A2, but if plates must be cut to length on the job site, they shall be treated in accordance with the requirements of Clause 6.1.

8.2.4

Where footings are required to be stepped (discontinuous) due to elevation changes in the foundation, any additional concentrated vertical loads (see Clause 8.1.1) shall be supported by column footings sized to carry the additional loads.

8.2.5

Bottom wall plates shall be nailed to wood footing plates in accordance with the provisions of Table 7. Joints in the bottom wall plate shall be offset a minimum of 600 mm (24 in) from adjacent joints in the footing plate.

8.3 Wood Footings for Columns

Foundation columns may be supported on wood footings. The wood members shall be nail laminated together by not less than 76 mm (3 in) nails spaced at maximum 450 mm (9 in) on centre and with nails at member ends located between 100 and 150 mm (4 and 6 in) from the ends. The appropriate type of wood footing may be selected in accordance with Table 4 and Figure A9.

Notes:

(1) *Full bearing transfer is necessary across the width of the footing at the base of the column (see Figure A9).*

(2) *Wood column footings may bear on undisturbed soil, or they may rest on a granular drainage layer or a thin layer of sand or gravel as shown in Figures A9 and A10.*

8.4 Concrete Footings

Concrete footings supporting walls or columns shall be sized and constructed in accordance with the appropriate building code.

8.4.1

Except as provided in Clauses 7.2.4 and 8.4.2, concrete footings shall be placed on a granular drainage layer.

8.4.2

Where a concrete footing is not placed on a granular drainage layer, drainage through the footings shall be provided by means of water passages having a minimal sectional area of 2500 mm^2 (4 in^2) at a maximum spacing of 1200 mm (4 ft) as shown in Figure A5.

8.4.3

The bottom wall plate of exterior walls need not be fastened to the concrete footing. If the wall plate is to be fastened to the concrete, holes shall not be drilled in the plate to accommodate the fastener. Lateral resistance to inward soil pressure at the bottom of the exterior wall shall be provided in accordance with Clauses 4.5.2, 9.7.2, 9.7.3, 9.8.1, and 9.8.2.

9. Exterior Walls with Wood Sleeper or Concrete Slab Floor

9.1 Wall Studs

Backfill heights for studs in exterior walls of foundations with wood sleeper or concrete slab floors shall not exceed the values in Tables 5A and 5B.

Note: *Backfill height tables for studs are given in imperial units in Appendix D.*

9.2 Framing Around Wall Openings (See Figure A11)

Where the height of backfill is 1200 mm (4 ft) or less, framing and fastening around wall openings may conform to the appropriate building code. Where the height of backfill is greater than 1200 mm (4 ft), such framing and fastening shall conform to Clauses 9.2.1 to 9.2.7.

9.2.1

Where lintels are located below the wall top plate they shall be nailed to adjacent studs with six 76 mm (3 in) nails where the lintel is 140 mm (6 in) in depth and eight 76 mm (3 in) nails where the lintel is 184 mm (8 in) in depth.

Note: *Built-up floor header joists may act as required lintels provided all members completely span the opening.*

9.2.2

Each member of lintels shall be fastened to the wall top plate with 76 mm (3 in) nails spaced 150 mm (6 in) oc.

9.2.3
Jack studs and adjacent wall studs shall be fastened together by two rows of 76 mm (3 in) nails spaced 300 mm (12 in) oc.

9.2.4
Framing straps or framing anchors shall be provided at the connection between the sills, jack studs, and cripple studs.

9.2.5
The size and spacing of cripples located below the sill in a wall opening shall be the same as specified for the wall studs for the backfill anticipated. For openings of 1200 mm (4 ft) or less in width, there shall be a minimum of two studs at both sides of the opening. Where required to support the end of a lintel, one only of the two studs may be a jack stud. For openings, between 1200 and 2400 mm (4 and 8 ft) in width, stud requirements shall be as specified in Figure A11.

9.2.6
Nail laminated wood sills shall conform to Figure A11.

9.2.7
For openings wider than 2400 mm (8 ft), the design shall be determined in accordance with Clause 4.4.

9.3 Wall Sheathing
Minimum thickness of plywood sheathing shall conform to Table 6.

9.3.1
All edges of foundation sheathing panels that occur below the exterior grade level shall be supported either by framing members, by 38 × 89 mm (2 × 4 in) wood blocking securely fastened to adjacent framing members (see Figure A12), or by bottom wall plates. Edges of the sheathing panels shall be embedded in a sealant.

9.3.2
A separation of 2 to 3 mm (about 1/10 in) shall be maintained between adjacent sheets of plywood (see Clause 14).

9.3.3
All gaps around edges of all foundation sheathing panels that occur below the exterior grade level shall be sealed with a sealant conforming to Clause 5.6.

9.4 Fastenings

9.4.1 Nailing
Except as provided in Clause 9.4.4, nailing shall conform to the minimum requirements of Table 7, in addition to the specific requirements of Clauses 9.4.3, 9.7, 12.3, 12.4, and of the appropriate building code.

9.4.2 Stapling

Where backfill height is uniform, staples may be used in conformance to Table 7.

9.4.3 Framing Anchors and Straps

When required by Clause 12 to provide positive load transfer to the main floor joist system from the wall studs and by Clause 9.2 for framing around wall openings, framing straps shall be 35 mm (1⅜ in) by minimum 0.9 mm (24 gauge) thickness galvanized steel of appropriate length, and framing anchors shall have a minimum load capacity of 1.3 kN (300 lb).

Note: *Straps used to connect the wall stud to the main floor should be at least* 600 mm *(24 in) in length. See Table 7, and Figures A19 and A20 for illustrations.*

9.4.4 Nailing When Backfill Height Is Not Uniform

For rectangular preserved wood foundations having a difference in backfill height on opposite walls, the walls that are perpendicular to these opposite walls shall have sheathing-to-framing nail spacing conforming to Tables 8A to 8E, or the foundation shall be designed to provide the required racking resistance.

Notes:

(1) *Where stairway openings occur in critical locations, floors should be checked for diaphragm deflection. Floors having lengths greater than* 15 m *(50 ft), or length-to-width ratios exceeding 4:1 should also be checked for diaphragm deflection by a qualified structural engineer. Where joists run parallel to the long direction, special care may be necessary to avoid diaphragm deflection.*

(2) *Lateral deflection of the floor generally is significant only with "walkout" basements. Where excessive deflection may occur, interior basement partitions should be designed by a qualified structural engineer as shear walls.*

(3) *All wall sheathing panel edges are required to be backed with* 38 mm *(2 in) or wider framing. Sheathing may be installed either horizontally or vertically. Space nails at* 300 mm *(12 in) on the centre along intermediate framing members.*

(4) *Staples are not considered to be adequate for the purposes of this Clause.*

9.5 Foundation Columns

Columns supporting floor beams in the interior of the structure, or forming part of the exterior foundation wall (see Figure A10), shall be constructed in conformance with column requirements in the appropriate building code. Column footings shall conform to Clause 8.3 or to Clause 8.4, as applicable.

9.6 Interior Loadbearing Walls

In addition to the requirements for interior loadbearing wood frame walls in the appropriate building code, such walls shall be supported by wood footing plates (see Figure A13) conforming to Clause 8.2 or by concrete footings conforming to Clause 8.4.

9.7 Wood Sleeper Floors

9.7.1 General

Wood sleeper floors (see Figure A14) shall be constructed to prevent the inward movement of exterior walls due to lateral pressure. Construction shall conform to the minimum requirements for wood frame construction in the appropriate building code and the additional requirements of Clauses 9.7.2 and 9.7.3. The clear distance between wood sleepers supporting the floor joists may be used as the span in determining the size requirements for the joists.

9.7.2 Support for Side Wall

9.7.2.1

Except as permitted by Clause 9.7.2.2, joists perpendicular to the exterior foundation walls shall be placed directly in line with the foundation wall studs and be butted together in line over the wood sleepers. Joists shall be toe-nailed to each supporting sleeper using two 76 mm (3 in) nails. Rim joists or full depth blocking between studs shall be used to provide fire stopping between floor and wall cavities.

9.7.2.2

Joists perpendicular to the exterior foundation wall may be located between studs provided that a rim joist of equivalent depth nailed to both studs and joist ends is used to transfer lateral wall loads to the floor system.

9.7.3 Support for End Wall

When joists are parallel to the exterior foundation wall, the wall shall be provided with special support (see Figure A14, Detail B) as required in Table 9.

9.7.4 Soil Gas Protection

A polyethylene sheet ground cover shall be placed between the underside of the floor joists and the granular drainage layer.

9.7.4.1

All joints in the polyethylene ground cover shall be lapped not less than 300 mm (12 in) and the sheet shall be sealed to the foundation wall footing around its entire perimeter.

9.7.4.2

All penetrations of the floor by pipes or other objects shall be sealed against water vapour and soil gas leakage.

9.7.4.3

All penetrations of the floor which are installed to drain water from the floor surface shall be sealed in a manner which prevents the upward flow of water vapour and soil gas without preventing the downward flow of liquid water.

9.8 Concrete Slab Floors

9.8.1 General

Concrete slab floors (see Figure A15) shall be not less than 75 mm (3 in) thick exclusive of concrete topping. They shall be installed to meet the requirements of the appropriate building code and of Clauses 9.8.2 and 9.8.3.

9.8.2 Support for Side and End Walls

Concrete slab floors shall extend at least 25 mm (1 in) above the top of the bottom plate (see Figure A15).

9.8.3 Soil Gas Protection

A polyethylene sheet ground cover shall be placed between the floor slab and the granular drainage layer.

9.8.3.1

All joints in the polyethylene ground cover shall be lapped not less than 300 mm (12 in) and the sheet shall be sealed to the foundation wall footing around its entire perimeter.

9.8.3.2

All penetrations of the floor by pipes or other objects shall be sealed against water vapour and soil gas leakage.

9.8.3.3

All penetrations of the floor which are installed to drain water from the floor surface shall be sealed in a manner which prevents the upward flow of water vapour and soil gas without preventing the downward flow of liquid water.

10. Exterior Walls with Suspended Wood Floor

10.1 Wall Studs

Backfill heights for studs in exterior walls with suspended wood floors (see Figures A16, A17, and A18) shall not exceed the values in Tables 10A and 10B.

Note: *Backfill height tables for studs in imperial units are given in Appendix D.*

10.1.1 Draft and Firestopping

Where the suspended wood floor meets the exterior wall, openings within stud spaces shall be fire stopped by means of 38 mm (2 in) thick wood blocking of full stud width at the level of the subfloor as shown in Figures A16, A17, and A18.

10.2 Framing Around Wall Openings (See Figure A11)

Where the height of backfill is 2000 mm (6 ft 8 in) or less, framing and fastenings around wall openings may conform to the appropriate building code. Where the height of backfill is greater than 2000 mm (6 ft 8 in) , such framing and fastening shall conform to Clauses 10.2.1 to 10.2.4.

10.2.1

Lintels shall be nailed to adjacent studs with six 76 mm (3 in) nails where the lintel is 140 mm (6 in) in depth and eight 76 mm (3 in) nails where the lintel is 184 mm (8 in) in depth.

Note: *Built-up floor header joists may act as required lintels provided all members completely span the opening.*

10.2.2

Each lintel member shall be fastened to the wall top plate with 76 mm (3 in) nails spaced 150 mm (6 in) oc.

10.2.3

Jack studs and adjacent wall studs shall be fastened together by two rows of 76 mm (3 in) nails spaced 300 mm (12 in) oc.

10.2.4
Framing straps or framing anchors shall be provided at the connection between the sills, jack studs, and cripple studs.

10.2.5
The size and spacing of cripples located below the sill in a wall opening shall be the same as specified for the wall studs for the backfill anticipated. For openings of 1200 mm (4 ft) or less in width, there shall be a minimum of two studs at both sides of the opening. Where required to support the end of a lintel, one only of the two studs may be a jack stud. For openings, between 1200 and 2400 mm (4 and 8 ft) in width, stud requirements shall be as specified in Figure A11.

10.2.6
Nail laminated wood sills shall conform to Figure A11.

10.2.7
For openings wider than 2400 mm (8 ft), the design shall be determined in accordance with Clause 4.4.

10.3 Wall Sheathing
Minimum thickness of plywood sheathing shall conform to Table 6.

10.3.1
All edges of foundation sheathing panels that occur below the exterior grade level shall be supported either by framing members, by firestopping, by 38 × 89 mm (2 × 4 in) wood blocking securely fastened to adjacent framing members (see Figure A12), or by bottom wall plates. Edges of sheathing panels shall be embedded in a sealant.

10.3.2
A separation of from 2 to 3 mm (about 1/10 in) shall be maintained between adjacent sheets of plywood (see Clause 14).

10.3.3
All gaps around edges of all foundation sheathing panels that occur below the exterior grade level shall be sealed with a sealant conforming to Clause 5.6.

10.4 Fastenings

10.4.1 Nailing
Except as provided in Clause 10.4.4, nailing shall conform to the minimum requirements of Table 7, in addition to the specific requirements of Clauses 10.4.3, 10.7, 12.3, 12.4, and of the appropriate building code.

10.4.2 Stapling
Where the backfill height is uniform, staples may be used in conformance to Table 7.

10.4.3 Framing Anchors and Straps

When required by Clause 12 to provide positive load transfer to the main floor joist system from the wall studs, or by Clause 9.2 for framing around wall openings, framing straps shall be 35 mm (1⅜ in) by minimum 0.9 mm (24 gauge) thickness galvanized steel of appropriate length, and framing anchors shall have a minimum load capacity of 1.3 kN (300 lb).

Note: *Straps used to connect the wall stud to the main floor should be at least* 600 mm *(24 in) in length. See Table 7 and Figures A19 and A20 for illustrations.*

10.4.4 Nailing When Backfill Height Is Not Uniform

For rectangular preserved wood foundations having a difference in backfill height on opposite walls, the walls that are perpendicular to these opposite walls shall have sheathing-to-framing nail spacing conforming to Tables 8A to 8E, or the foundation shall be designed to provide the required racking resistance.

Notes:

(1) *Where stairway openings occur in critical locations, floors should be checked for diaphragm deflection. Floors having lengths greater than* 15 m *(50 ft), or length-to-width ratios exceeding 4:1 should also be checked for diaphragm deflection by a qualified structural engineer. Where joists run parallel to the long direction, special care may be necessary to avoid diaphragm deflection.*

(2) *Lateral deflection of the floor generally is significant only with "walkout" basements. Where excessive deflection may occur, interior basement partitions should be designed by a qualified structural engineer as shear walls.*

(3) *All wall sheathing panel edges are required to be backed with* 38 mm *(2 in) or wider framing. Sheathing can be installed either horizontally or vertically. Space nails at* 300 mm *(12 in) on centre along intermediate framing members.*

(4) *Staples are not considered to be adequate for the purposes of this Clause.*

10.5 Foundation Columns

Columns supporting floor beams in the interior of the structure, or forming part of the exterior foundation wall, shall be constructed in conformance with column requirements in the appropriate building code. Column footings shall conform to either Clause 8.3 or Clause 8.4, as applicable.

10.6 Interior Loadbearing Walls

Where interior loadbearing walls are supported on top of suspended wood floors (see Figure A16) they may be constructed of untreated lumber.

10.7 Suspended Wood Floors

10.7.1 General

Suspended wood floors shall be constructed to prevent the inward movement of exterior walls due to lateral pressure. Construction shall conform to the minimum requirements for wood frame construction in the appropriate building code and the additional requirements of Clauses 10.7.2 and 10.7.3.

10.7.1.1

Use of approved parallel chord wood floor trusses or I-joists shall be permitted in place of solid sawn wood joists provided the trusses or I-joists are installed with adequate lateral bracing and blocking to restrain the members from twisting. The provisions of Clauses 10.7.2 and 10.7.3, and Table 9 shall apply.

10.7.2 Support for Side Wall

10.7.2.1

Except as permitted by Clause 10.7.2.2, joists perpendicular to the exterior foundation walls shall be placed directly in line with the foundation wall studs and be butted together in line over the interior support bearing wall. Joists shall be nailed directly to the interior support bearing wall, and shall be supported at the exterior wall by a minimum 38 × 140 mm (2 × 6 in) ledger nailed in accordance with Table 7.

10.7.2.2

Joists perpendicular to the exterior foundation wall may be located between studs provided that a minimum 38 × 140 mm (2 × 6 in) rim joist nailed to both studs and joist ends is used to transfer lateral wall loads to the floor system.

10.7.3 Support for End Wall

When joists are parallel to the exterior foundation wall, the wall shall be provided with special support (see Figures A17 and A18) as required in Table 9.

10.7.4 Soil Gas Protection

The upper surface of the granular drainage layer beneath a suspended wood floor shall be covered with polyethylene sheet ground cover.

10.7.4.1

All joints in the polyethylene ground cover shall be lapped not less than 300 mm (12 in) and weighted down, and the sheet shall be sealed to the foundation wall footing around its entire perimeter.

10.7.4.2

All penetrations of the floor by pipes or other objects shall be sealed against water vapour and soil gas leakage.

10.7.4.3

All penetrations of the floor which are installed to drain water from the floor surface shall be sealed in a manner which prevents the upward flow of water vapour and soil gas without preventing the downward flow of liquid water.

11. Exterior Walls for Crawl Space Foundations (See Figure A6)

11.1

The provisions of Clause 9 shall apply to crawl space foundation walls.

11.2

Where no floor system is provided at or near the base of the crawl space foundation wall, the wall shall be placed in a trench and backfilled on the inside to resist lateral pressure. The inside backfill shall be compacted to a depth of no less than 2/5 of the exterior backfill height.

12. Floors at Top of Foundation

12.1 General

Floors at top of the foundation shall be constructed to prevent the inward movement of exterior walls due to lateral pressure. Construction shall conform to the minimum requirements for wood frame construction in the appropriate building code and the additional requirements of Clauses 5.8, 12.2, 12.3, and 12.4.

12.1.1

Use of approved parallel chord wood floor trusses or I-joists shall be permitted in place of solid sawn wood joists provided the trusses or I-joists are installed with adequate lateral bracing and blocking to prevent the members from twisting. Wood floor trusses or I-joists may be installed at the top of foundation walls as either top chord bearing or bottom chord bearing members provided they are designed for the particular application and adequate means of vertical support are provided. The additional provisions of Clauses 12.2.2 or 12.2.3, and 12.3.2 or 12.3.3 shall apply.

12.2 Support for Side Walls

12.2.1 Solid Sawn Wood Joists

Joists and blocking shall be nailed as required by Table 7, including the nailing of both to the top plate of the foundation wall.

12.2.1.1

When the backfill height is greater than 1500 mm (5 ft) with a wood sleeper or concrete slab floor, or greater than 2000 mm (6 ft 8 in) with a suspended wood floor, framing straps (see Figure A19) shall be installed to attach the floor to the foundation wall in accordance with the requirements of Table 7.

12.2.2 Top Chord Bearing Trusses and I-Joists

Top chord bearing units shall be connected to the top of the wall to prevent inward movement of the wall by means of

(a) framing straps nailed to the ends of the top chord and the inner face of the wall studs;

(b) steel hangers or a wood ledger so located as to provide positive bearing of the chord end against the wall stud ends; or

(c) other means or providing support and positive transfer of lateral loads from the wall studs into the top chord and floor sheathing.

12.2.3 Bottom Chord Bearing Trusses and I-Joists

Bottom chord bearing units shall be connected to the top of the wall to prevent inward movement of the wall by means of

(a) steel hangers or a wood ledger so located as to provide positive bearing of the chord end against the wall studs; or

(b) other means of providing support and positive transfer of lateral soil loads from the wall studs into the bottom chord.

The line of lateral load transfer may be designed and constructed to move diagonally from the end of the chord to the top chord to the floor sheathing, or in a direct line through the bottom chord, to the opposite foundation wall.

12.3 Support for End Walls

12.3.1 Lateral Loading of Solid Sawn Wood Joists

Full-depth blocking shall be installed, in line with foundation studs, between the rim joist or wall studs and the first joist from the wall (see Figures A20 and A21).

Note: *The requirements of Clause 6 shall be adhered to.*

12.3.1.1

When the backfill height is greater than 1500 mm (5 ft) with a wood sleeper or concrete slab floor, or greater than 2000 mm (6 ft 8 in) with a suspended wood floor, the first joists away from the wall shall be reinforced with one additional joist of 38 × 89 mm (2 × 4 in) size or larger. In these cases, the subflooring shall be nailed to each of the floor joists with one row of 51 mm (2 in) nails at 100 mm (4 in) centres. Framing straps shall also be installed in accordance with Table 7.

12.3.2 Lateral Loading of Truss or I-Joist at Top Chord

When the top chords of floor trusses or I-joists are located at the level of the foundation top plates (see Figures A20 and A21), lateral inward movement of the wall shall be resisted by blocking, installed to ensure the direct transfer of lateral loads from the studs to the top chord of the first unit from the end wall, and by increased nailing of the subfloor to the top chord in accordance with Table 7. When the nailing face of the top chord of the unit is minimum 89 mm (4 in) wide, reinforcement of the chord per Clause 12.3.1.1 is not required.

12.3.3 Lateral Loading of Truss or I-Joist at Bottom Chord

When the bottom chords of floor trusses or I-joists are located at the level of the foundation top plates, lateral inward movement of the wall shall be resisted by

(a) blocking or diagonal bracing designed and installed so that lateral loads are transferred upward into the floor sheathing at a top chord located at a distance from the wall at least twice the depth of the truss or I-joist; or

(b) if the backfill height on opposite foundation walls is uniform, by blocking installed in a continuous line to transfer lateral loads across the full foundation to opposing exterior walls.

In both cases, connections at the top of the wall shall be adequate to provide transfer of lateral loads from the wall studs into the blocking or bracing.

12.4 Stairwell Openings

12.4.1 General

Stairwell openings adjacent to foundation walls require special framing and increased nailing to provide lateral resistance against soil loads at the top of the foundation wall (see Figures A22, A23, and A24). Construction shall conform to the minimum requirements for wood frame construction in the appropriate building code when the opening is 1200 mm (4 ft) or more from a foundation side wall and 1800 mm (6 ft) or more from a foundation end wall. Otherwise the requirements of Clauses 12.4.2 through 12.4.4 shall apply.

12.4.2 Dimensions

The maximum dimensions of a stairwell opening shall be 4300 mm (14 ft) when located within 1200 mm (4 ft) of the side wall or within 1800 mm (6 ft) of the end wall.

12.4.3 Framing at Side Wall

Openings less than 1200 mm (4 ft) from a side wall shall be framed with a multiply horizontal member (see Figures A22 and A24), the size and nailing of which shall conform to Table 11.

12.4.4 Framing at End Wall

Openings less than 1800 mm (6 ft) from an end wall shall be framed with a multiply horizontal member (see Figures A23 and A24), the sizes and nailing of which shall conform to Table 11.

13. Support for Accessory Materials and Structures

13.1 Support for Masonry Veneer

13.1.1 General

Masonry veneer exterior cladding conforming to the appropriate building code for above-grade masonry may be supported on a preserved wood foundation either
(a) on a knee wall attached to the exterior of the main foundation wall, as shown in Figure A25; or
(b) on top of the main foundation wall, as shown in Figure A26.

In either case, the main foundation wall shall be constructed as required in Clauses 9, 10, or 11, as applicable.

13.1.2 Masonry Veneer on Knee Wall

The knee wall supporting masonry veneer cladding (see Figure A25) shall be in accordance with Clauses 13.1.2.1 through 13.1.2.4.

13.1.2.1

Footings shall conform to Clause 8. Composite-type wood footing plates may be used.

13.1.2.2

Knee-wall studs shall be 38 × 89 mm (2 × 4 in) at 400 mm (16 in) oc for supporting a single wythe of masonry of a maximum 5500 mm (18 ft) in height. The knee wall shall be installed outside the exterior moisture barrier and nailed at top and bottom of each stud to the main foundation wall. Where knee-wall studs exceed 1500 mm (5 ft) in height, they shall also be toe-nailed at mid-height to the wall. Top plates of knee walls shall be doubled to support the masonry veneer. Joints in the two top plates shall be spaced a minimum of two stud spaces apart and shall occur directly above the centre of a supporting stud.

13.1.2.3

Knee-wall sheathing shall conform to Clause 5.4 and at any point shall extend below the exterior grade a minimum of 300 mm (12 in).

Note: *Sheathing need not be installed between this point and the footing; backfill material is permitted between the exposed knee-wall studs.*

13.1.2.4

No exterior moisture barrier is required over the knee-wall sheathing.

13.1.3 Masonry Veneer on Main Foundation Wall

Where masonry veneer is supported on the main foundation wall (see Figure A27), the foundation framing shall have a width sufficient to provide required support for the masonry veneer as well as accommodating the floor framing. Top plates shall be doubled and pressure treated.

13.2 Support for Exterior Concrete Slabs

Where driveway or garage floor slabs supporting cars or light trucks abut the foundation wall, appropriate steps shall be taken to ensure that the effects of additional loading are considered.

Note: *Two possible approaches to account for this additional loading are*
(a) *selecting the stud size and spacing for the wall using an effective backfill height* 500 mm *(20 in) greater than the actual backfill height; or*
(b) where the slab is reinforced on the bottom side, supporting the slab on a preserved-wood knee wall placed adjacent to the foundation wall (see Figure A27).

13.3 Support for Exterior Steps and Landings

Exterior steps and landings may be supported on a preserved wood foundation. Supported steps and landings shall not be hung so as to be cantilevered from a foundation wall.

13.4 Garage Frost Walls

13.4.1

The frost wall shall be placed in a trench and backfilled on both sides. Footing plates shall be located below the frost penetration level, except, where the garage is heated and external thermal insulation of the frost wall is properly and continuously installed to direct heat loss to the soil below the footing, the depth of the footing may be reduced.

13.4.2

Where the wall is subject to balanced soil loads, the studs may be 38 × 89 mm (2 × 4 in) in size, and the plywood sheathing may be 12.5 mm in thickness and extend a minimum of 600 mm (24 in) below grade.

14. Exterior Moisture Barrier

14.1 General

Except for the case of knee walls, or crawl spaces with trenched footings, the below-grade portion of the exterior face of the wall sheathing on a preserved wood foundation enclosing habitable space shall be protected by the moisture barrier specified in Clause 14.2.

14.2 Attachment of Polyethylene Sheet

A polyethylene sheet moisture barrier shall be applied to the plywood by means of embedment into vertical beads of sealant, or into dampproofing applied uniformly over the plywood. Joints between polyethylene sheets shall be vertical, lapped a minimum of 600 mm (2 ft), and sealed. When attached with vertical sealant beads, the polyethylene shall not be sealed along the bottom of the wall. The upper edge of the polyethylene shall be looped a minimum of 150 mm (6 in) and secured in place by nailing of the cover plate (see Figure A28).

14.3 Protection by Cover Plate

The moisture barrier shall be protected at its upper edge by covering it with a cover plate consisting of a treated strip of plywood having a minimum thickness of 12.5 mm and a minimum width of 300 mm (12 in). The top edge of this continuous strip shall be embedded in sealant or dampproofing along its full length. The plywood strip may follow the contour of the finished outside grade but it shall extend above the grade at any point by a minimum of 75 mm (3 in).

14.4 Protection of Corners

The moisture barrier shall be protected at interior and exterior corners from mechanical damage by treated plywood strips or other durable corner protection.

14.5 Extent of Coverage

The moisture barrier shall cover the entire surface of the wall below grade and extend to the bottom edge of the wood footing. It shall not extend out over the granular drainage layer or under the wood footing plate. In the case of a concrete footing, the moisture barrier shall not obstruct the required drainage passages (see Figure A5).

15. Backfilling and Site Grading

15.1 Timing

Preserved wood foundations shall not be backfilled until the basement floor or suspended floor and the floor at the top of the foundation walls are both fully installed including subfloor sheathing and all fastenings, or in the case of crawl spaces, adequate interior resistance to exterior load is installed.

15.2 Safe Placement of Backfill

Heavy equipment and loads shall be kept a safe distance away from foundations during backfilling. Backfill shall be placed in uniform lifts not exceeding 600 mm (2 ft) around the foundation.

Note: *In most soils, a safe distance for the use of backfilling equipment is a distance equal to the depth of the trench from the edge of the trench. Backfill should not be mechanically compacted.*

15.3 Use of Native Soil

Except as permitted in Clauses 15.4 or 15.5, and except as required in Clause 15.6, native soils conforming to Clause 5.10 may be used as the backfill material around foundations enclosing heated space and frost walls extending below the frostline. When native soil is to be replaced by sand and/or gravel as the backfill material to improve subgrade drainage around the foundation, the top 300 mm (1 ft) of backfill material shall have no greater porosity than that of the surrounding soil.

15.4 Use of Manufactured Drainage Layers

Where a manufactured drainage layer is applied to the vertical face of the foundation wall from grade level to the granular drainage layer, the backfill need not conform to Clause 15.3.

15.5 Foundations Not Requiring Drainage

For backfilling foundations enclosing unheated space, native soils in the coarse grained (cohesionless) group in Table 2 may be used full height as the backfill material.

15.6 Problem Soils

The backfill and drainage system shall be designed by a qualified engineer when the foundation is to be installed in a soil having a high volume change potential or where soils susceptible to frost heave are present around unheated portions of foundation walls.

15.7 Site Grading

Backfill shall be placed such that the final grade after the fill settles shall fall away from the walls at a minimum slope of 1 in 12 (see Figure A3).

Table 1
Lumber Species, Grade Stamps, and Groupings
(See Clause 5.3.)

Species	Grade stamp identification*	Strength grouping for stud tables†
Douglas fir‡	D Fir (N)	Spec 1
Western hemlock Amabilis fir Grand fir	W Hem (N) or Hem-Fir (N)§ Am Fir (N) or Hem-Fir (N)§ G Fir (N)	Spec 1
Lodgepole pine Jack pine Alpine fir Balsam fir Ponderosa pine	L Pine (N) J Pine (N) Alpine Fir (N) B Fir (N) P Pine	Spec 1
Red pine Western white pine Eastern white pine	R Pine (N) W.W. Pine East White Pine or (EW Pine) (N)	Spec 2
Eastern hemlock	East Hemlock (N) or (E Hem) (N)	Spec 2

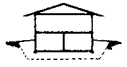
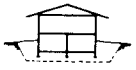
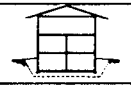
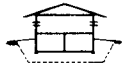
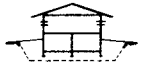
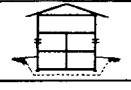
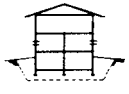
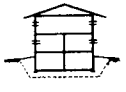
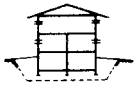
**Grade stamp identifications of species and species combinations are set forth in NLGA* Standard Grading Rules for Canadian Lumber.
†These groupings combine species of similar strength properties for purposes of developing preserved wood foundation stud backfill height tables, Tables 5A and 5B, and 10A and 10B. The calculation of permissible backfill heights using specified properties for the particular species and loading conditions is also permitted.
‡Douglas fir lumber is restricted to Coast Douglas fir, in conformance with CSA Standard O80.15.
§Hem-fir is the only species combination all of whose species are suitable for preservative treatment in accordance with Clause 5.1.

Table 2
Properties of Backfill Soils
(See Clause 5.10 and 15.3.)

Soil group	Unified soil classification	Description of backfill soil	Drainage characteristics	Frost heave potential	Soil volume change potential
Coarse grained (cohesionless)	GW to GP SW to SP	clean sand and gravel	excellent	none	none
	GM to GP SM to SP	dirty sand and gravel	good to medium	medium	low
Fine grained (mostly cohesive)	GC SM, SC ML, MH	clayey gravels clayey sands silty fine sands	medium	high	medium
	CL, CH	stiff residual silts and clays	medium	high	high
	CI, CH ML, MH OL, OH	very soft to soft clay silty clay organic silt and clay	poor	high	high
	CL CH	medium to stiff clay deposited in chunks and protected from infiltration	poor	high	high

Note: *Some soils experience large volume changes, swelling or shrinkage, due to absorption or loss of moisture.*

Table 3
Wood Footing Plates for Foundation Walls
(See Clause 8.2.)

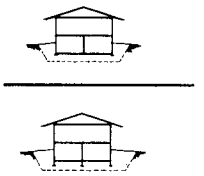
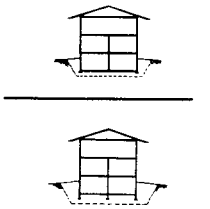
Type of exterior cladding		Number of storeys above foundation	Foundation floor type	Minimum size of footing plate, mm (in)	
				Exterior	Interior*
Conventional†		One 	Wood sleeper or slab	38 × 140 (2 × 6)	38 × 89 (2 × 4)
		One 	Suspended	38 × 140 (2 × 6)	38 × 140 (2 × 6)
		Two 	Wood sleeper or slab	38 × 140 (2 × 6)	38 × 140 (2 × 6)
		Two 	Suspended	38 × 184 (2 × 8)	38 × 235 (2 × 10) or composite‡
Masonry veneer supported on main foundation or knee wall	Masonry on first storey only	One § 	Wood sleeper or slab	38 × 140 (2 × 6)	38 × 89 (2 × 4)
		One § 	Suspended	38 × 184 (2 × 8)	38 × 140 (2 × 6)
		Two § 	Wood sleeper or slab	38 × 184 (2 × 8)	38 × 140 (2 × 6)
		Two § 	Suspended	38 × 235 (2 × 10) or composite‡	38 × 235 (2 × 10) or composite‡
	Masonry on two storeys	Two § 	Wood sleeper or slab	38 × 235 (2 × 10) or composite‡	38 × 140 (2 × 6)
		Two § 	Suspended	2 pcs 38 × 140 (2 pcs 2 × 6) conforming to Clause 8.2.1	38 × 235 (2 × 10) or composite‡

(Continued)

Table 3 (Concluded)

*Interior walls supported on the concrete slab do not require footing plates.
†Conventional cladding includes wood, metal, plastic, stucco, and other nonmasonry claddings.
‡Composite-type footing plates consist of at least 38 mm (2 in) lumber butted edge-to-edge and tied together with 12.5 mm (½ in) minimum thickness plywood and nails.
§ = Masonry veneer.

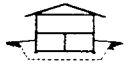
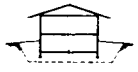
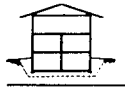
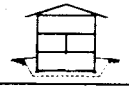
Table 4
Typical Footing Types for Columns
(See Figure A9 and Clause 8.3.)

Building width (parallel to joists), mm (ft-in)	One storey above foundation		Two storeys above foundation	
				
	Beam span		Beam span	
	2400 mm (8 ft)	3000 mm (10 ft)	2400 mm (8 ft)	3000 mm (10 ft)
6 000 (19-8)	A	A	B	C
8 000 (26-3)	A	B	C	D
10 000 (32-9)	B	C	D	D

Notes:
(1) *Design assumptions of Clause 4.3 shall apply.*
(2) *Details of the typical footing types designated as A, B, C, and D are provided in Figure A9.*
(3) *For beams at end walls, column footing areas may be one-half those shown in Figure A9.*

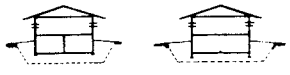
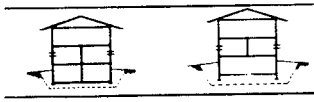
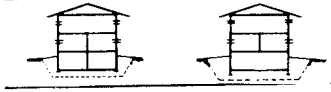
Table 5A
Maximum Backfill Heights for Various Sizes of Wood Foundation Studs for Exterior Walls with Wood Sleeper or Concrete Slab Floors or for Crawl Space Foundations

(See Clause 9.1.)

Maximum building width (parallel to floor joists)		Lumber		Stud size, mm x mm, 2.4 m (8 ft) length					
				38 × 89		38 × 140		38 × 184	
With centre support	No centre support	Strength grouping*	Grade	Stud spacing, mm (in), oc					
				400 (16)	300 (12)	400 (16)	300 (12)	400 (16)	300 (12)
				Maximum backfill when supporting one storey above foundation, no brick veneer, mm					
7 m (23 ft)	5 m (16 ft)	Spec 1	SS	1200	1350	2075	2400	2400	2400
			No. 2	1050	1250	1650	1925	2050	2400
		Spec 2	SS	1025	1200	1700	1975	2125	2400
			No. 2	875	1075	1450	1675	1800	2075
		Spec 1	SS	1200	1350	2025	2400	2400	2400
			No. 2	925	1150	1600	1875	2025	2375
10 m (33 ft)	8 m (26 ft)	Spec 2	SS	925	1150	1650	1925	2075	2400
			No. 2	750	975	1400	1650	1750	2050
				Maximum backfill when supporting two storeys above foundation, no brick veneer, mm					
7 m (23 ft)	5 m (16 ft)	Spec 1	SS	1200	1350	2050	2400	2400	2400
			No. 2	950	1175	1625	1900	2025	2375
		Spec 2	SS	950	1175	1650	1950	2075	2400
			No. 2	775	975	1400	1650	1750	2050

(Continued)

Table 5A (Continued)

Maximum building width (parallel to floor joists)		Lumber		Stud size, mm x mm, 2.4 m (8 ft) length					
				38 × 89		38 × 140		38 × 184	
				Stud spacing, mm (in), oc					
With centre support	No centre support	Strength grouping*	Grade	400 (16)	300 (12)	400 (16)	300 (12)	400 (16)	300 (12)
10 m (33 ft)	8 m (26 ft)	Spec 1	SS	1075†	1350†	1950	2350	2400	2400
			No. 2	800†	1050†	1550	1825	1975	2325
		Spec 2	SS	775‡	1050†	1575	1875	2025	2400
			No. 2	575‡	850†	1350	1575	1700	2000
				**Maximum backfill when supporting one storey above foundation, with brick veneer, mm**					
10 m (33 ft)	8 m (26 ft)	Spec 1	SS	na	na	1975	2375	2400	2400
			No. 2	na	na	1575	1850	1975	2350
		Spec 2	SS	na	na	1600	1900	2050	2400
			No. 2	na	na	1350	1600	1725	2025
				**Maximum backfill when supporting two storeys above foundation, brick veneer on first storey, mm**					
10 m (33 ft)	8 m (26 ft)	Spec 1	SS	na	na	1900	2300	2400	2400
			No. 2	na	na	1500	1800	1925	2300
		Spec 2	SS	na	na	1525	1825	2000	2375
			No. 2	na	na	1300	1550	1675	1975
				**Maximum backfill when supporting two storeys above foundation, brick veneer full height, mm**					
10 m (33 ft)	8 m (26 ft)	Spec 1	SS	na	na	1875	2250	2400	2400
			No. 2	na	na	1450	1750	1900	2250
		Spec 2	SS	na	na	1500	1800	1950	2325
			No. 2	na	na	1250	1500	1625	1950

(Continued)

Table 5A (Concluded)

*Strength grouping for purposes of these tables is described in Table 1 and its Notes.
†Where marked, the tabulated value shall be reduced by 100 mm for 'no centre support' floor cases.
‡Where marked, the tabulated value shall be reduced by 200 mm for 'no centre support' floor cases.

Notes:

(1) Backfill height is defined in Clause 2.

(2) Design assumptions of Clause 4.3 apply.

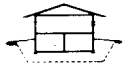
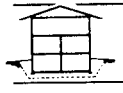
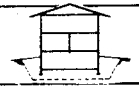
(3) Buildings are assumed to have masonry-veneer cladding, supported on the preserved wood foundation wall, where indicated (=) and conventional siding consisting of wood, metal, plastics, stucco or other nonmasonry cladding elsewhere.

(4) When masonry veneer is carried on a knee wall conforming to Clause 13.1.2, the sections of the table headed "no brick veneer" shall apply.

(5) When "na" is indicated, use of this Table not applicable.

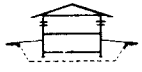
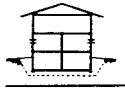
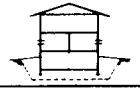
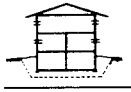
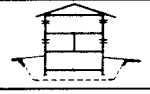
Table 5B
Maximum Backfill Heights for Various Sizes of Wood Foundation Studs for Exterior Walls with Wood Sleeper or Concrete Slab Floors or for Crawl Space Foundations

(See Clause 9.1.)

Maximum building width (parallel to floor joists)		Lumber		Stud size, mm × mm, 3.0 m (10 ft) length					
				38 × 89		38 × 140		38 × 184	
With centre support	No centre support	Strength grouping*	Grade	Stud spacing, mm (in), oc					
				400 (16)	300 (12)	400 (16)	300 (12)	400 (16)	300 (12)
				Maximum backfill when supporting one storey above foundation, no brick veneer, mm					
7 m (23 ft)	5 m (16 ft)	Spec 1	SS	1100	1225	1800	2025	2200	2600
			No. 2	850	1075	1525	1775	1900	2175
		Spec 2	SS	800	1050	1550	1775	1925	2225
			No. 2	625	875	1350	1550	1675	1925
10 m (33 ft)	8 m (26 ft)	Spec 1	SS	900†	1200	1800	2025	2200	2600
			No. 2	625†	925	1475	1725	1850	2125
		Spec 2	SS	500‡	875	1500	1750	1900	2200
			No. 2	0	700†	1275	1500	1625	1875
				Maximum backfill when supporting two storeys above foundation, no brick veneer, mm					
7 m (23 ft)	5 m (16 ft)	Spec 1	SS	950†	1225	1800	2025	2200	2600
			No. 2	675†	950	1475	1725	1850	2150
		Spec 2	SS	575‡	900	1500	1750	1900	2200
			No. 2	250§	725	1300	1500	1625	1875
10 m (33 ft)	8 m (26 ft)	Spec 1	SS	600§	1025‡	1750	2025	2200	2600
			No. 2	0	725‡	1400	1650	1800	2100
		Spec 2	SS	0	625§	1425	1675	1850	2150
			No. 2	0	200§	1200	1450	1575	1825

(Continued)

Table 5B (Continued)

Maximum building width (parallel to floor joists)		Lumber		Stud size, mm x mm, 3.0 m (10 ft) length					
				38 x 89		38 x 140		38 x 184	
With centre support	No centre support	Strength grouping*	Grade	Stud spacing, mm (in), oc					
				400 (16)	300 (12)	400 (16)	300 (12)	400 (16)	300 (12)
				Maximum backfill when supporting one storey above foundation, with brick veneer, mm					
10 m (33 ft)	8 m (26 ft)	Spec 1	SS	na	na	1775	2025	2200	2600
			No. 2	na	na	1425	1675	1800	2100
		Spec 2	SS	na	na	1450	1700	1850	2150
			No. 2	na	na	1225	1450	1600	1850
				Maximum backfill when supporting two storeys above foundation, brick veneer on first storey, mm					
10 m (33 ft)	8 m (26 ft)	Spec 1	SS	na	na	1700	2025	2200	2600
			No. 2	na	na	1350	1625	1750	2050
		Spec 2	SS	na	na	1375	1650	1800	2125
			No. 2	na	na	1150	1400	1550	1800
				Maximum backfill when supporting two storeys above foundation, brick veneer full height, mm					
10 m (33 ft)	8 m (26 ft)	Spec 1	SS	na	na	1650	1975	2175	2575
			No. 2	na	na	1300	1575	1725	2025
		Spec 2	SS	na	na	1325†	1600	1775	2075
			No. 2	na	na	1100	1350	1500	1775

**Strength grouping for purposes of these tables is described in Table 1 and its Notes.*
†Where marked, the tabulated value shall be reduced by 100 mm for 'no centre support' floor cases.
‡Where marked, the tabulated value shall be reduced by 200 mm for 'no centre support' floor cases.
§Where marked, the entry shall read "na" for 'no centre support' floor cases.

(Continued)

Table 5B (Concluded)

Notes:

(1) *Backfill height is defined in Clause 2.*

(2) *Design assumptions of Clause 4.3 apply.*

(3) *Buildings are assumed to have masonry-veneer cladding, supported on the preserved wood foundation wall, where indicated (=) and conventional siding consisting of wood, metal, plastics, stucco or other nonmasonry cladding elsewhere.*

(4) *When masonry veneer is carried on a knee wall conforming to Clause 13.1.2, the sections of the table headed "no brick veneer" shall apply.*

(5) *When "na" is indicated, use of this Table not applicable.*

Table 6
Plywood Sheathing Requirements
(See Clauses 9.3 and 10.3.)

Plywood alignment on wall	Stud spacing, mm (in)	Permissible backfill heights, mm (ft-in)		
		Plywood thickness		
		12.5 mm	15.5 mm	18.5 mm
Face grain perpendicular to studs	300 (12)	2900 (9-6)	3500 (11-6)	3600 (11-10)
	400 (16)	2200 (7-3)	2600 (8-6)	3600 (11-10)
Face grain parallel to studs	300 (12)	2100 (6-11)	2700 (8-10)	3000 (9-10)
	400 (16)	1300 (4-3)	2000 (6-7)	2200 (7-3)

Notes:
(1) *Backfill height is defined in Clause 2.*
(2) *Design assumptions of Clause 4.3 apply.*
(3) *Plywood thicknesses shown are for unsanded sheathing grade plywood having at least four plies.*
(4) *Four-ply plywood shall be installed with face grain perpendicular to studs.*
(5) *Plywood must be manufactured of treatable species and be clearly marked to indicate it is of such a layup (see Clause 5.4).*

Table 7
Minimum Fastening Requirements
(See Clauses 4.5, 9.4 and 10.4.)

	Construction detail	Minimum length of nails, mm (in)	Minimum number or maximum spacing of fasteners
Foundation wall framing (nails)	Bottom wall plate to wood footing plate	76 (3)	600 mm (24 in) centres
	Bottom wall plate to wall stud (end nail)	76 (3)	2 each stud
	(toe nail)	63 (2½)	3 each stud
	Top wall plate to stud (end nail)		
	— 38 × 89 mm (2 × 4 in) stud	89 (3½)	2 each stud
	— 38 × 140 mm (2 × 6 in) stud	89 (3½)	3 each stud
	— 38 x 184 mm (2 × 8 in) stud	89 (3½)	4 each stud
	Plate to plate nailing for doubled top plates		
	— 38 × 89 mm (2 × 4 in) stud	76 (3)	2 each stud space
	— 38 × 140 mm (2 × 6 in) stud	76 (3)	2 each stud space
	— 38 × 184 mm (2 × 8 in) stud	76 (3)	3 each stud space
	Horizontal wall blocking to wall stud	76 (3)	2 each end of each block

(Continued)

Table 7 (Concluded)

	Construction detail	Minimum length of nails, mm (in)	Minimum number or maximum spacing of fasteners
Floor framing (nails)	End wall blocking to floor joists	76 (3)	400 mm (16 in) centres
	Full depth end wall blocking to floor joists (end nail)	76 (3)	2 each end of each block
	Suspended floors — floor joist to ledger and to top plate of interior bearing support (toe nail)	76 (3)	2 per joist
	Ledger strip to wall stud	89 (3½)	3 each stud
Floor attachment to foundation wall (nails and framing straps)	Floor joists and blocking at top of foundation wall to top wall plate (toe nail)		
	— 38 × 89 mm (2 × 4 in) wall plate	89 (3½)	2 per joist or per block
	— 38 × 140 mm (2 × 6 in) wall plate	89 (3½)	3 per joist or per block
	— 38 × 184 mm (2 × 8 in) wall plate	89 (3½)	4 per joist or per block
	In addition, framing straps are required where backfill height exceeds (a) 1500 mm (5 ft) with sleeper or slab floor; or (b) 2000 mm (6 ft-6 in) with suspended wood floor.	76 (3)	1 framing strap at every stud, with 3 nails into floor header and 3 nails into inner face of foundation wall stud
Wall sheathing and subfloor (nails or staples)	Sheathing to wall framing* and subfloor to floor joists		
	— Nails	51 (2)	150 mm (6 in) centres along edges and 300 mm (12 in) centres along intermediate supports
	— Staples	51 (2)	100 mm (4 in) centres along edges and 200 mm (8 in) centres along intermediate supports
Framing around windows (framing anchors)	In addition to normal nailing requirements, framing anchors are required where backfill height exceeds (a) 1200 mm (4 ft) with sleeper or slab floor; or (b) 2000 mm (6 ft-6 in) with suspended wood floor, at sill plate to		
	— cripple studs — jack studs	51 (2)	1 framing anchor at each point, nailed as required by manufacturer

**Table 7 applies for sheathing to wall framing nailing when backfill height is uniform. When backfill height is not uniform, per the Note to Clause 4.3, Table 8 shall apply.*

Table 8A
Perimeter Nail Spacings for Differential Backfill Heights
Backfill A = 3 m (10 ft)

(See Clauses 9.4.4 and 10.4.4)

Backfill, B m (ft)	Common nail length, mm (in)	Required nail spacing along panel edges, mm (in*) L/W					
		0.4	0.6	0.8	1.0	1.2	1.4
≤1.2 (4)	51 (2)	65	—	—	—	—	—
>1.2 (4)	51 (2)	65	50	—	—	—	—
>1.8 (6)	51 (2)	100	65	—	—	—	—
>2.1 (7)	51 (2)	100	65	50	—	—	—
>2.4 (8)	51 (2)	150	150	150	150	150	150
≤1.5 (5)	63 (2.5)	100	65	50	—	—	—
>1.5 (5)	63 (2.5)	100	65	65	—	—	—
>1.8 (6)	63 (2.5)	150	100	65	50	—	—
>2.1 (7)	63 (2.5)	150	100	65	65	50	—
>2.4 (8)	63 (2.5)	150	150	150	150	150	150
≤0.9 (3)	76 (3)	100	65	65	—	—	—
>0.9 (3)	76 (3)	150	100	65	50	—	—
>1.5 (5)	76 (3)	150	100	65	65	—	—
>1.8 (6)	76 (3)	150	100	65	65	50	—
>2.1 (7)	76 (3)	150	100	100	65	65	50
>2.4 (8)	76 (3)	150	150	150	150	150	150

**To determine the perimeter nail spacing in inches, substitute for the tabulated values as follows:*
6 in for 150 mm;
4 in for 100 mm;
2½ in for 65 mm; *and*
2 in for 50 mm.

Notes:

(1) *All panel edges are backed with* 38 mm *(2 in) or wider framing. Sheathing is installed either horizontally or vertically. Space nails at* 300 mm *(12 in) oc along intermediate framing members.*

(2) *Backfill heights and overall foundation dimensions are as defined by the figures shown in Table 8B.*

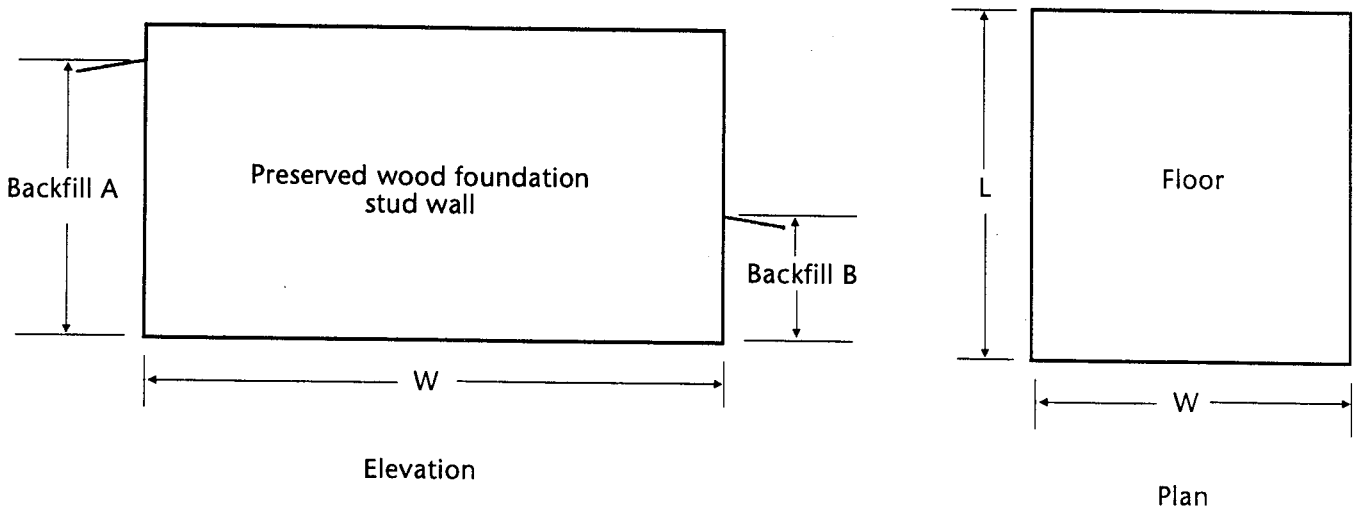


Table 8B
Perimeter Nail Spacings for Differential Backfill Heights
Backfill A = 2.4 m (8 ft)

(See Clauses 9.4.4 and 10.4.4.)

Backfill B, m (ft)	Common nail length, mm (in)	Required nail spacing along panel edges, mm (in*) L/W								
		0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0
≤0.6 (2)	51 (2)	150	100	65	50	—	—	—	—	—
>0.6 (2)	51 (2)	150	100	65	65	—	—	—	—	—
>1.2 (4)	51 (2)	150	100	65	65	50	—	—	—	—
>1.5 (5)	51 (2)	150	100	100	65	65	50	—	—	—
>1.8 (6)	51 (2)	150	150	150	150	150	150	150	150	150
≤0.6 (2)	63 (2.5)	150	150	100	65	65	65	—	—	—
>0.6 (2)	63 (2.5)	150	150	100	65	65	65	50	—	—
>1.2 (4)	63 (2.5)	150	150	100	100	65	65	65	50	—
>1.5 (5)	63 (2.5)	150	150	150	100	100	65	65	65	50
>1.8 (6)	63 (2.5)	150	150	150	150	150	150	150	150	150
≤0.6 (2)	76 (3)	150	150	100	100	65	65	65	50	—
>0.6 (2)	76 (3)	150	150	150	100	65	65	65	50	50
>1.2 (4)	76 (3)	150	150	150	100	100	65	65	65	50
>1.5 (5)	76 (3)	150	150	150	150	100	100	65	65	65
>1.8 (6)	76 (3)	150	150	150	150	150	150	150	150	150

**Refer to Notes of Table 8A.*

Table 8C
Perimeter Nail Spacings for Differential Backfill Heights
Backfill A = 2.1 m (7 ft)

(See Clauses 9.4.4 and 10.4.4.)

Backfill B, m (ft)	Common nail length, mm (in)	Required nail spacing along panel edges, mm (in*) L/W								
		1.0	1.4	1.6	1.8	2.0	2.4	2.6	2.8	3.0
≤0.6 (2)	51 (2)	65	65	50	—	—	—	—	—	—
>0.6 (2)	51 (2)	100	65	50	—	—	—	—	—	—
>1.2 (4)	51 (2)	100	65	65	65	50	—	—	—	—
>1.5 (6)	51 (2)	150	150	150	150	150	150	150	150	150
≤0.6 (2)	63 (2.5)	100	65	65	65	65	—	—	—	—
>0.6 (2)	63 (2.5)	100	100	65	65	65	50	—	—	—
>1.2 (4)	63 (2.5)	150	100	100	65	65	65	50	50	—
>1.5 (5)	63 (2.5)	150	150	150	150	150	150	150	150	150
≤0.9 (3)	76 (3)	150	100	100	65	65	65	50	50	—
>0.9 (3)	76 (3)	150	100	100	100	65	65	65	50	50
>1.2 (4)	76 (3)	150	150	100	100	100	65	65	65	65
>1.5 (5)	76 (3)	150	150	150	150	150	150	150	150	150

**Refer to notes of Table 8A.*

Table 8D
Perimeter Nail Spacings for Differential Backfill Heights
Backfill A = 1.8 m (6 ft)

(See Clauses 9.4.4 and 10.4.4.)

Backfill B, m (ft)	Common nail length, mm (in)	Required nail spacing along panel edges, mm (in*) L/W								
		1.0	1.4	1.6	1.8	2.0	2.5	3.0	3.5	4.0
≤0.9 (3)	51 (2)	150	100	65	65	65	50	—	—	—
>0.9 (3)	51 (2)	150	100	100	100	65	65	50	—	—
>1.2 (4)	51 (2)	150	150	150	150	150	150	150	150	150
≤0.9 (3)	63 (2.5)	150	150	100	100	100	65	65	50	—
>0.9 (3)	63 (2.5)	150	150	150	100	100	100	65	65	50
>1.2 (4)	63 (2.5)	150	150	150	150	150	150	150	150	150
≤0.9 (3)	76 (3)	150	150	150	150	100	100	65	65	65
>0.9 (3)	76 (3)	150	150	150	150	150	100	100	65	65
>1.2 (4)	76 (3)	150	150	150	150	150	150	150	150	150

Refer to Notes of Table 8A.

Table 8E
Perimeter Nail Spacing for Differential Backfill Heights
Backfill A = 1.5 m (5 ft)

(See Clauses 9.4.4 and 10.4.4.)

Backfill B, m (ft)	Common nail length, mm (in)	Required nail spacing along panel edges, mm (in*) L/W								
		1.0	1.2	1.4	1.6	2.0	2.5	3.0	3.5	4.0
≤0.9 (3)	51 (2)	150	150	150	150	100	100	65	65	65
>0.9 (3)	51 (2)	150	150	150	150	150	150	150	150	150
≤0.9 (3)	63 (2.5)	150	150	150	150	150	150	100	100	65
>0.9 (3)	63 (2.5)	150	150	150	150	150	150	100	100	100
≤0.9 (3)	76 (3)	150	150	150	150	150	150	150	100	100
>0.9 (3)	76 (3)	150	150	150	150	150	150	150	150	150

Refer to notes of Table 8A.

Table 9
Support for End Wall at Wood Sleeper or Suspended Floor Edges

(See Figures A14, A17, and A18 and Clause 9.7.)

Framing member and location	Backfill height, with wood sleeper floor			
	Less than 1500 mm (5 ft)		1500 mm (5 ft) or greater	
	Framing members	Nailing for subflooring	Framing members	Nailing for subflooring
Joist at end wall	1, 38 × 89 mm or larger	per code	2, 38 × 89 mm or larger	51 mm (2 in) nails, 76 mm (3 in) oc, 2 rows
First joist away from end wall	1, sized per code	per code	1, sized per code	per code
Blocking in first joist space (adjacent to end wall)	Blocking not required	per code	38 × 89 mm or larger to line up with wall studs	per code
	Backfill height, with suspended wood floor			
	Less than 2000 mm (6 ft-6 in)		2000 mm (6 ft-6 in) or greater	
	Framing members	Nailing for subflooring	Framing members	Nailing for subflooring
Joists at end wall	2, 38 × 89 mm or larger	51 mm (2 in) nails, 76 mm (3 in) oc, 2 rows	2, 38 × 89 mm or larger	51 mm (2 in) nails, 76 mm (3 in) oc, 2 rows
First joist away from end wall	1, sized per code	per code	1, sized per code, plus 1, 38 × 89 mm or larger	51 mm (2 in) nails, 76 mm (3 in) oc, 2 rows
Blocking in first joist space (adjacent to end wall)	Blocking not required	per code	38 × 89 mm or larger to line up with wall studs	per code

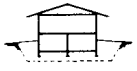
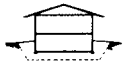
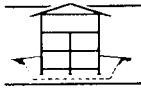
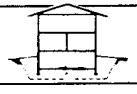
Notes:

(1) *Backfill height is defined in Clause 2.*

(2) *Design assumptions of Clause 4.3 apply.*

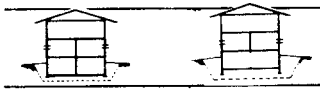
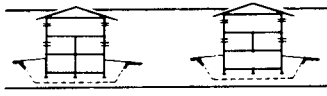
Table 10A
Maximum Backfill Heights for Various Sizes of Wood Foundation Studs for Exterior Walls with Suspended Wood Floor

(See Clause 10.1.)

Maximum building width (parallel to floor joists)		Lumber		Stud size, mm × mm, 3.0 m (10 ft) length					
				38 × 89		38 × 140		38 × 184	
				Stud spacing, mm (in), oc					
With centre support	No centre support	Strength grouping*	Grade	400 (16)	300 (12)	400 (16)	300 (12)	400 (16)	300 (12)
				Maximum backfill when supporting one storey above foundation, no brick veneer, mm					
7 m (23 ft)	5 m (16 ft)	Spec 1	SS	1900	2000	2500	2700	2775	3150
			No. 2	1300	1950	2275	2500	2600	2875
		Spec 2	SS	1300	1875	2300	2475	2650	2925
			No. 2	875	1375	2125	2300	2400	2625
10 m (33 ft)	8 m (26 ft)	Spec 1	SS	1825†	2000	2500	2700	2775	3150
			No. 2	1025†	1675†	2250	2450	2550	2825
		Spec 2	SS	1000†	1700†	2275	2475	2600	2875
			No. 2	625	1125†	2075	2275	2350	2600
				Maximum backfill when supporting two storeys above foundation, no brick veneer, mm					
7 m (23 ft)	5 m (16 ft)	Spec 1	SS	1900†	2000	2500	2700	2775	3150
			No. 2	1075†	1725†	2250	2475	2575	2825
		Spec 2	SS	1050†	1750†	2275	2475	2600	2900
			No. 2	675†	1175†	2075	2275	2375	2600
10 m (33 ft)	8 m (26 ft)	Spec 1	SS	1400§	2000	2500	2700	2775	3150
			No. 2	700†	1350‡	2200	2400	2525	2800
		Spec 2	SS	625	1325‡	2200	2425	2550	2850
			No. 2	600	825‡	2050	2225	2325	2550

(Continued)

Table 10A (Continued)

Maximum building width (parallel to floor joists)		Lumber		Stud size, mm × mm, 3.0 m (10 ft) length					
				38 × 89		38 × 140		38 × 184	
With centre support	No centre support	Strength grouping*	Grade	Stud spacing, mm (in), oc					
				400 (16)	300 (12)	400 (16)	300 (12)	400 (16)	300 (12)
				**Maximum backfill when supporting one storey above foundation, with brick veneer, mm**					
10 m (33 ft)	8 m (26 ft)	Spec 1	SS	na	na	2500	2700	2775	3150
			No. 2	na	na	2200	2425	2525	2800
		Spec 2	SS	na	na	2225	2450	2575	2850
			No. 2	na	na	2050	2225	2325	2550
				**Maximum backfill when supporting two storeys above foundation, brick veneer on first storey, mm**					
10 m (33 ft)	8 m (26 ft)	Spec 1	SS	na	na	2450	2700	2775	3150
			No. 2	na	na	2150	2375	2500	2775
		Spec 2	SS	na	na	2175	2400	2525	2825
			No. 2	na	na	2050†	2175	2300	2525
				**Maximum backfill when supporting two storeys above foundation, brick veneer full height, mm**					
10 m (33 ft)	8 m (26 ft)	Spec 1	SS	na	na	2425	2700	2775	3150
			No. 2	na	na	2125	2350	2450	2725
		Spec 2	SS	na	na	2125	2375	2500	2800
			No. 2	na	na	1950‡	2150	2250	2500

**Strength grouping for purposes of these tables is described in Table 1 and its Notes.*
†Where marked, the tabulated value shall be reduced by 100 mm for 'no centre support' floor cases.
‡Where marked, the tabulated value shall be reduced by 200 mm for 'no centre support' floor cases.
§Where marked, the entry shall read "na" for 'no centre support' floor cases.

(continued)

Table 10A (Concluded)

Notes:

(1) *Backfill height is defined in Clause 2.*

(2) *Design assumptions of Clause 4.3 apply.*

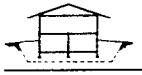
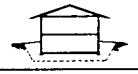
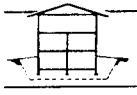
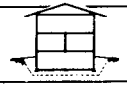
(3) *Buildings are assumed to have masonry-veneer cladding, supported on the preserved wood foundation wall, where indicated (=) and conventional siding consisting of wood, metal, plastics, stucco or other nonmasonry cladding elsewhere.*

(4) *When masonry veneer is carried on a knee wall conforming to Clause 13.1.2, the sections of the table headed "no brick veneer" shall apply.*

(5) *When "na" is indicated, use of this Table not applicable.*

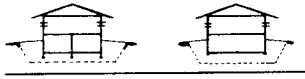
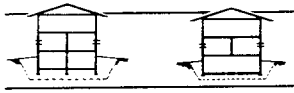
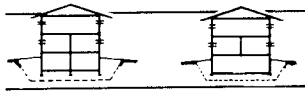
Table 10B
Maximum Backfill Heights for Various Sizes of Wood Foundation Studs for Exterior Walls with Suspended Wood Floor

(See Clause 10.1.)

Maximum building width (parallel to floor joists)		Lumber		Stud size, mm x mm, 3.6 m (12 ft) length					
				38 x 89		38 x 140		38 x 184	
With centre support	No centre support	Strength grouping*	Grade	Stud spacing, mm (in), oc					
				400 (16)	300 (12)	400 (16)	300 (12)	400 (16)	300 (12)
				Maximum backfill when supporting one storey above foundation, no brick veneer, mm					
7 m (23 ft)	5 m (16 ft)	Spec 1	SS	1700	1925	2350	2525	2700	3050
			No. 2	950	1600	2200	2400	2500	2725
		Spec 2	SS	875	1575	2175	2325	2525	2775
			No. 2	600	1025	2050	2225	2325	2525
10 m (33 ft)	8 m (26 ft)	Spec 1	SS	1175‡	1925	2350	2525	2700	3050
			No. 2	600	1200†	2150	2350	2475	2700
		Spec 2	SS	600	1100‡	2175	2325	2500	2750
			No. 2	600	650	2000	2175	2275	2500
				Maximum backfill when supporting two storeys above foundation, no brick veneer, mm					
7 m (23 ft)	5 m (16 ft)	Spec 1	SS	1250‡	1925	2350	2525	2700	3050
			No. 2	600	1275‡	2175	2375	2475	2700
		Spec 2	SS	600	1175‡	2175	2325	2500	2750
			No. 2	600	725†	2000	2175	2275	2500
10 m (33 ft)	8 m (26 ft)	Spec 1	SS	600	1600§	2350	2525	2700	3050
			No. 2	600	725†	2100	2300	2425	2675
		Spec 2	SS	600	600	2100	2325	2450	2700
			No.2	600	600	2000†	2125	2225	2450

(Continued)

Table 10B (Concluded)

Maximum building width (parallel to floor joists)		Lumber		Stud size, mm x mm, 3.6 m (12 ft) length					
				38 x 89		38 x 140		38 x 184	
With centre support	No centre support	Strength grouping*	Grade	Stud spacing, mm (in), oc					
				400 (16)	300 (12)	400 (16)	300 (12)	400 (16)	300 (12)
				**Maximum backfill when supporting one storey above foundation, with brick veneer, mm**					
10 m (33 ft)	8 m (26 ft)	Spec 1	SS	na	na	2350	2525	2700	3050
			No. 2	na	na	2125	2325	2425	2675
		Spec 2	SS	na	na	2125	2325	2475	2725
			No. 2	na	na	2000	2150	2250	2450
				**Maximum backfill when supporting two storeys above foundation, brick veneer on first storey, mm**					
10 m (33 ft)	8 m (26 ft)	Spec 1	SS	na	na	2325	2525	2700	3050
			No. 2	na	na	2050	2275	2400	2625
		Spec 2	SS	na	na	2075	2275	2425	2675
			No. 2	na	na	1875‡	2075	2200	2425
				**Maximum backfill when supporting two storeys above foundation, brick veneer full height, mm**					
10 m (33 ft)	8 m (26 ft)	Spec 1	SS	na	na	2275	2525	2700	3050
			No. 2	na	na	2025	2225	2350	2600
		Spec 2	SS	na	na	2025	2250	2400	2650
			No. 2	na	na	1675‡	2050	2175	2400

**Strength grouping for purposes of these tables is described in Table 1 and its Notes.*

†Where marked, the tabulated value shall be reduced by 100 mm for 'no centre support' floor cases.

‡Where marked, the tabulated value shall be reduced by 200 mm for 'no centre support' floor cases.

§Where marked, the entry shall read "na" for 'no centre support' floor cases.

Notes:

(1) *Backfill height is defined in Clause 2.*

(2) *Design assumptions of Clause 4.3 apply.*

(3) *Buildings are assumed to have masonry-veneer cladding, supported on the preserved wood foundation wall, where indicated (=) and conventional siding consisting of wood, metal, plastics, stucco or other nonmasonry cladding elsewhere.*

(4) *When masonry veneer is carried on a knee wall conforming to Clause 13.1.2, the sections of the table headed "no brick veneer" shall apply.*

(5) *When "na" is indicated, use of this Table not applicable.*

Table 11
Framing for Floor Openings* Greater than 1200 mm (4 ft) in Opening Width†
(See Clause 12.4.)

Stairwell opening width†, mm (ft-in)	Backfill height, H, mm (ft-in)	Number of stairwell beam laminations of size			Minimum number of joist headers‡	Maximum spacing for subfloor to joist header and trimmer joist nailing, 76 mm (3 in) nails
		38 × 140 (2 × 6)	38 × 184 (2 × 8)	38 × 235 (2 × 10)		
Wood sleeper or concrete slab floor types						
≤ 3200 (10-6)	≤ 1500 (6-0)	3	2	—	2	2 rows, 150 mm (6 in) centres
	≯ 2300 (7-6)	9	6	4	3	2 rows, 50 mm (2 in) centres
	≯ 2900 (9-6)	—	10	7	3	2 rows, 50 mm (2 in) centres
≯ 3600 (12-0)	≤ 1500 (6-0)	3	3	2	2	2 rows, 150 mm (6 in) centres
	≯ 2300 (7-6)	11	8	5	3	2 rows, 50 mm (2 in) centres
	≯ 2900 (9-6)	—	12	8	3	2 rows, 50 mm (2 in) centres
≯ 4300 (14-0)	≤ 1500 (6-0)	5	3	2	2	2 rows, 150 mm (6 in) centres
	≯ 2300 (7-6)	—	11	8	3	2 rows, 50 mm (2 in) centres
	≯ 2900 (9-6)	—	—	12	3	2 rows, 50 mm (2 in) centres
Suspended wood floor type						
≤ 3200 (10-6)	≤ 2000 (6-6)	2	—	—	2	2 rows, 150 mm (6 in) centres
	≯ 2300 (7-6)	4	3	—	2	2 rows, 50 mm (2 in) centres
	≯ 2900 (9-6)	7	5	4	3	2 rows, 50 mm (2 in) centres
	≯ 3500 (11-6)	12	8	6	3	2 rows, 50 mm (2 in) centres
≯ 3600 (12-0)	≤ 2000 (6-6)	2	—	—	3	2 rows, 150 mm (6 in) centres
	≯ 2300 (7-6)	4	3	—	3	2 rows, 50 mm (2 in) centres
	≯ 2900 (9-6)	9	6	4	3	2 rows, 50 mm (2 in) centres
	≯ 3500 (11-6)	—	10	7	3	2 rows, 50 mm (2 in) centres
≯ 4300 (14-0)	≤ 2000 (6-6)	3	2	—	2	2 rows, 150 mm (6 in) centres
	≯ 2300 (7-6)	6	4	3	2	2 rows, 50 mm (2 in) centres
	≯ 2900 (9-6)	—	9	6	3	2 rows, 50 mm (2 in) centres
	≯ 3500 (11-6)	—	—	10	3	2 rows, 50 mm (2 in) centres

This Table shall be applied when the closest edge of a floor opening is within 1200 mm of a side wall or 1800 mm of an end wall. When the distance from the foundation wall to the opening exceeds these limits, normal building code requirements shall apply.

†The width is measured parallel to the foundation wall. The requirements of this Table shall apply as appropriate to a stairwell beam lying in the direction of measurement. In the case of a stairwell opening located at the corner of a foundation, the tabulated width and framing requirements shall be applied separately and independently in both major directions.

‡Joist headers which exceed 3200 mm (10 ft-6 in) in unsupported length shall also be sized by calculation or may be determined from Tables for builtup floor beams.

Appendix A
Figures

Note: *This Appendix is not a mandatory part of this Standard.*

A1. Preservative Treatment Code

A1.1

To assist in identifying where untreated materials may be used in preserved wood foundations, all wood in the figures of this Appendix is assumed to be treated if shaded. Wood used in preserved wood foundations may be untreated only if certain conditions are met, in compliance with the *National Building Code of Canada*, as follows:

(a) At the top of the foundation wall, headers, plywood sheathing, lintels, and top plates must be more than 200 mm above grade.

(b) In suspended floors and crawl spaces, subflooring and floor joists must be more than 300 mm above the granular drainage layer or soil, and the underfloor space must be ventilated.

(c) In interior partitions, the bottom wall plate in contact with the studs must be separated from a concrete slab floor or gravel by a dampproofing material.

Note: *We wish to thank the Canadian Wood Council for the preparation of these figures and permission to reproduce them.*

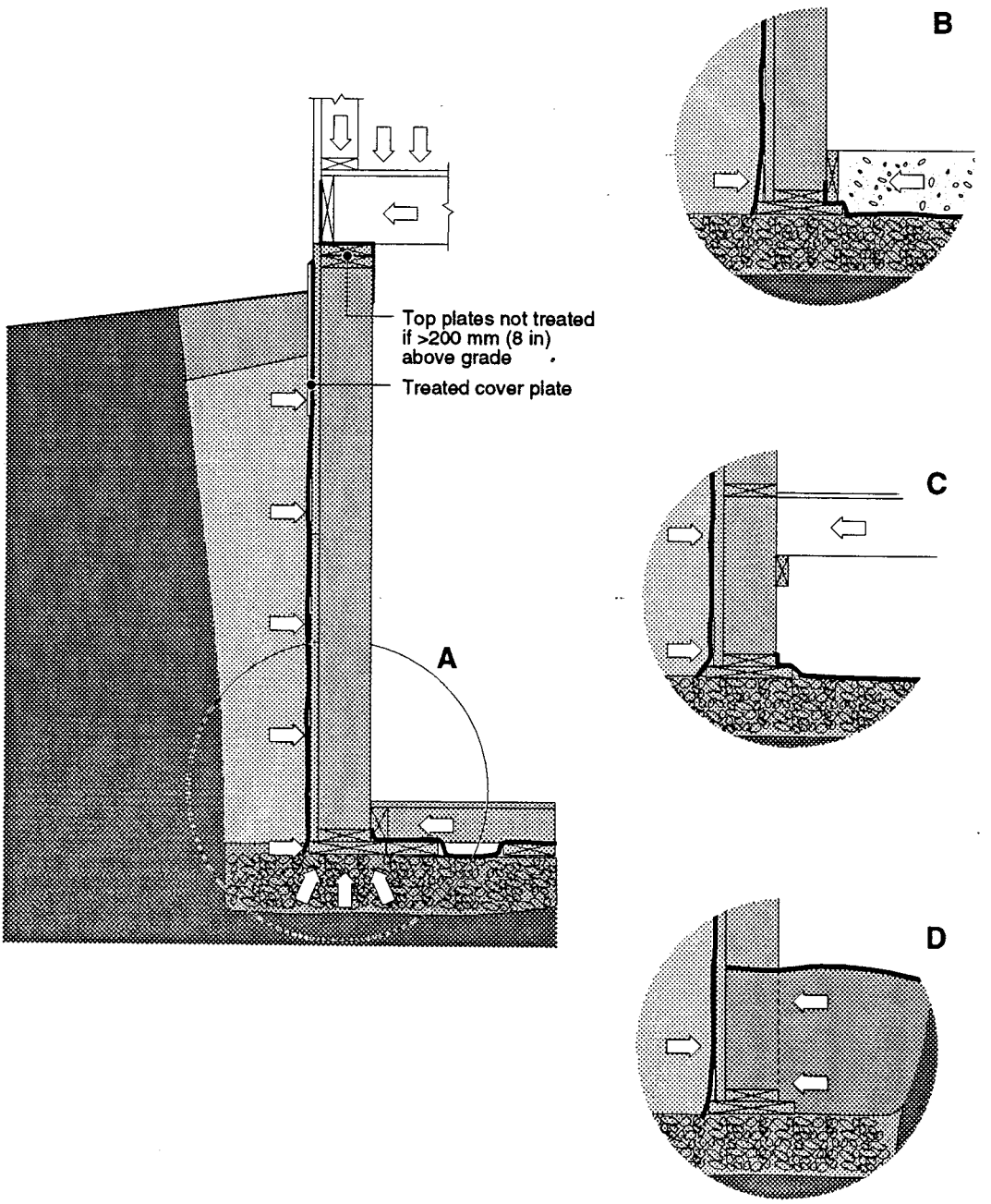


Figure A1
Preserved Wood Foundation Wall with Wood Sleeper, Concrete Slab, and Suspended Wood Basement Floor Systems, and Crawl Space Type without a Floor

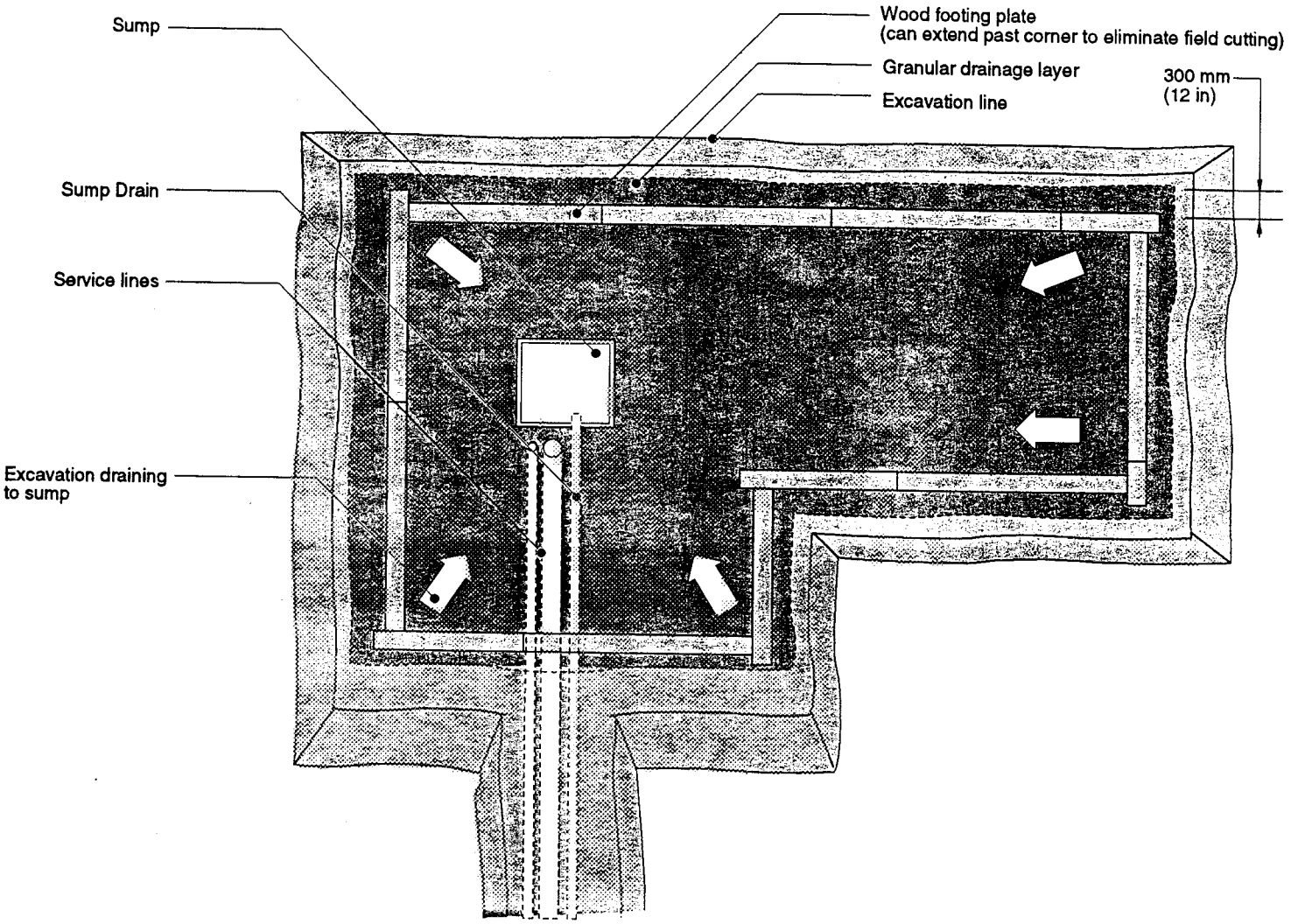


Figure A2
Excavation Plan Showing Continuous Wood Footing Plate and Drainage and Service Lines Layout

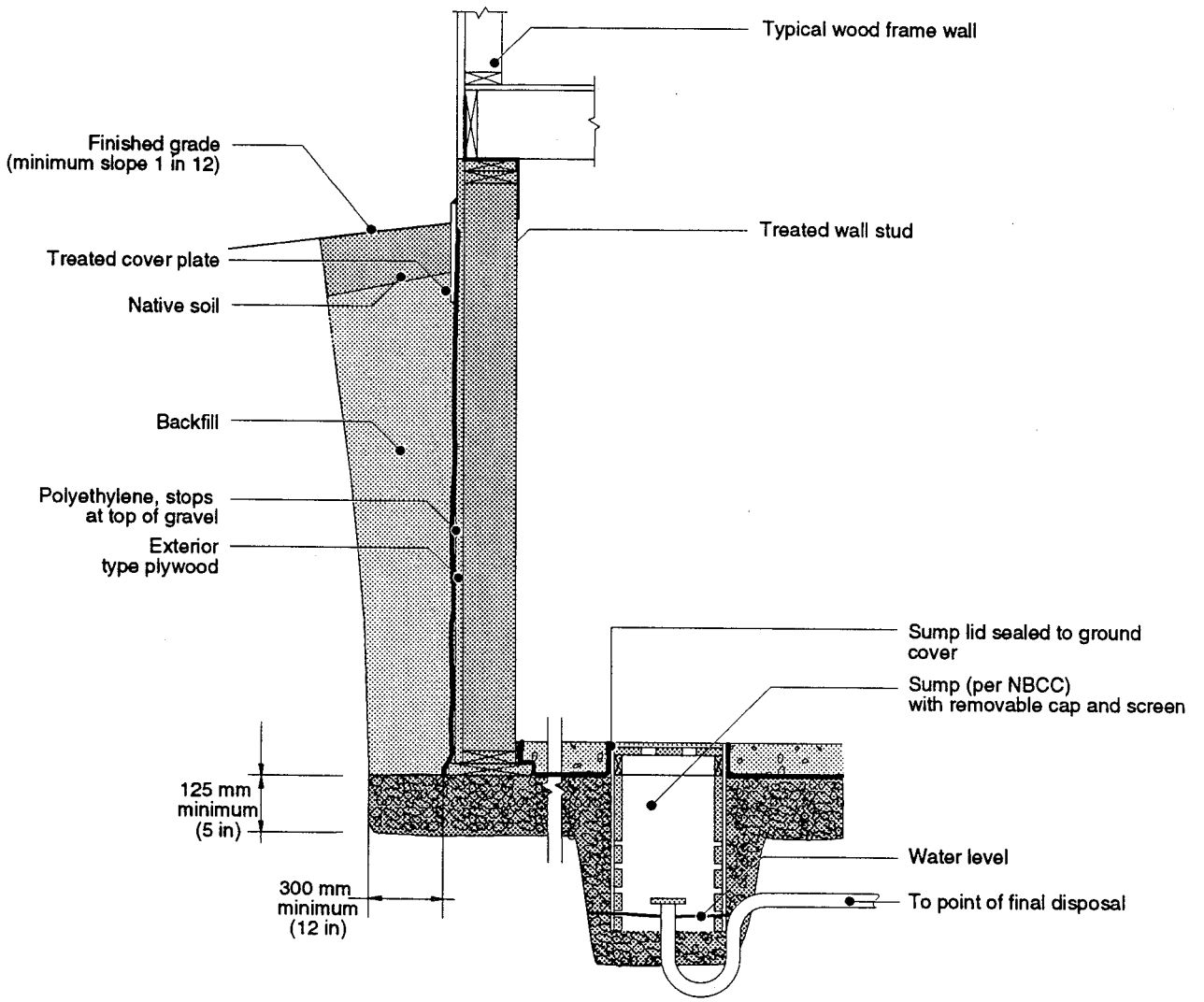


Figure A3
Granular Drainage to Sump Pit

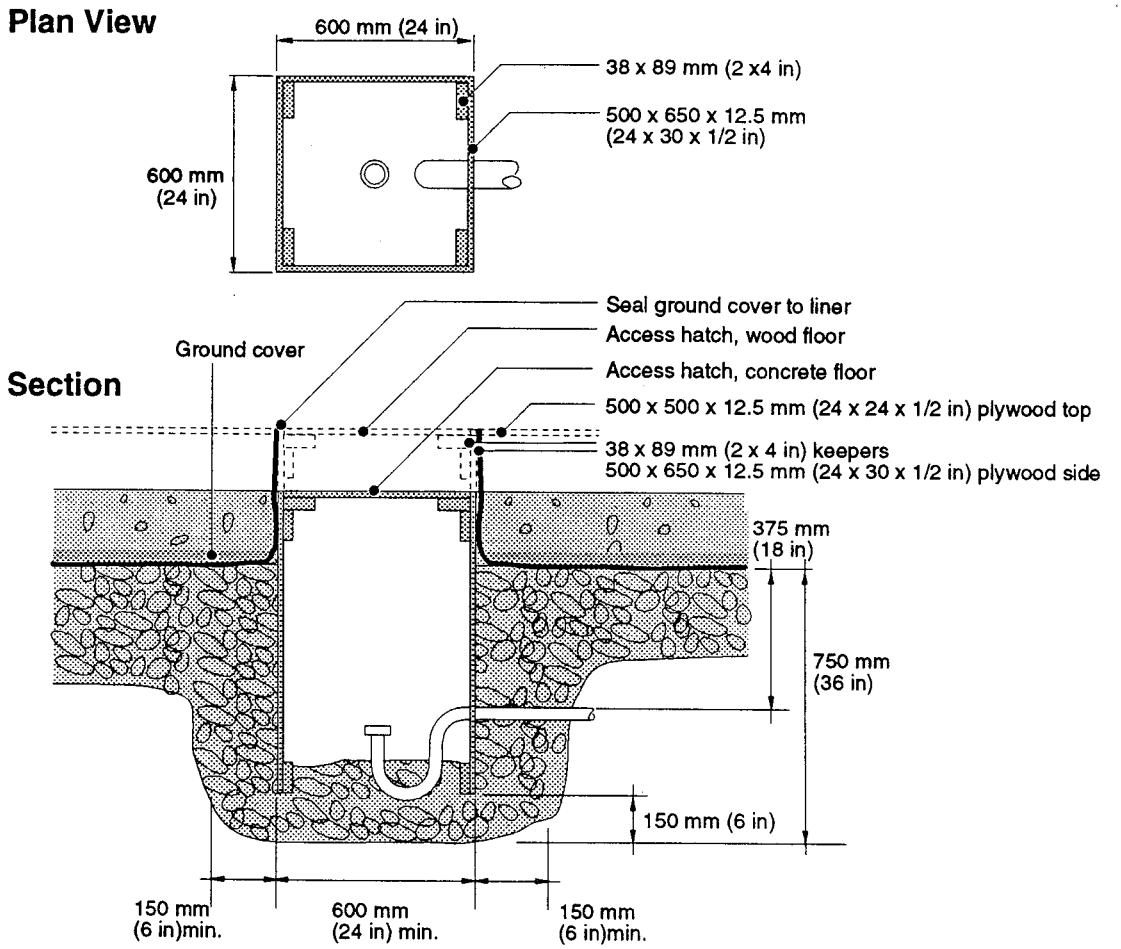


Figure A4
Sump Pit and Liner of Treated Wood

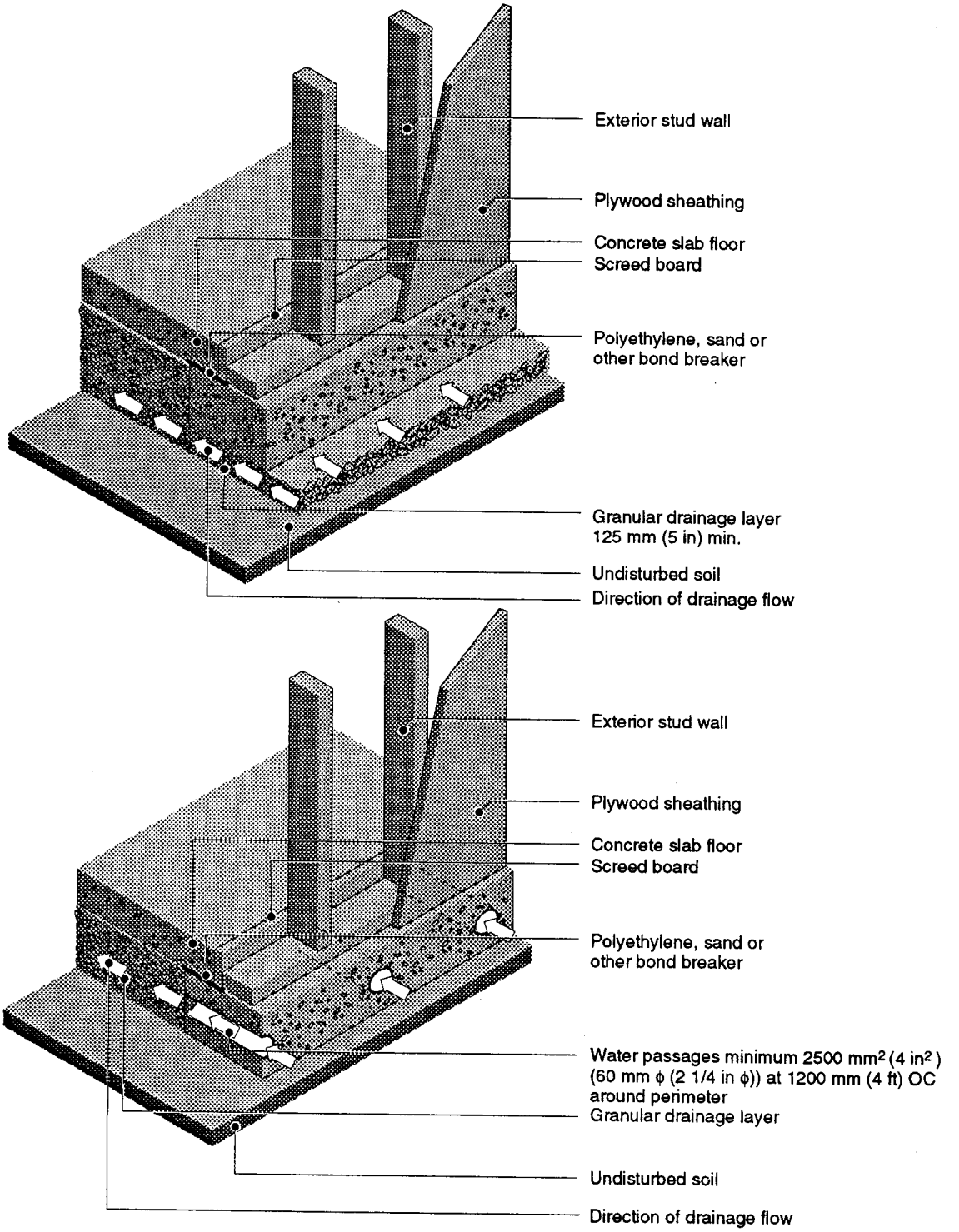
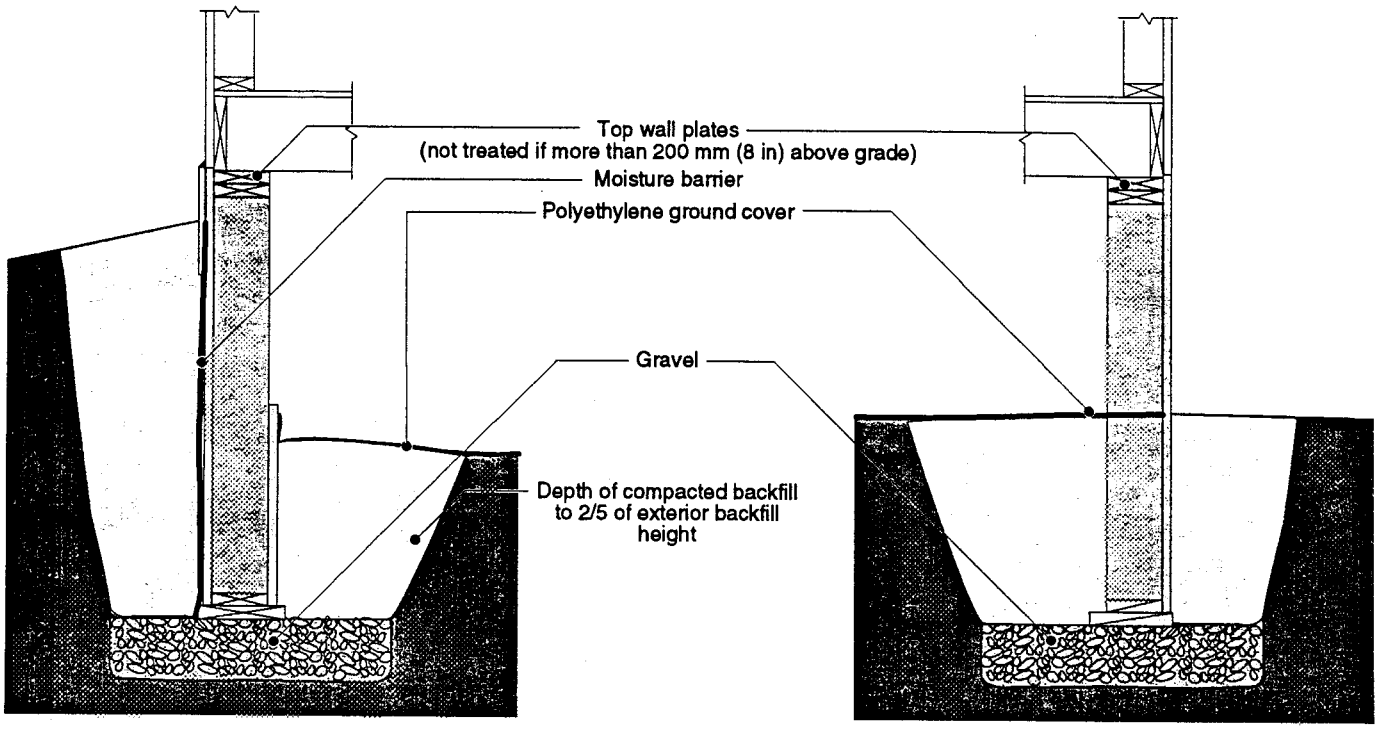


Figure A5
Granular Drainage with Concrete Footings



Partially Excavated Crawl Space

Unexcavated Crawl Space with Trenched Footing

Notes:
(1) *Polyethylene moisture barriers shall not extend under exterior footing plate or between the granular drainage layer and the backfill at the exterior wall.*
(2) *Restraint at base of wall is provided by unexcavated soil inside; load transfer is through compacted soil backfill inside wall footing.*

Figure A6
Walls for Crawl Space Foundations

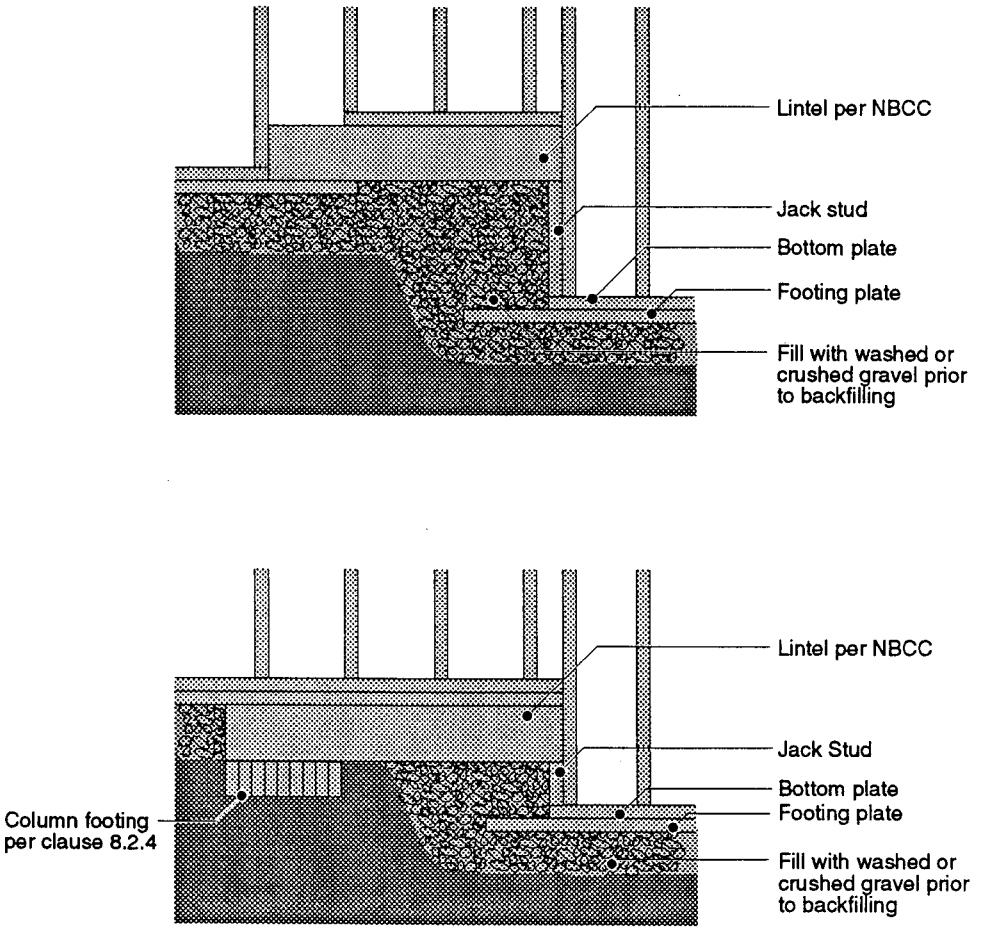
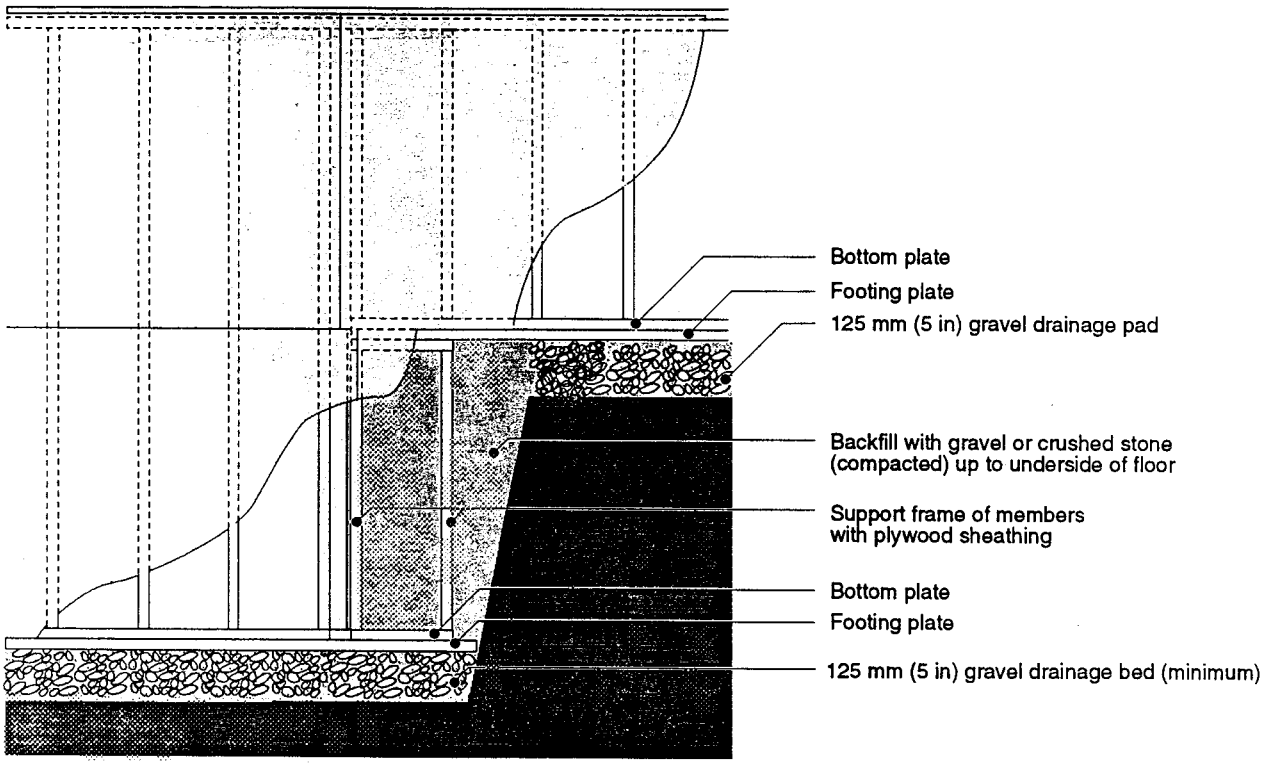


Figure A7
Stepped Footings with Load-Transferring Lintel



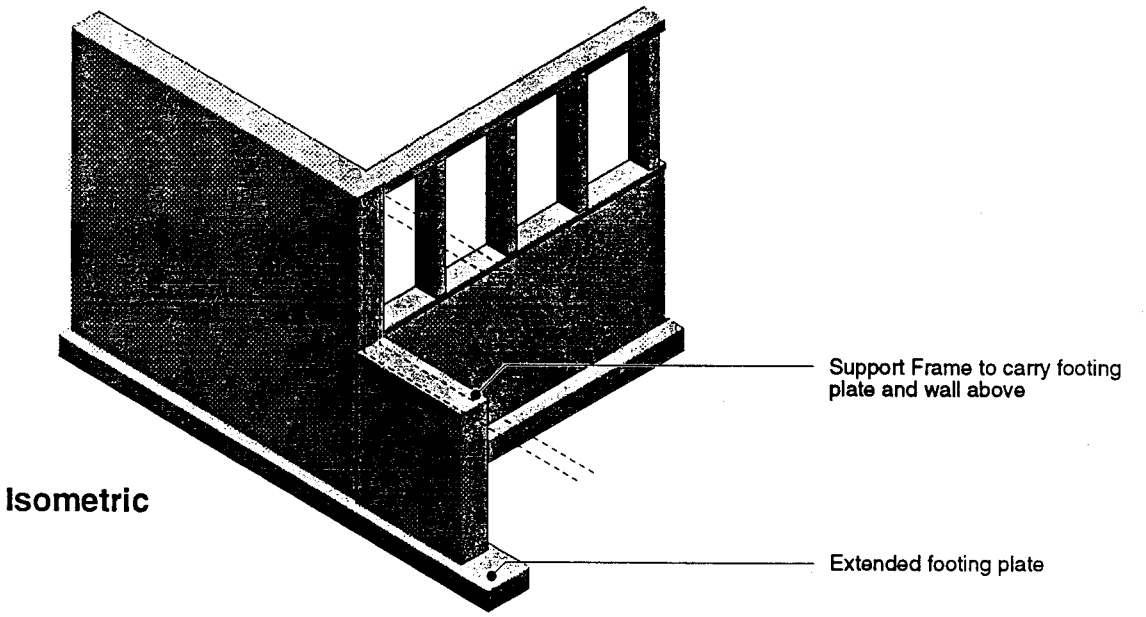
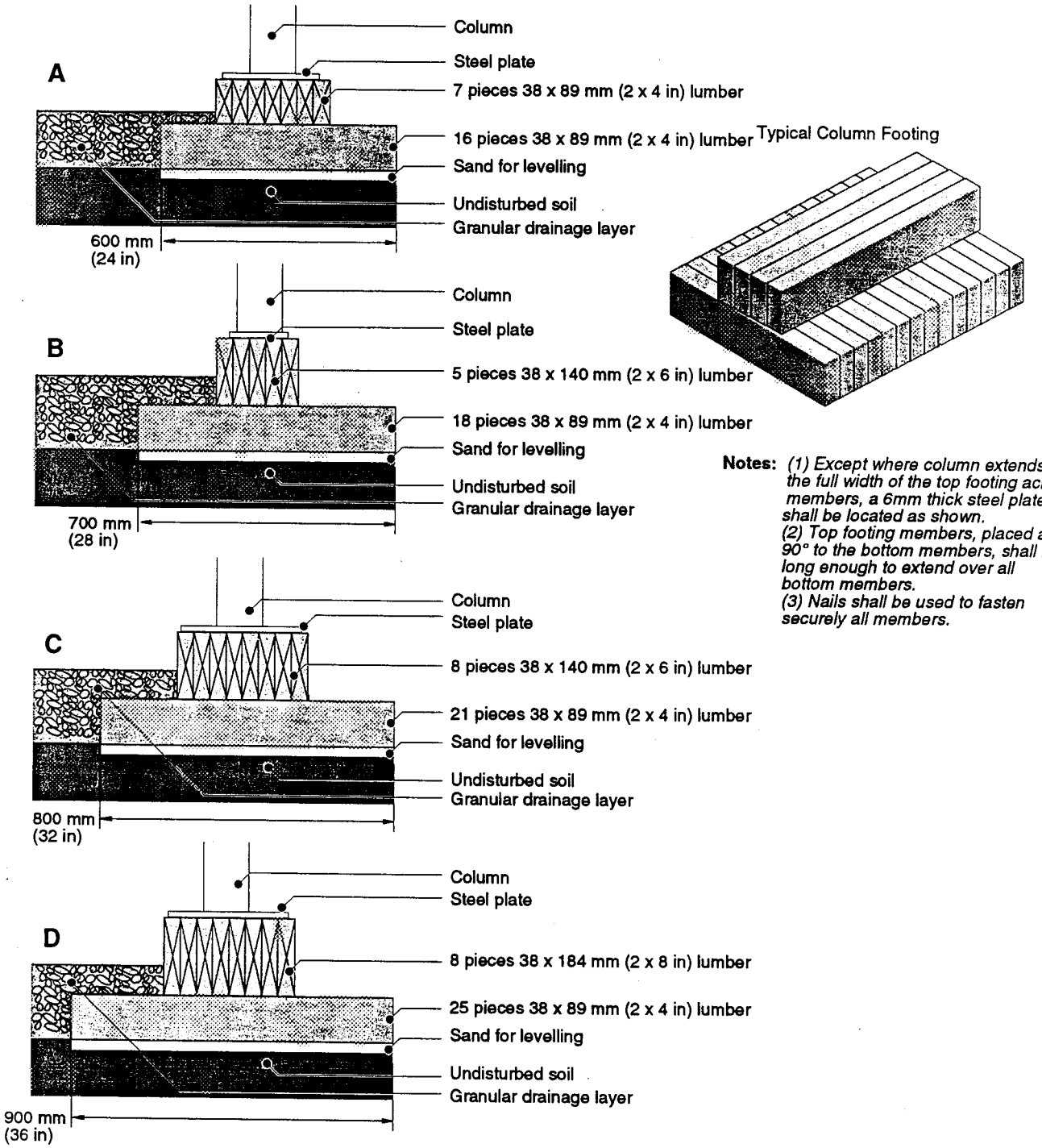
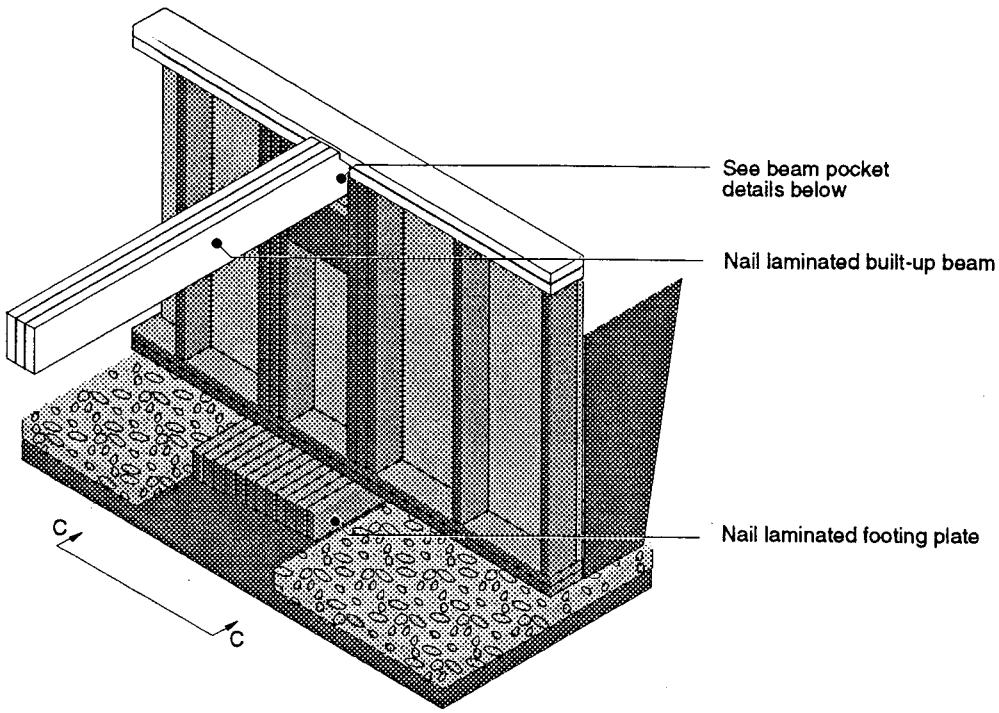


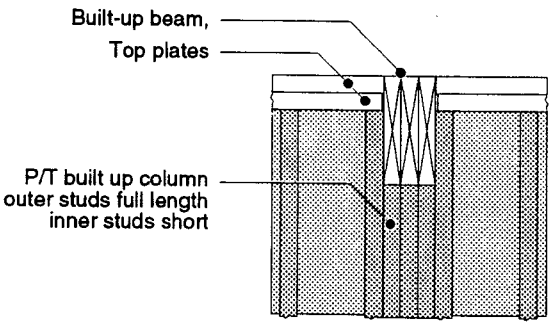
Figure A8
Stepped Footing with Extended Support Wall



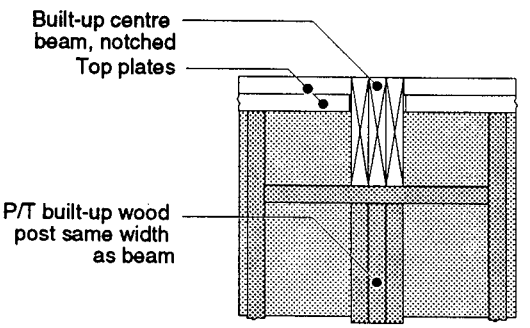
Notes: *(1) Except where column extends the full width of the top footing across members, a 6mm thick steel plate shall be located as shown.*
(2) Top footing members, placed at 90° to the bottom members, shall be long enough to extend over all bottom members.
(3) Nails shall be used to fasten securely all members.

Figure A9
Typical Wood Column Footings

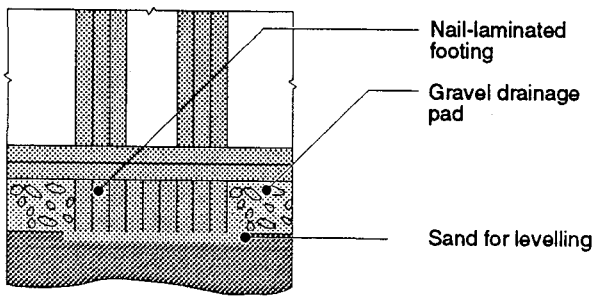




Beam Support : Alternative 1

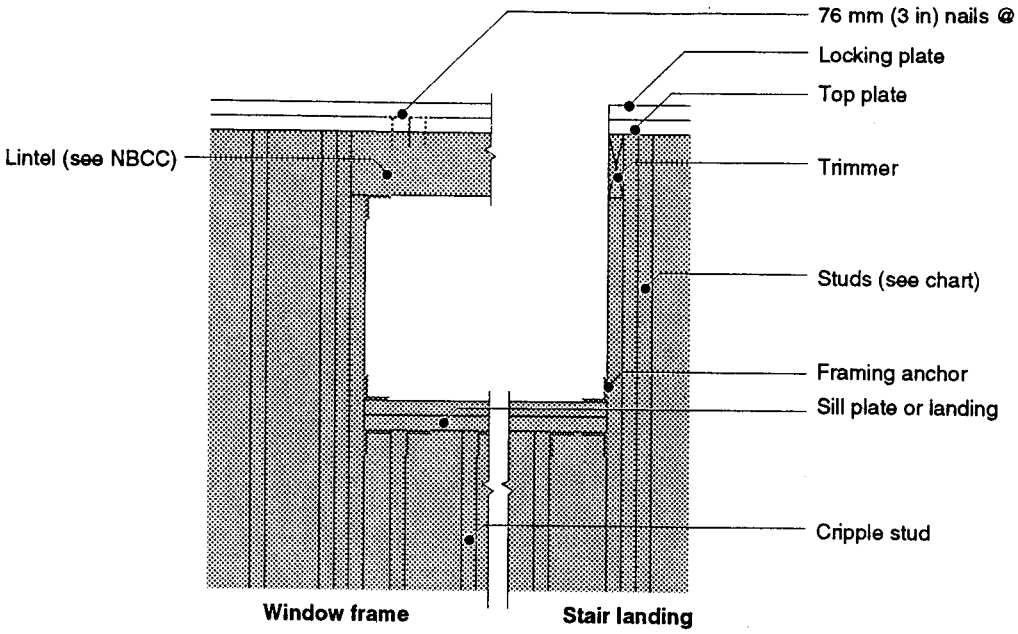


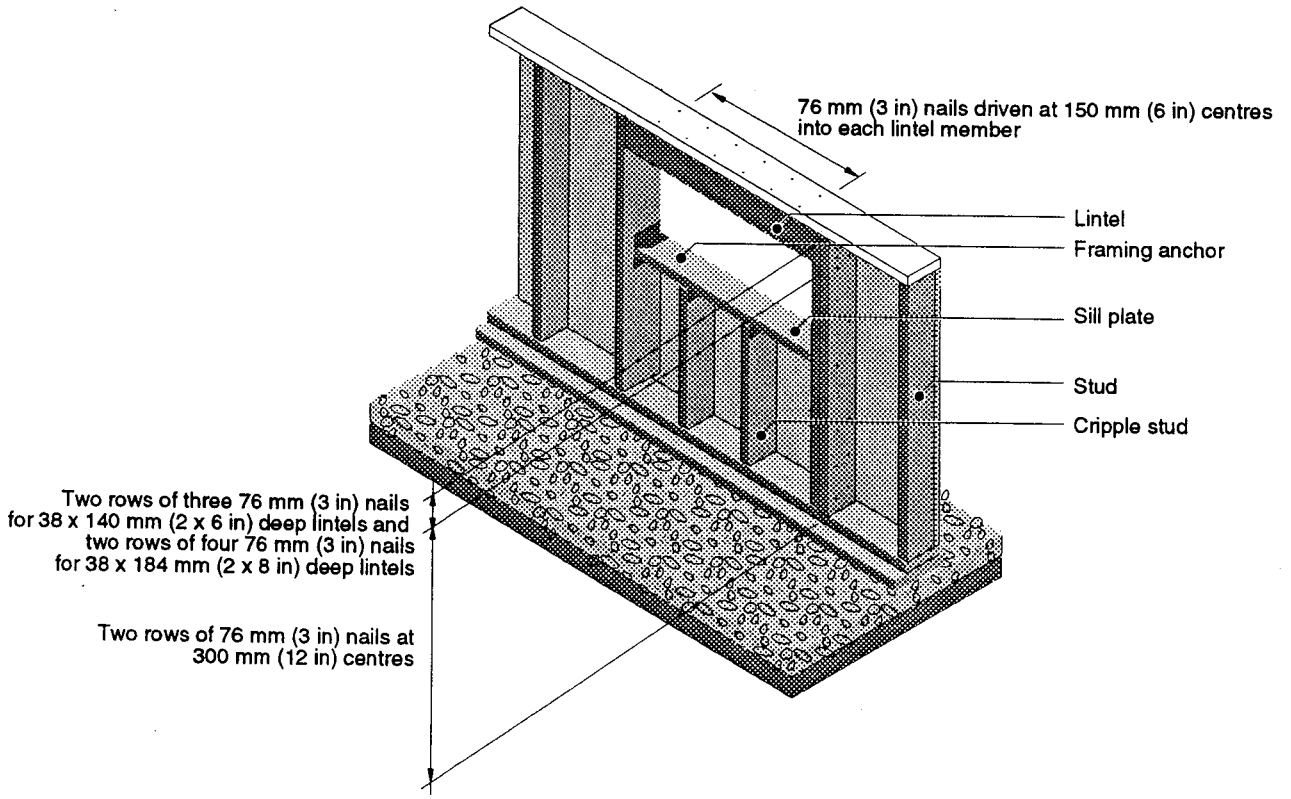
Beam Support : Alternative 2



Detail CC Footing

Figure A10
Beam and Column Support at End Wall





Width of opening	No. of studs each side*	No. of sill plates* for 2.4 m studs	for longer studs
≤ 1200 mm (48 in)	2	1-38 x 140 mm (2 x 6 in)	2-38 x 140 mm (2 x 6 in)
≤ 1800 mm (72 in)	3	2-38 x 140 mm (2 x 6 in)	3-38 x 140 mm (2 x 8 in)
≤ 2100 mm (84 in)	3	3-38 x 140 mm (2 x 6 in)	
		2-38 x 184 mm (2 x 8 in)	3-38 x 184 mm (2 x 8 in)
≤ 2400 mm (96 in)	4	4-38 x 140 mm (2 x 6 in)	
		3-38 x 184 mm (2 x 8 in)	4-38 x 184 mm (2 x 8 in)

* Where backfill height is less than 1200 mm (48 in), the requirements of the local building code apply

Figure A11
Foundation Wall Panel Openings

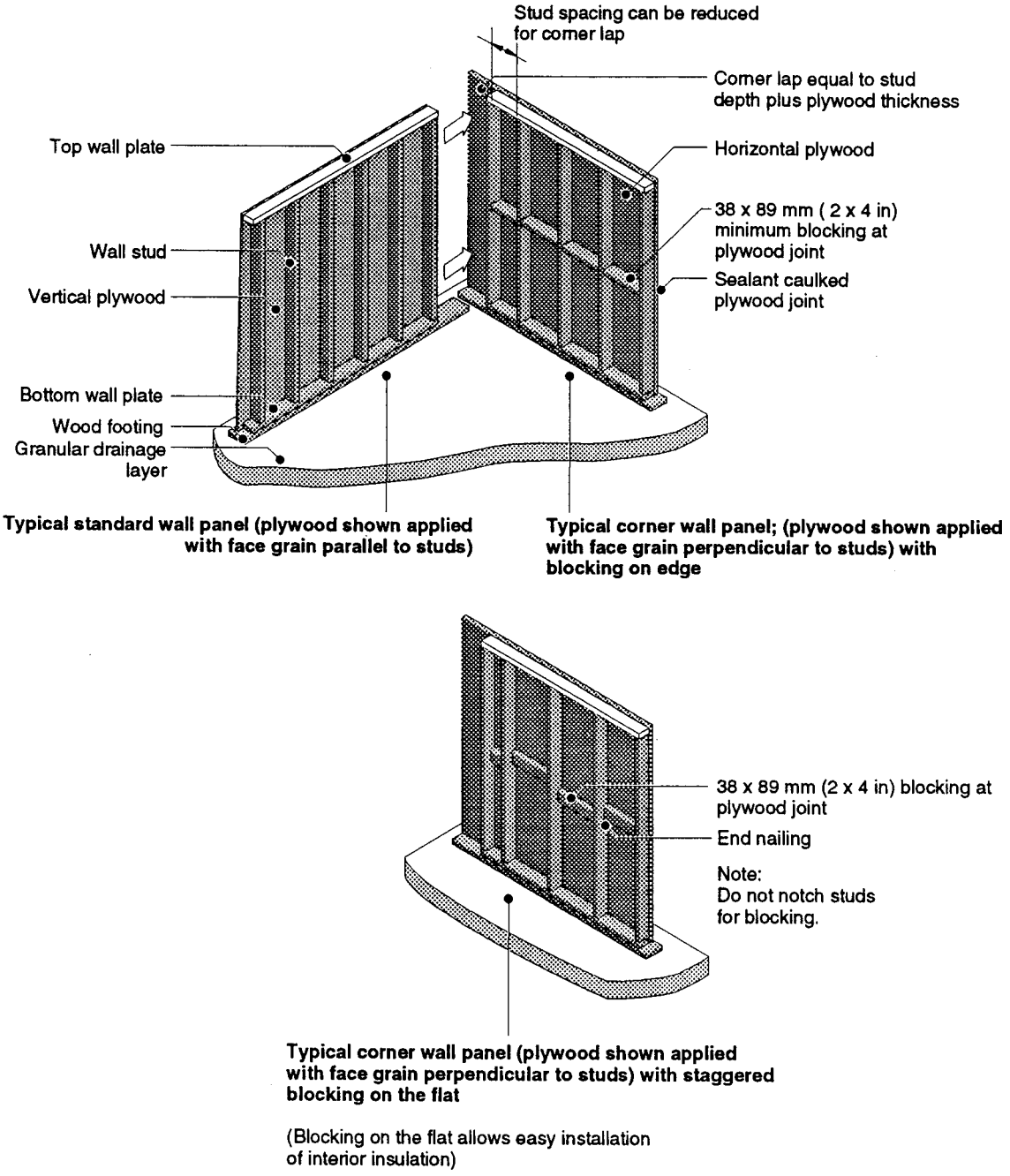


Figure A12
Application of Foundation Wall Sheathing

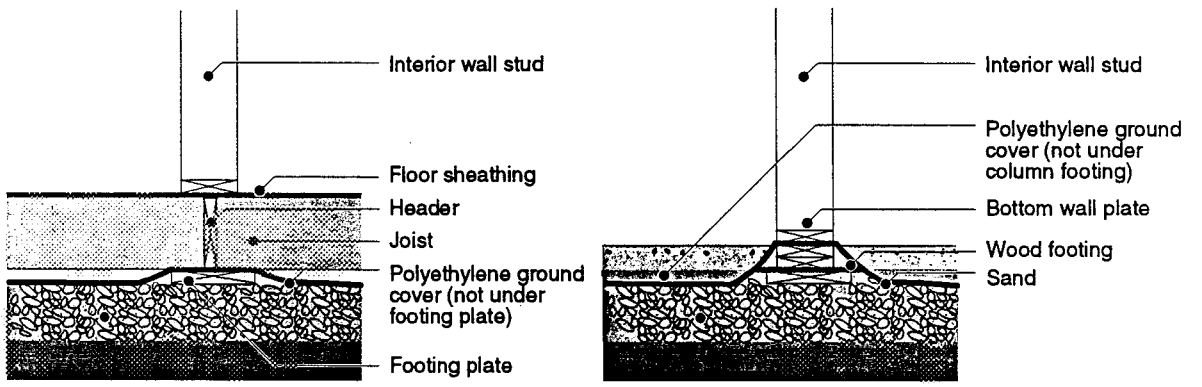
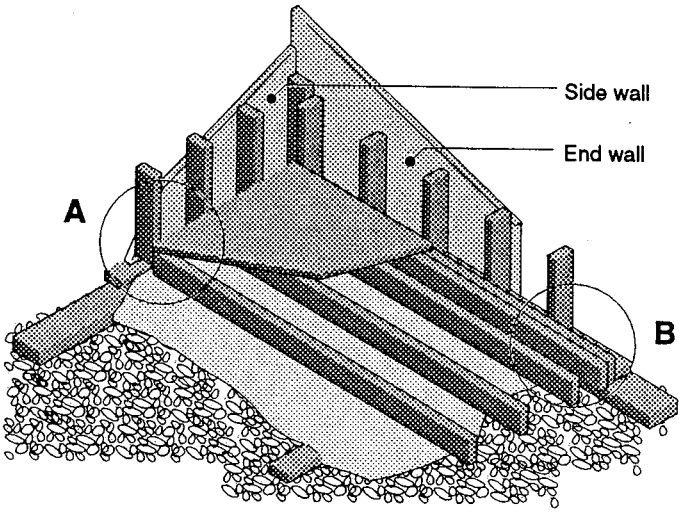
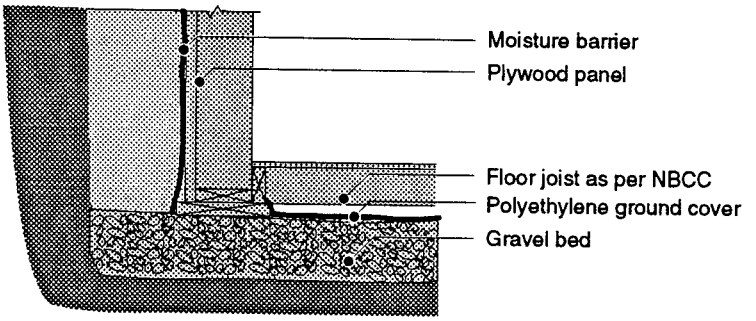


Figure A13
Wood Footing Plates under Loadbearing Interior Basement Walls



Detail A: Side Wall



Detail B: End Wall

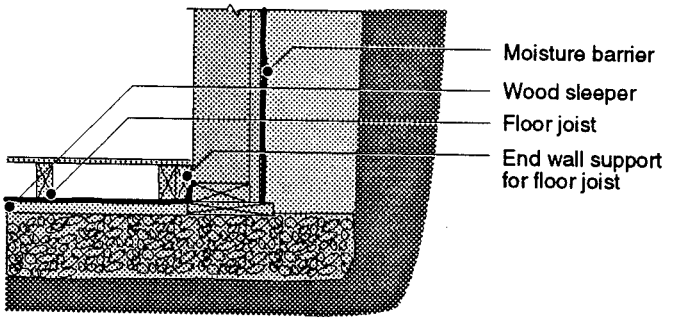


Figure A14
Wood Sleeper Floor Type

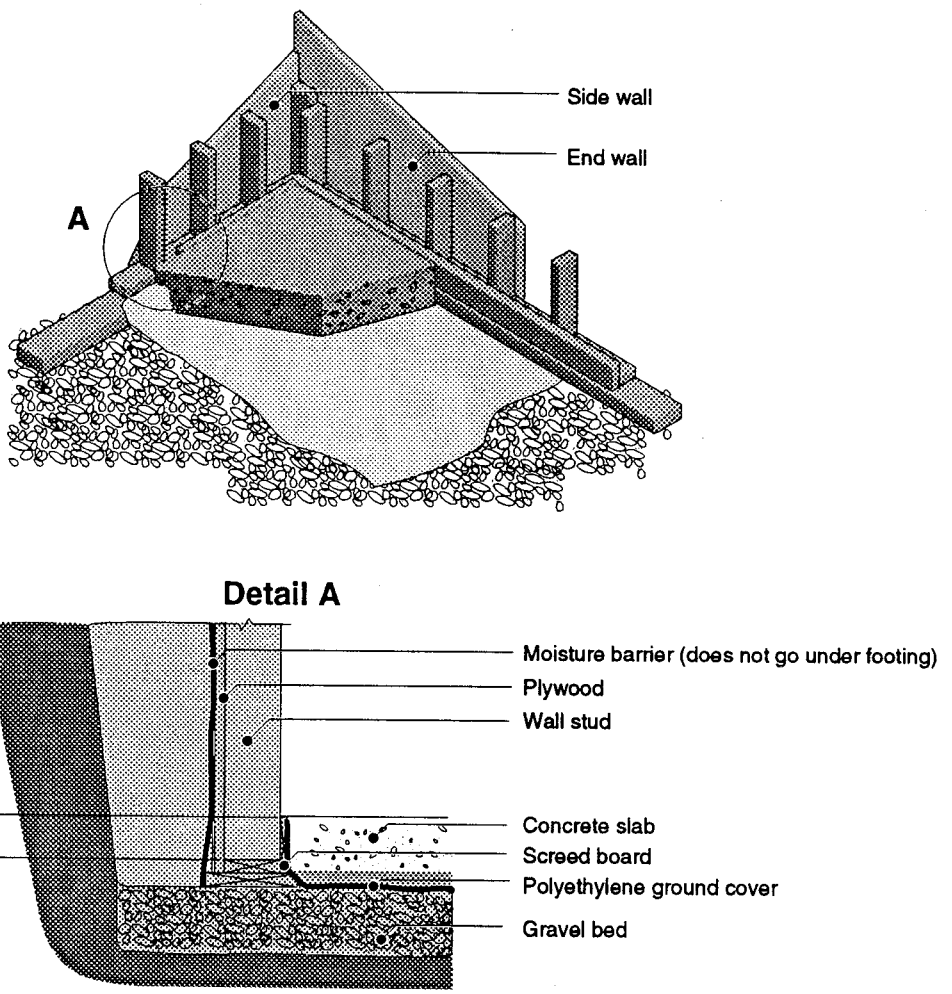


Figure A15
Concrete Slab Floor Type

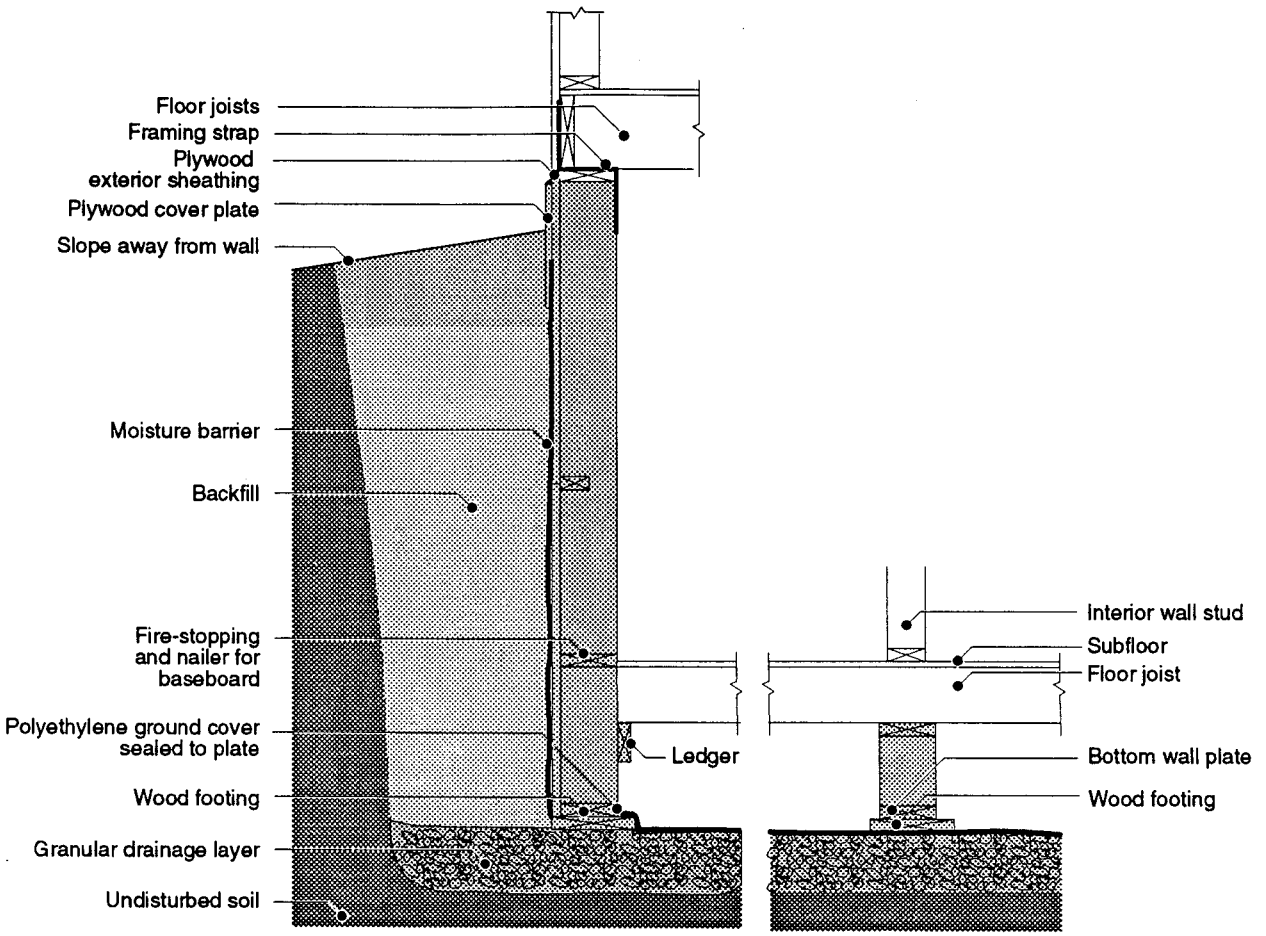


Figure A16
Exterior Foundation Wall and Interior Loadbearing Foundation Wall with Suspended Wood Floor

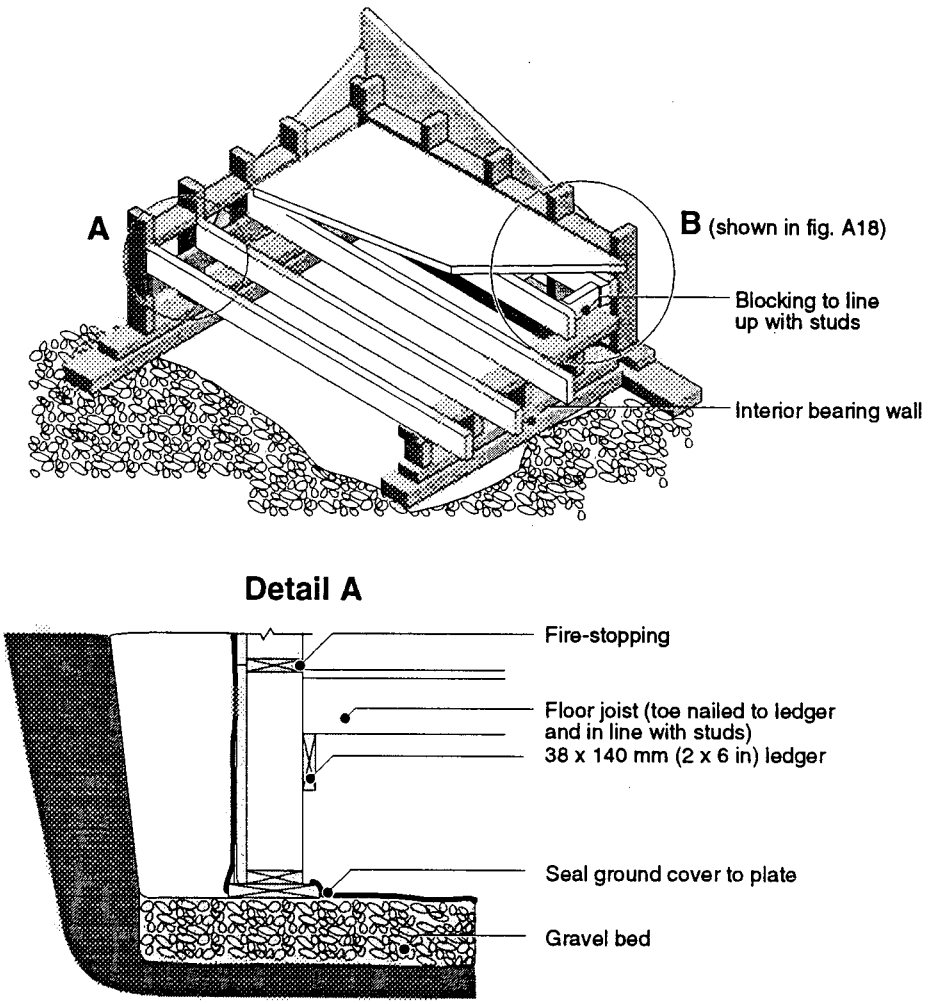


Figure A17
Suspended Wood Floor

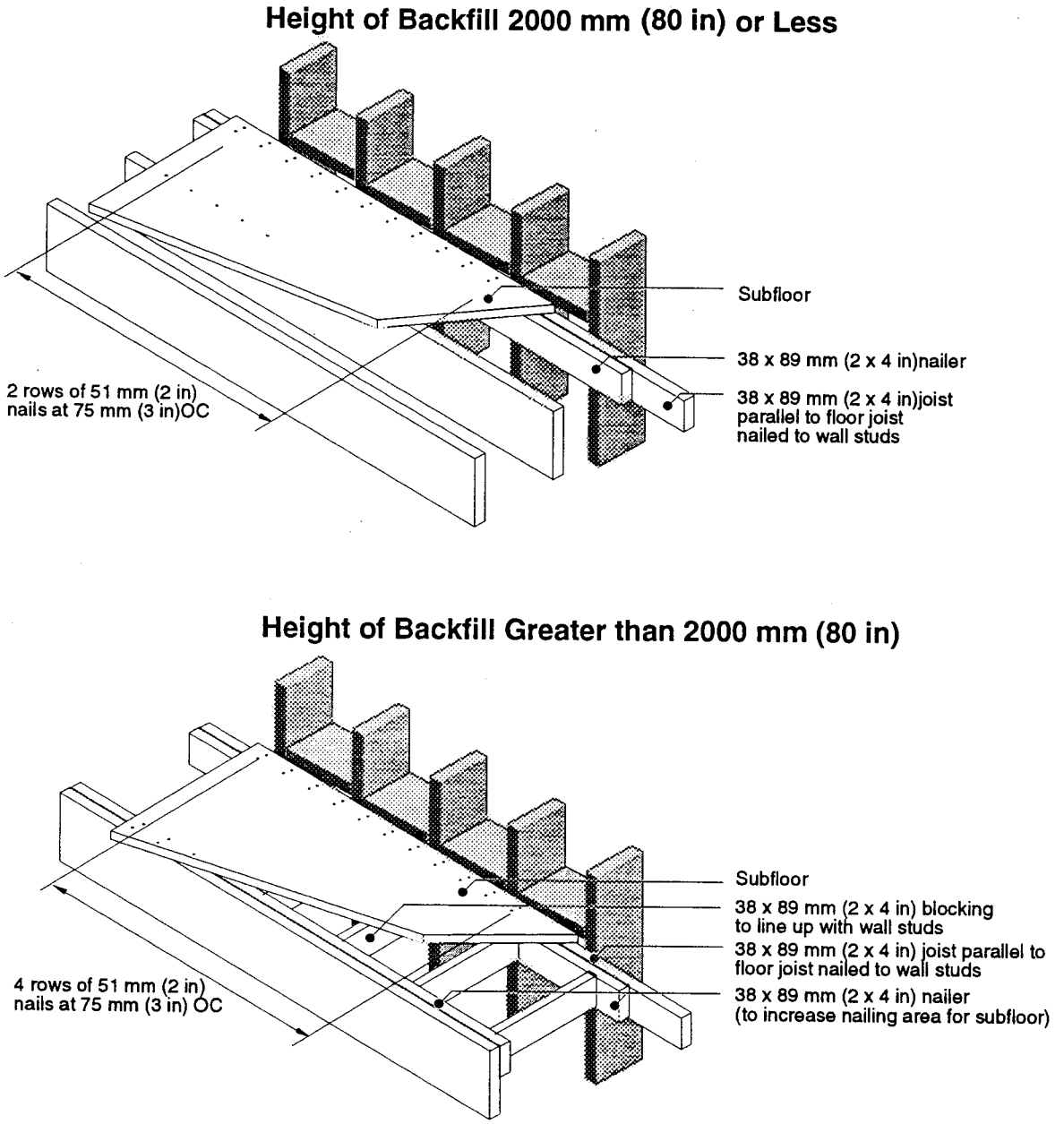


Figure A18
Support for End Wall at Suspended Wood Floor

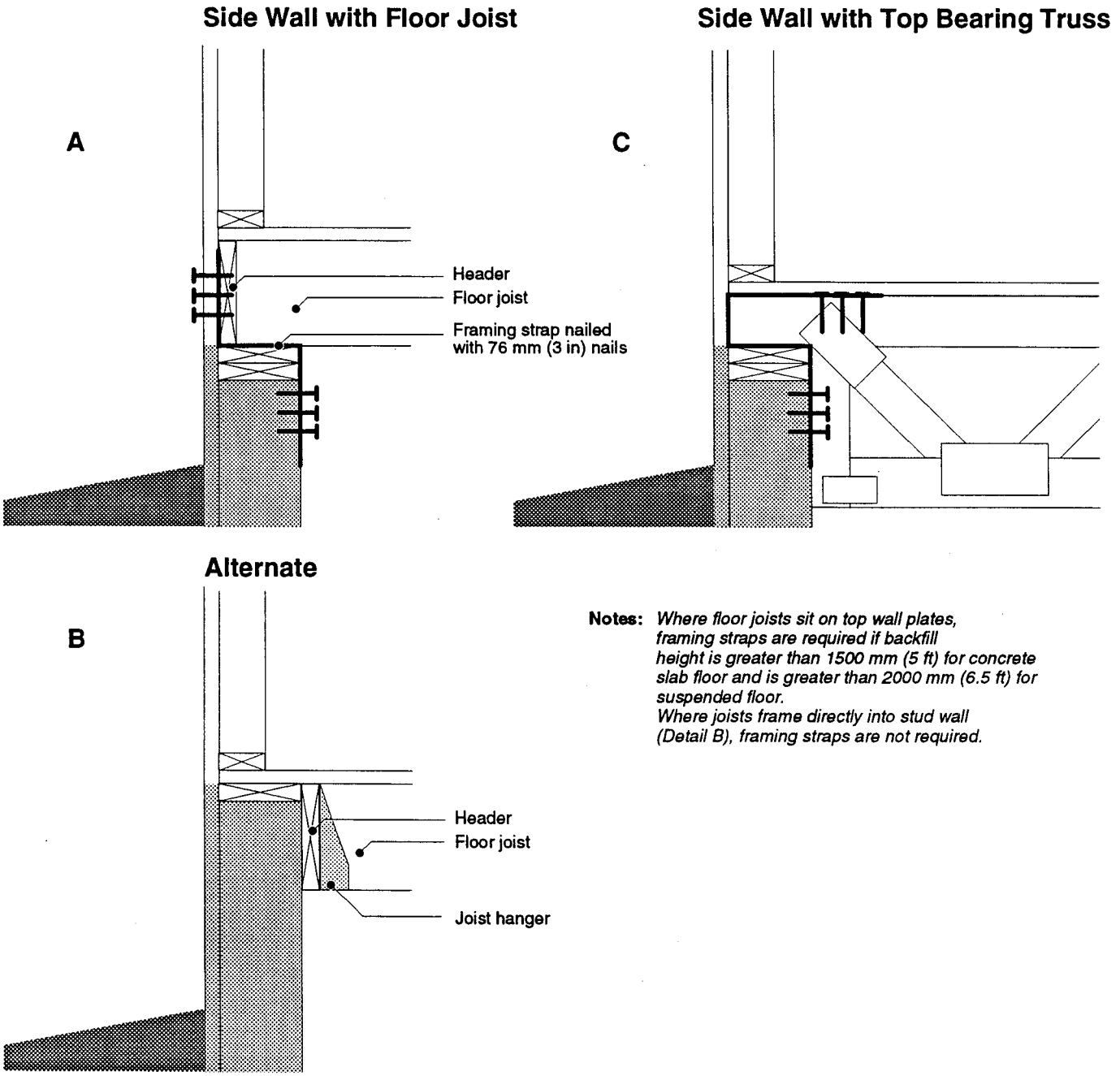
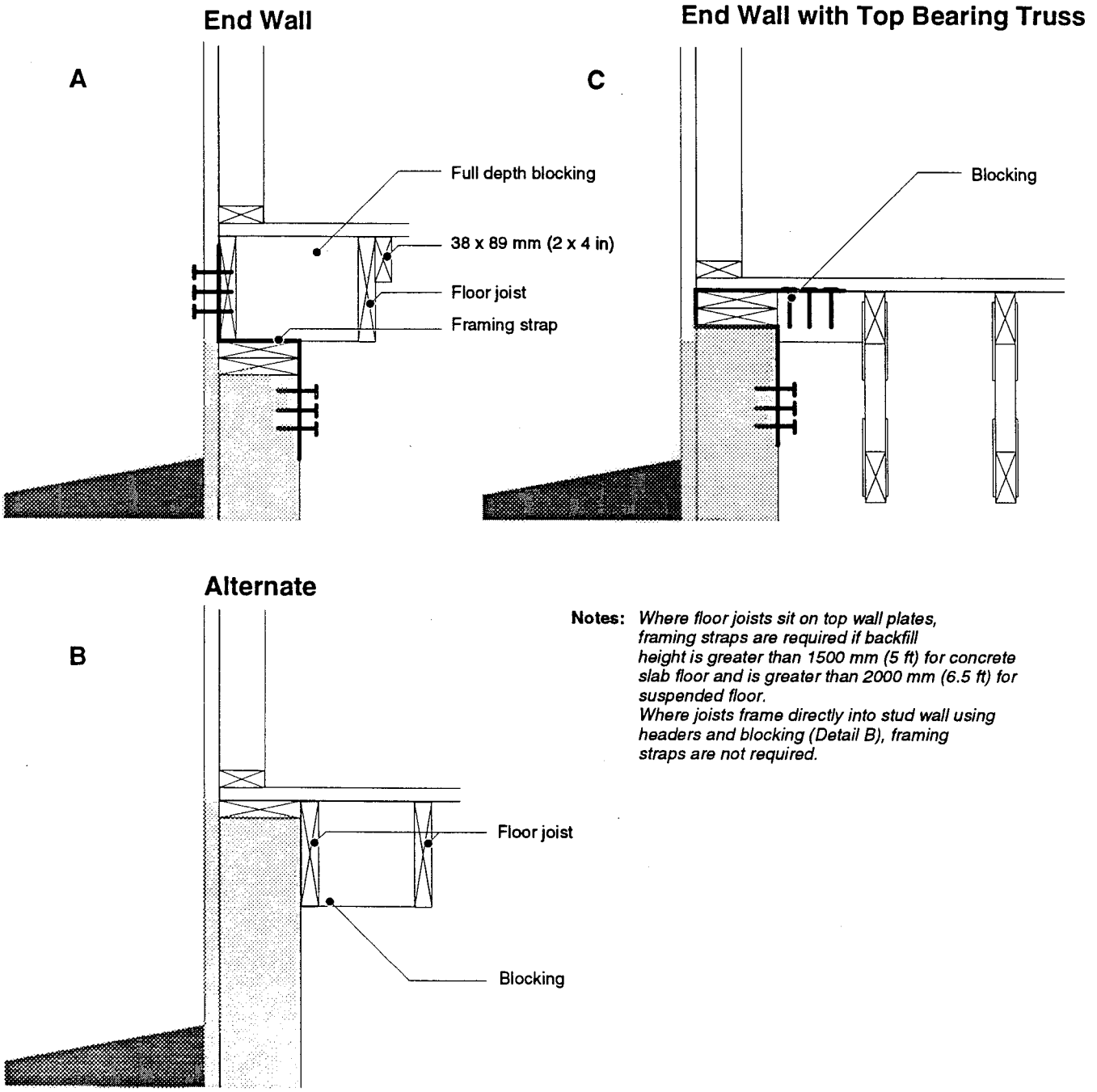


Figure A19
Typical Side Wall Connections to First Storey Floor Systems



Notes: *Where floor joists sit on top wall plates, framing straps are required if backfill height is greater than 1500 mm (5 ft) for concrete slab floor and is greater than 2000 mm (6.5 ft) for suspended floor.*
Where joists frame directly into stud wall using headers and blocking (Detail B), framing straps are not required.

Figure A20
Typical End Wall Connections to First Storey Floor Systems

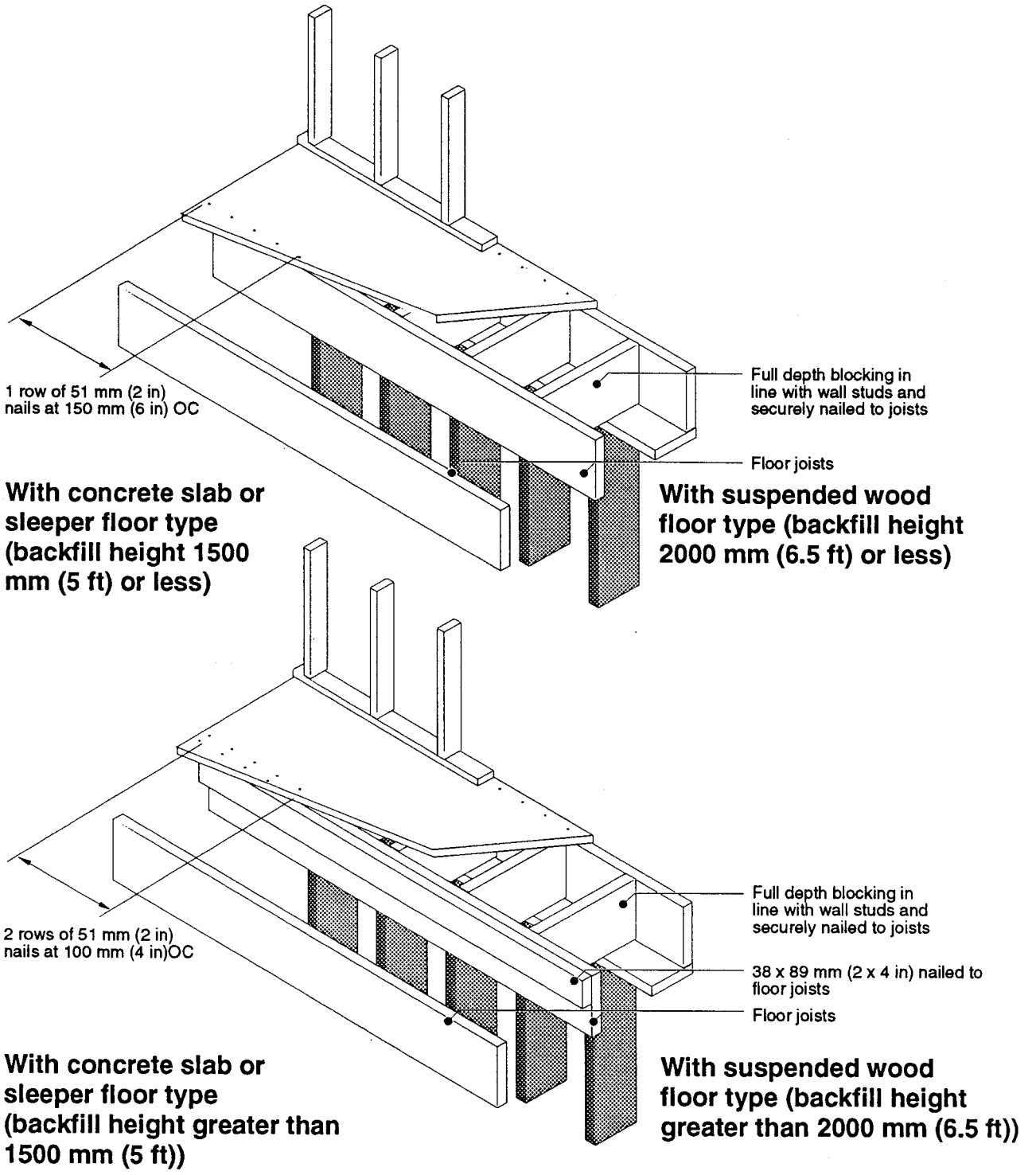


Figure A21
Lateral Support for End Wall at Top of Foundation with Floor Supported on Top of Wall

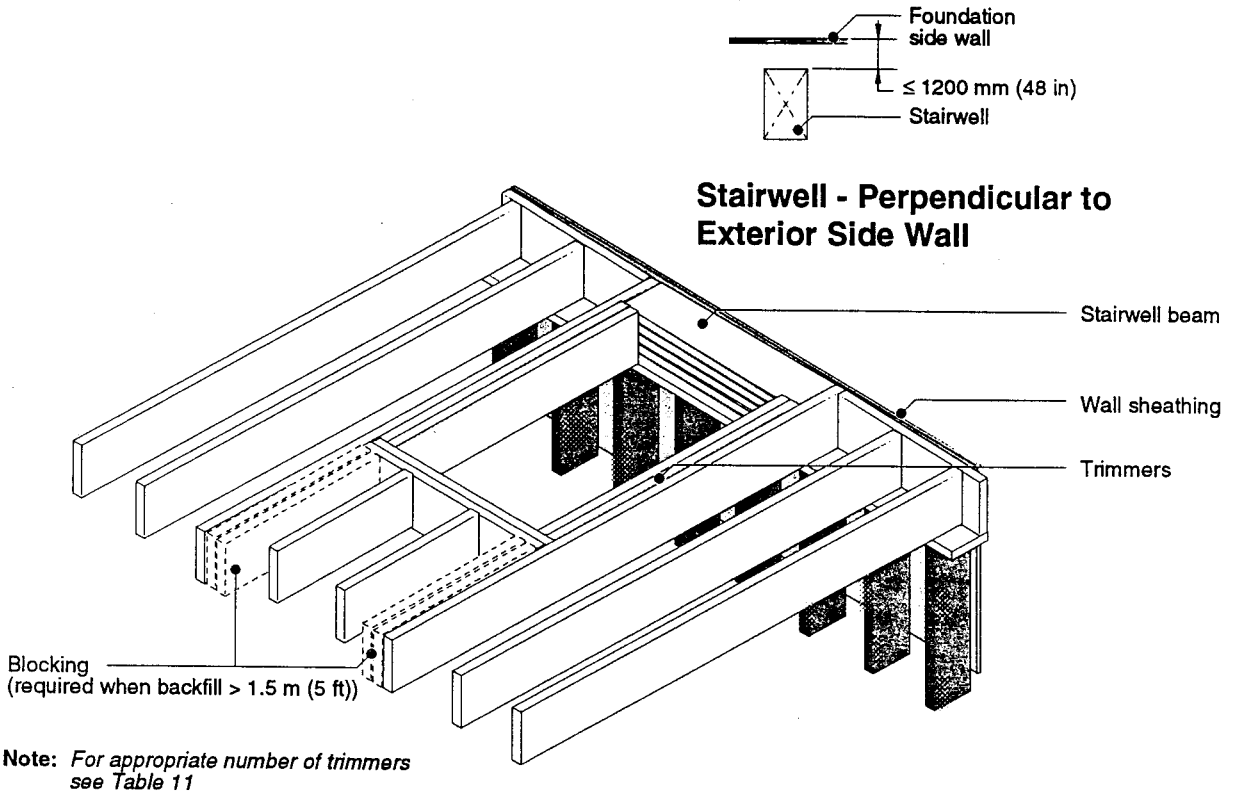


Figure A22
Stairwell Framing within 1200 mm (48 in) of Side Wall

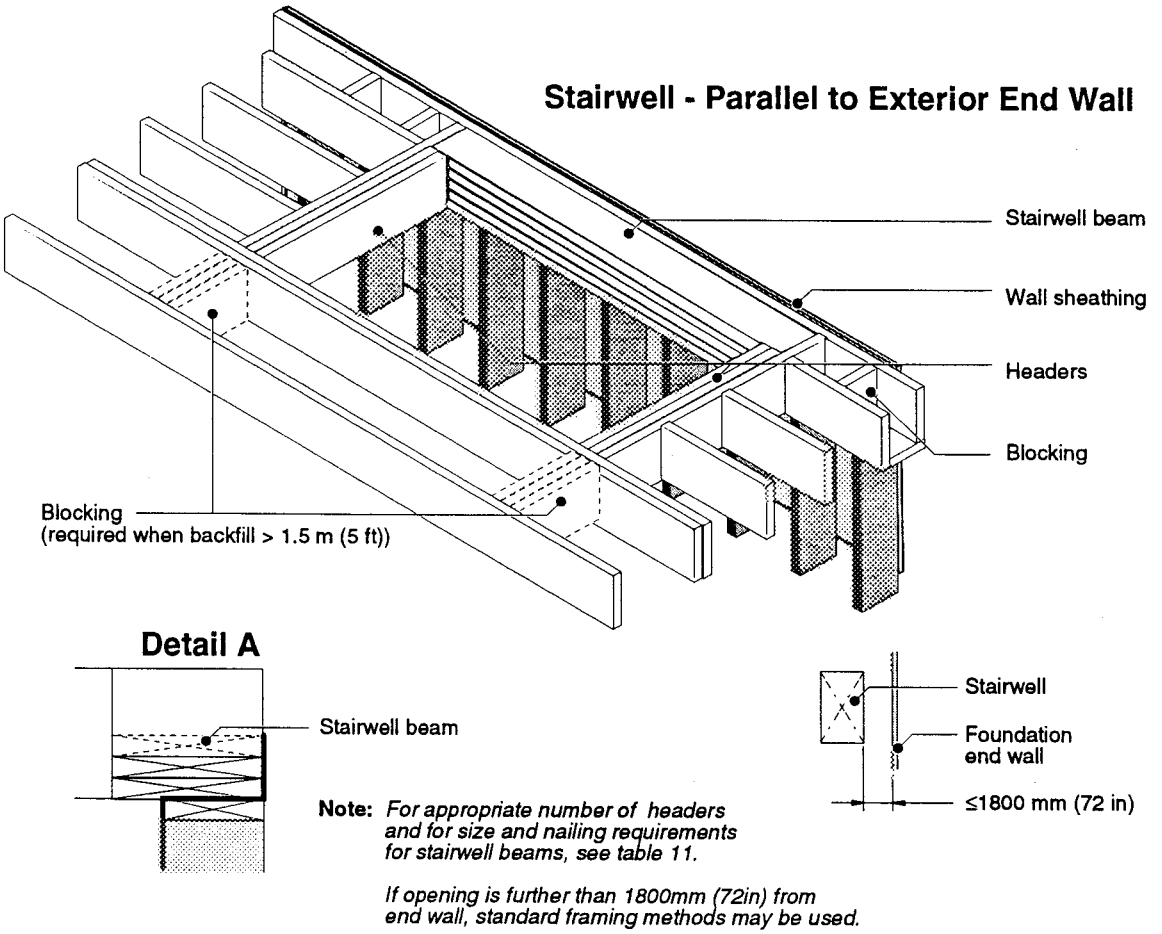


Figure A23
Stairwell Framing within 1800 mm (72 in) of End Wall

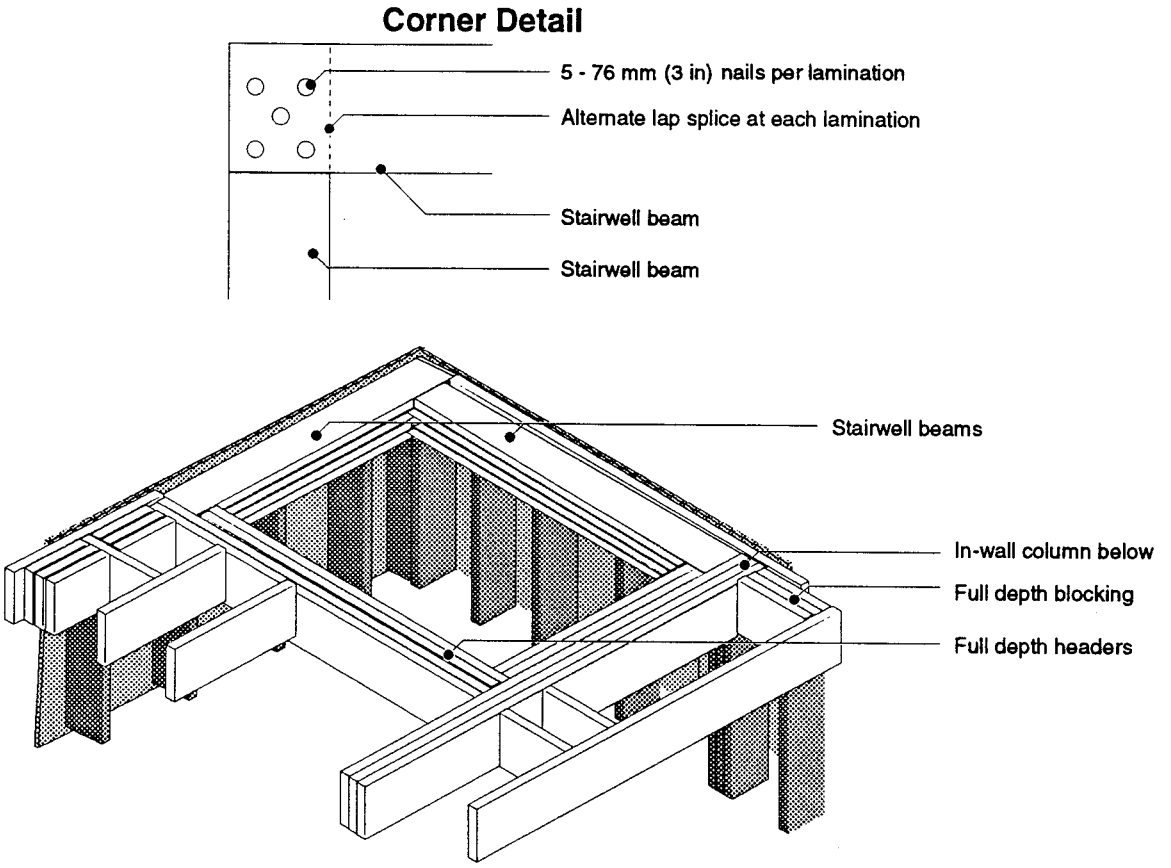


Figure A24
Stairwell Framing at Foundation Corner

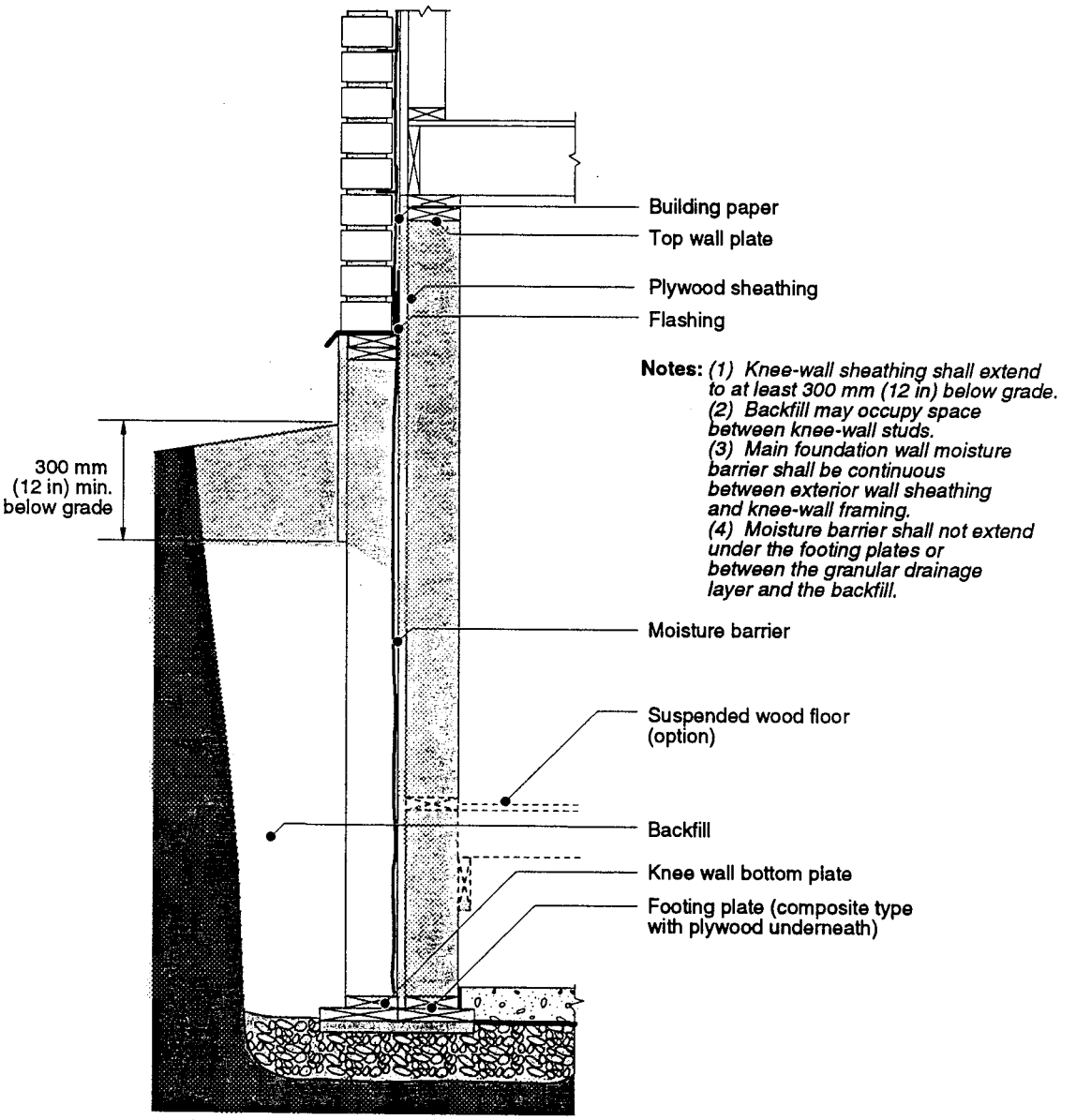


Figure A25
Foundation Wall with Masonry Veneer Supported by Exterior Knee Wall

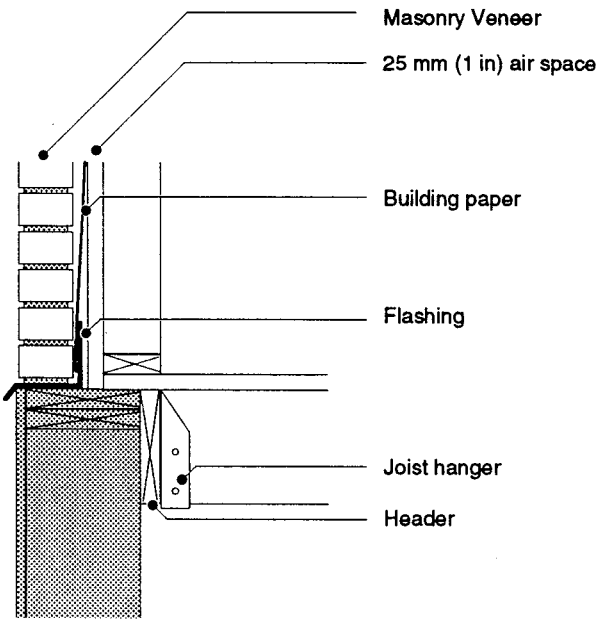


Figure A26
Foundation Wall Supporting Masonry Veneer

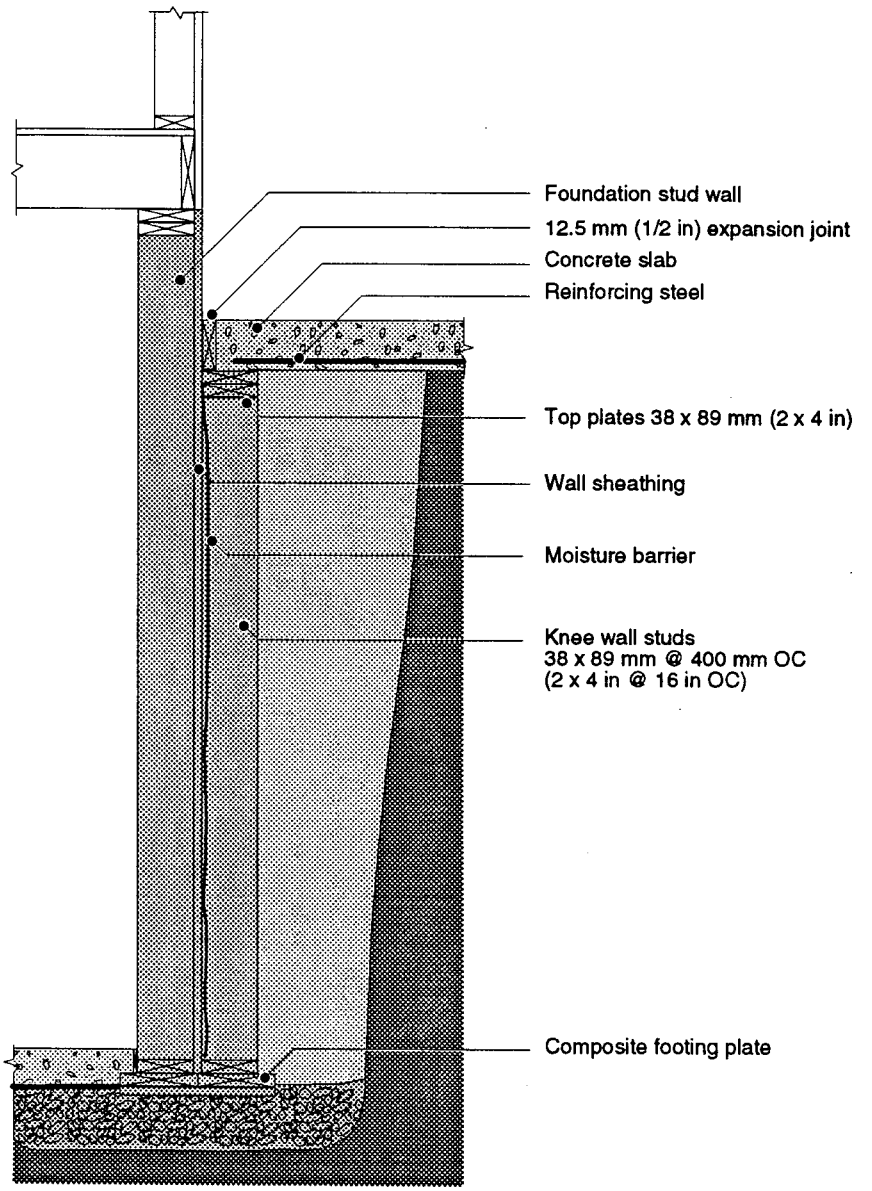
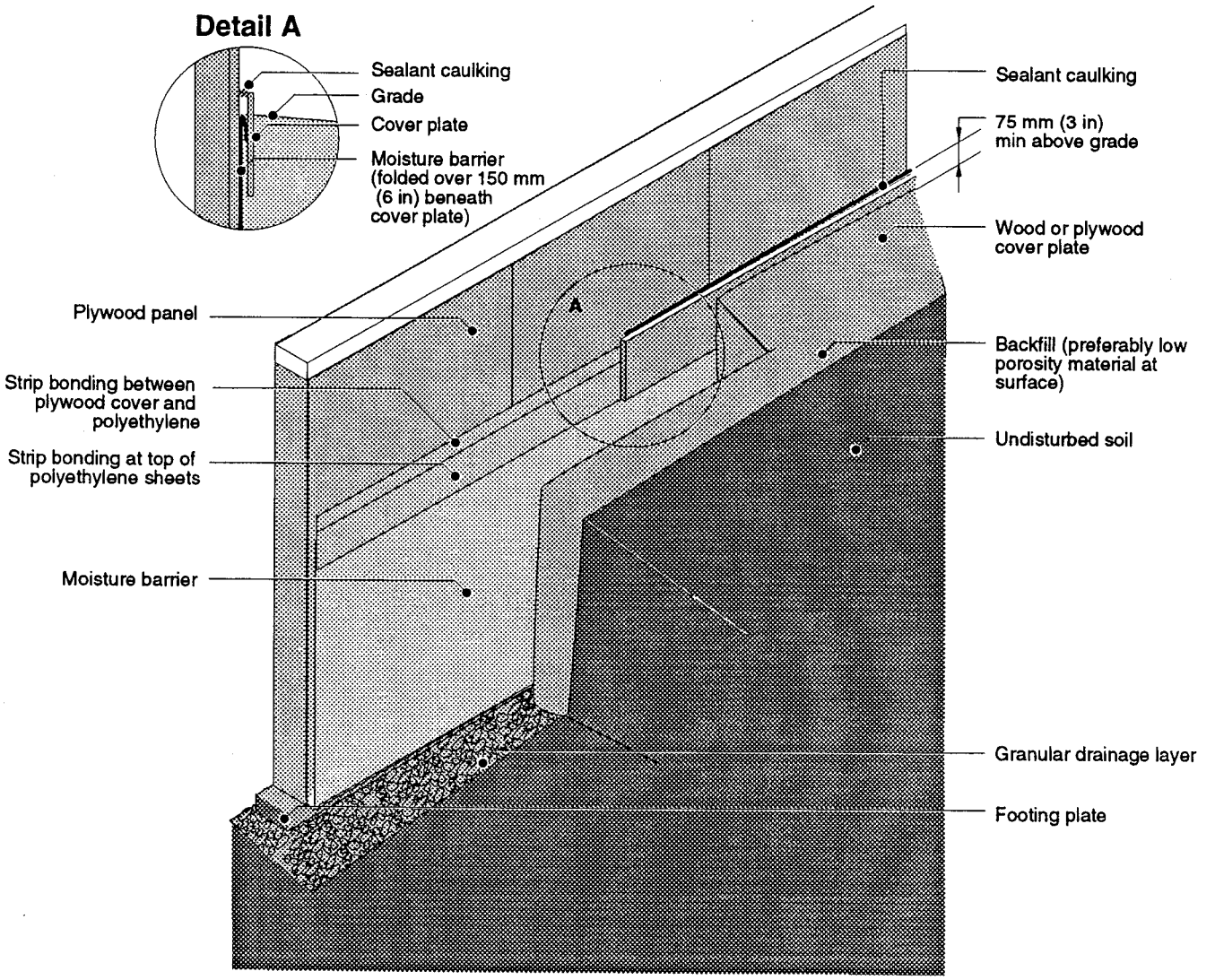


Figure A27
Exterior Knee Wall Supporting Concrete Slab



Notes: *(1) Sealant shall be compatible with the preservative treated lumber, sheathing and polyethylene moisture barrier.*
(2) Moisture barrier shall not extend under the footing plate or between the granular drainage layer and the backfill at exterior wall.
(3) Strip bonding means application of a suitable sealant in a strip or strips to secure the upper edge of the moisture barrier.

Figure A28
Sealing and Dampproofing Foundation Wall Exterior

Appendix B
Commentary on Safe Use and Handling of Pressure-Treated Wood

Note: *This Appendix is not a mandatory part of this Standard.*

B1. Introduction

Wood products that have been preserved by pressure treatment in Canada use chemicals registered for this purpose by Agriculture Canada. The treated products meet the requirements of a series of treatment and commodity use standards contained in CSA Standard CAN/CSA-O80, *Wood Preservation,* or to requirements of the purchaser.

The recommendations contained in CSA Standard CAN/CSA-O80 are based solely on the efficacy of the preservative for specific applications. Preservative chemicals and their uses are regulated by government authorities. It is the responsibility of the user to ensure that the end use for treated wood does not conflict with current laws and regulations.

Preserved wood foundation lumber and plywood have been treated with an inorganic arsenical preservative chromated copper arsenate (CCA). CCA, a formulation found to be highly effective as a wood preservative, is a mixture of stable metallic oxides which are reduced by wood sugars to form insoluble precipitates. These precipitates are fixed in the wood, are highly leach resistant and are nonvolatile — they will not vaporize or evaporate.

Inorganic arsenic penetrates deeply into and remains in the pressure-treated wood for a long time. Exposure to inorganic arsenic may present certain hazards. Therefore, the following precautions should be taken both when handling treated wood and in determining where to use or dispose of the treated wood.

B2. Generally Accepted Applications

Wood pressure treated with waterborne arsenical preservatives may be used inside residences as long as all dust is vacuumed from the wood surface. Wood treated with arsenical preservatives used without surface sealers is safe for frequent contact because absorption through the skin is negligible.

Do not use treated wood under circumstances where the preservative may become a component of food or animal feed. Examples of such sites would be structures or containers for storing silage or food.

Do not use treated wood for cuttingboards or countertops.

Only treated wood that is visibly clean and free of surface residue should be used for patios, decks, and walkways.

Do not use treated wood for construction of those portions of beehives which may come into contact with the honey.

Treated wood should not be used where it may come into direct or indirect contact with public drinking water, except for uses involving incidental contact such as docks and bridges.

Do not use treated wood shavings or sawdust for bedding or litter in barns, chicken houses, or similar structures.

B3. Disposal

Dispose of treated wood by ordinary trash collection or burial. Treated wood should not be burned in open fires or stoves, fireplaces, or residential boilers because toxic chemicals may be produced as part of the smoke and ashes. Treated wood from commercial or industrial use (eg, construction sites) may be burned only in commercial or industrial incinerators or boilers in accordance with provincial and federal regulations.

B4. Handling Precautions

Avoid frequent or prolonged inhalation of sawdust from treated wood. When sawing and machining treated wood, wear a dust mask. Whenever possible, these operations should be performed outdoors to avoid indoor accumulations of airborne sawdust from treated wood.

When power-sawing and machining, wear goggles to protect eyes from flying particles. Wear gloves to provide protection against splinters.

B5. Worker Hygiene

Follow good personal hygiene practices in the shop and on the job. After working with the wood, and before eating, drinking, and use of tobacco products, thoroughly wash exposed areas after skin contact.

If preservatives or sawdust accumulate on clothes, launder before reuse. Wash work clothes separately from other household clothing.

Appendix C
Requirements for Design and Supervision

Note: *This Appendix is not a mandatory part of this Standard. However, it has been written in mandatory terms to facilitate adoption where users of the Standard or regulatory authorities wish to formally adopt it as additional requirements to this Standard.*

C1. Design of Foundations

Preserved wood foundations shall be designed by a registered professional engineer in accordance with this Standard and the plans and specifications for the foundations shall bear the seal and signature of the professional engineer.

C2. Supervision of Installations

Where contracted or required, the review of the construction of the preserved wood foundation shall be carried out by the designer or another suitably qualified person to determine whether or not the installation is in conformance with this Standard and the design.

Appendix D
Imperial Unit Backfill Height Tables for Wood Foundation Studs

Note: *This Appendix is not a mandatory part of this Standard.*

D1. General

D1.1

This Appendix contains imperial unit versions of the backfill height tables, Tables 5A and 5B, and 10A and 10B, for wood foundation studs. These tables are numbered to correspond to the numbering used in the Standard, prefixed by the letter D. The tabulated values of these Appendix Tables and those in the Standard were calculated using the design criteria of Clause 4.3. In addition, all tables were calculated on the basis of 12 and 16-inch stud spacings (rather than the metric modules of 300 and 400 mm), introducing a degree of conservatism to those tables in the Standard.

D1.2

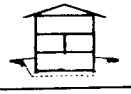
Discrepancies between the Appendix Tables and those in the Standard do not exceed 1 inch and are due to rounding procedures.

D1.3

Interpolation between corresponding Tables A and B (eg, D10A and D10B) will yield conservative values for studs of intermediate length.

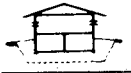
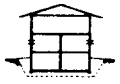
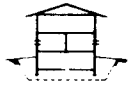
Table D5A
Maximum Backfill Heights for Various Sizes of Wood Foundation Studs for Exterior Walls with Wood Sleeper or Concrete Slab Floors or for Crawl Space Foundations

(See Clause 9.1.)

Maximum building width (parallel to floor joists)		Lumber		Stud size, in x in (nominal), 8 ft length					
				2 × 4		2 × 6		2 × 8	
				Stud spacing, in, oc					
With centre support	No centre support	Strength grouping*	Grade	16	12	16	12	16	12
				Maximum backfill when supporting one storey above foundation, no brick veneer, ft-in					
23 ft	16 ft	Spec 1	SS	3–11	4– 5	6–10	7–10	7–10	7–10
			No. 2	3– 5	4– 1	5– 5	6– 4	6– 9	7–10
		Spec 2	SS	3– 4	3–11	5– 7	6– 6	7– 0	7–10
			No. 2	2–10	3– 6	4– 9	5– 6	5–11	6–10
33 ft	26 ft	Spec 1	SS	3–11	4– 5	6– 8	7–10	7–10	7–10
			No. 2	3– 0	3– 9	5– 3	6– 2	6– 8	7–10
		Spec 2	SS	3– 0	3– 9	5– 5	6– 4	6–10	7–10
			No. 2	2– 6	3– 2	4– 7	5– 5	5– 9	6– 9
				Maximum backfill when supporting two storeys above foundation, no brick veneer, ft-in					
23 ft	16 ft	Spec 1	SS	3–11	4– 5	6– 9	7–10	7–10	7–10
			No. 2	3– 1	3–10	5– 4	6– 3	6– 8	7–10
		Spec 2	SS	3– 1	3–10	5– 5	6– 5	6–10	7–10
			No. 2	2– 7	3– 2	4– 7	5– 5	5– 9	6– 9
33 ft	26 ft	Spec 1	SS	3– 6†	4– 5†	6– 5	7– 9	7–10	7–10
			No. 2	2– 8†	3– 5†	5– 1	6– 0	6– 6	7– 8
		Spec 2	SS	2– 7‡	3– 5†	5– 2	6– 2	6– 8	7–10
			No. 2	1–11‡	2– 9†	4– 5	5– 2	5– 7	6– 7

(Continued)

Table D5A (Concluded)

Maximum building width (parallel to floor joists)		Lumber		Stud size, in x in (nominal), 8 ft length					
				2 × 4		2 × 6		2 × 8	
With centre support	No centre support	Strength grouping*	Grade	Stud spacing, in, oc					
				16	12	16	12	16	12
				Maximum backfill when supporting one storey above foundation, with brick veneer, ft-in					
33 ft	26 ft	Spec 1	SS	na	na	6– 6	7–10	7–10	7–10
			No. 2	na	na	5– 2	6– 1	6– 6	7– 9
		Spec 2	SS	na	na	5– 3	6– 3	6– 9	7–10
			No. 2	na	na	4– 5	5– 3	5– 8	6– 8
				Maximum backfill when supporting two storeys above foundation, brick veneer on first storey, ft-in					
33 ft	26 ft	Spec 1	SS	na	na	6– 3	7– 7	7–10	7–10
			No. 2	na	na	4–11	5–11	6– 4	7– 7
		Spec 2	SS	na	na	5– 0	6– 0	6– 7	7–10
			No. 2	na	na	4– 3	5– 1	5– 6	6– 6
				Maximum backfill when supporting two storeys above foundation, brick veneer full height, ft-in					
33 ft	26 ft	Spec 1	SS	na	na	6– 2	7– 5	7–10	7–10
			No. 2	na	na	4– 9	5– 9	6– 3	7– 5
		Spec 2	SS	na	na	4–11	5–11	6– 5	7– 8
			No. 2	na	na	4– 1	4–11	5– 4	6– 5

**Strength grouping for purposes of these tables is described in Table 1 and its Notes.*

†Where marked, the tabulated value shall be reduced by 4 in for 'no centre support' floor cases.

‡Where marked, the tabulated value shall be reduced by 8 in for 'no centre support' floor cases.

Notes:

(1) *Backfill height is defined in Clause 2.*

(2) *Design assumptions of Clause 4.3 apply.*

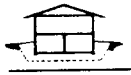
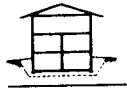
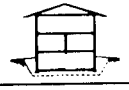
(3) *Buildings are assumed to have masonry-veneer cladding, supported on the preserved wood foundation wall, where indicated (=) and conventional siding consisting of wood, metal, plastics, stucco or other nonmasonry cladding elsewhere.*

(4) *When masonry veneer is carried on a knee wall conforming to Clause 13.1.2, the sections of the table headed "no brick veneer" shall apply.*

(5) *When "na" is indicated, use of this Table not applicable.*

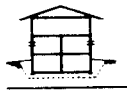
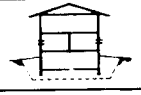
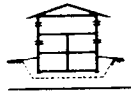
Table D5B
Maximum Backfill Heights for Various Sizes of Wood Foundation Studs for Exterior Walls with Wood Sleeper or Concrete Slab Floors or for Crawl Space Foundations

(See Clause 9.1.)

Maximum building width (parallel to floor joists)		Lumber		Stud size, in × in, (nominal), 10 ft length					
				2 × 4		2 × 6		2 × 8	
				Stud spacing, in, oc					
With centre support	No centre support	Strength grouping*	Grade	16	12	16	12	16	12
				Maximum backfill when supporting one storey above foundation, no brick veneer, ft-in					
23 ft	16 ft	Spec 1	SS	3– 7	4– 0	5–11	6– 8	7– 3	8– 6
			No. 2	2– 9	3– 6	5– 0	5–10	6– 3	7– 2
		Spec 2	SS	2– 8	3– 5	5– 1	5–10	6– 4	7– 4
			No. 2	2– 1	2–10	4– 5	5– 1	5– 6	6– 4
33 ft	26 ft	Spec 1	SS	2–11†	3–11	5–11	6– 8	7– 3	8– 6
			No. 2	2– 1†	3– 0	4–10	5– 8	6– 1	7– 0
		Spec 2	SS	1– 8‡	2–10	4–11	5– 9	6– 3	7– 3
			No. 2	0– 0	2– 4‡	4– 2	4–11	5– 4	6– 2
				Maximum backfill when supporting two storeys above foundation, no brick veneer, ft-in					
23 ft	16 ft	Spec 1	SS	3– 1†	4– 0	5–11	6– 8	7– 3	8– 6
			No. 2	2– 3†	3– 1	4–10	5– 8	6– 1	7– 1
		Spec 2	SS	1–11‡	2–11	4–11	5– 9	6– 3	7– 3
			No. 2	0–10§	2– 5	4– 3	4–11	5– 4	6– 2
33 ft	26 ft	Spec 1	SS	2– 0§	3– 4‡	5– 9	6– 8	7– 3	8– 6
			No. 2	0– 0	2– 5‡	4– 7	5– 5	5–11	6–11
		Spec 2	SS	0– 0	2– 1§	4– 8	5– 6	6– 1	7– 1
			No. 2	0– 0	0– 8§	3–11	4– 9	5– 2	6– 0

(Continued)

Table D5B (Concluded)

Maximum building width (parallel to floor joists)		Lumber		Stud size, in × in, (nominal), 10 ft length					
				2 × 4		2 × 6		2 × 8	
With centre support	No centre support	Strength grouping*	Grade	Stud spacing, in, oc					
				16	12	16	12	16	12
				Maximum backfill when supporting one storey above foundation, with brick veneer, ft-in					
33 ft	26 ft	Spec 1	SS	na	na	5–10	6– 8	7– 3	8– 6
			No. 2	na	na	4– 8	5– 6	5–11	6–11
		Spec 2	SS	na	na	4– 9	5– 7	6– 1	7– 1
			No. 2	na	na	4– 0	4– 9	5– 3	6– 1
				Maximum backfill when supporting two storeys above foundation, brick veneer on first storey, ft-in					
33 ft	26 ft	Spec 1	SS	na	na	5– 7	6– 8	7– 3	8– 6
			No. 2	na	na	4– 5	5– 4	5– 9	6– 9
		Spec 2	SS	na	na	4– 6	5– 5	5–11	7– 0
			No. 2	na	na	3– 9	4– 7	5– 1	5–11
				Maximum backfill when supporting two storeys above foundation, brick veneer full height, ft-in					
33 ft	26 ft	Spec 1	SS	na	na	5– 5	6– 6	7– 2	8– 5
			No. 2	na	na	4– 3	5– 2	5– 8	6– 8
		Spec 2	SS	na	na	4– 4†	5– 3	5–10	6–10
			No. 2	na	na	3– 7	4– 5	4–11	5–10

Strength grouping for purposes of these tables is described in Table 1 and its Notes.

†*Where marked, the tabulated value shall be reduced by 4 in for 'no centre support' floor cases.*

‡*Where marked, the tabulated value shall be reduced by 8 in for 'no centre support' floor cases.*

§*Where marked, the entry shall read "na" for 'no centre support' floor cases.*

Notes:

(1) *Backfill height is defined in Clause 2.*

(2) *Design assumptions of Clause 4.3 apply.*

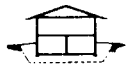
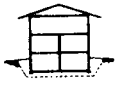
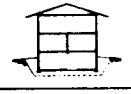
(3) *Buildings are assumed to have masonry-veneer cladding, supported on the preserved wood foundation wall, where indicated (=) and conventional siding consisting of wood, metal, plastics, stucco or other nonmasonry cladding elsewhere.*

(4) *When masonry veneer is carried on a knee wall conforming to Clause 13.1.2, the sections of the table headed "no brick veneer" shall apply.*

(5) *When "na" is indicated, use of this Table not applicable.*

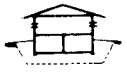
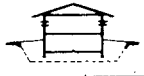
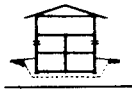
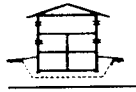
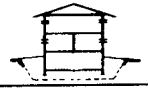
Table D10A
Maximum Backfill Heights for Various Sizes of Wood Foundation Studs for Exterior Walls with Suspended Wood Floor

(See Clause 10.1.)

Maximum building width (parallel to floor joists)		Lumber		Stud size, in × in, (nominal), 10 ft length					
				2 × 4		2 × 6		2 × 8	
				Stud spacing, in, oc					
With centre support	No centre support	Strength grouping*	Grade	16	12	16	12	16	12
				Maximum backfill when supporting one storey above foundation, no brick veneer, ft-in					
23 ft	16 ft	Spec 1	SS	6– 3	6– 7	8– 2	8–10	9– 1	10–4
			No. 2	4– 3	6– 5	7– 6	8– 2	8– 6	9–5
		Spec 2	SS	4– 3	6– 2	7– 7	8– 1	8– 8	9–7
			No. 2	2–10	4– 6	7– 0	7– 7	7–10	8–7
33 ft	26 ft	Spec 1	SS	6– 0†	6– 7	8– 2	8–10	9– 1	10–4
			No. 2	3– 4†	5– 6†	7– 5	8– 0	8– 4	9–3
		Spec 2	SS	3– 3†	5– 7†	7– 6	8– 1	8– 6	9–5
			No. 2	2– 1	3– 8†	6–10	7– 6	7– 9	8–6
				Maximum backfill when supporting two storeys above foundation, no brick veneer, ft in					
23 ft	16 ft	Spec 1	SS	6– 3†	6– 7	8– 2	8–10	9– 1	10–4
			No. 2	3– 6†	5– 8†	7– 5	8– 1	8– 5	9–3
		Spec 2	SS	3– 5†	5– 9†	7– 6	8– 1	8– 6	9–6
			No. 2	2– 3†	3–10†	6–10	7– 6	7–10	8–6
33 ft	26 ft	Spec 1	SS	4– 7§	6– 7	8– 2	8–10	9– 1	10–4
			No. 2	2– 4†	4– 5‡	7– 3	7–10	8– 3	9–2
		Spec 2	SS	2– 1	4– 4‡	7– 3	7–11	8– 4	9–4
			No. 2	2– 0	2– 8‡	6– 9	7– 4	7– 8	8–4

(Continued)

Table D10A (Concluded)

Maximum building width (parallel to floor joists)		Lumber		Stud size, in × in, (nominal), 10 ft length					
				2 × 4		2 × 6		2 × 8	
				Stud spacing, in, oc					
With centre support	No centre support	Strength grouping*	Grade	16	12	16	12	16	12
				Maximum backfill when supporting one storey above foundation, with brick veneer, ft-in					
33 ft	26 ft	Spec 1	SS	na	na	8– 2	8–10	9–1	10– 4
			No. 2	na	na	7– 3	7–11	8–3	9– 2
		Spec 2	SS	na	na	7– 4	8– 0	8–5	9– 4
			No. 2	na	na	6– 9	7– 4	7–8	8– 4
				Maximum backfill when supporting two storeys above foundation, brick veneer on first storey, ft-in					
33 ft	26 ft	Spec 1	SS	na	na	8– 0	8–10	9–1	10– 4
			No. 2	na	na	7– 1	7–10	8–2	9– 1
		Spec 2	SS	na	na	7– 2	7–10	8–3	9– 3
			No. 2	na	na	6– 9†	7– 2	7–7	8– 3
				Maximum backfill when supporting two storeys above foundation, brick veneer full height, ft-in					
33 ft	26 ft	Spec 1	SS	na	na	7–11	8–10	9–1	10– 4
			No. 2	na	na	7– 0	7– 9	8–0	8–11
		Spec 2	SS	na	na	7– 0	7–10	8–2	9– 2
			No. 2	na	na	6– 5‡	7– 1	7–5	8– 2

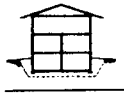
Strength grouping for purposes of these tables is described in Table 1 and its Notes.
†Where marked, the tabulated value shall be reduced by 4 in for 'no centre support' floor cases.
‡Where marked, the tabulated value shall be reduced by 8 in for 'no centre support' floor cases.
§Where marked, the entry shall read "na" for 'no centre support' floor cases.

Notes:

(1) *Backfill height is defined in Clause 2.*
(2) *Design assumptions of Clause 4.3 apply.*
(3) *Buildings are assumed to have masonry-veneer cladding, supported on the preserved wood foundation wall, where indicated (=) and conventional siding consisting of wood, metal, plastics, stucco or other nonmasonry cladding elsewhere.*
(4) *When masonry veneer is carried on a knee wall conforming to Clause 13.1.2, the sections of the table headed "no brick veneer" shall apply.*
(5) *When "na" is indicated, use of this Table not applicable.*

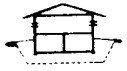
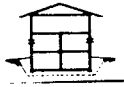
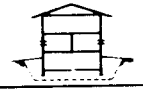
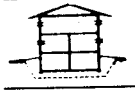
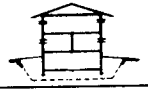
Table D10B
Maximum Backfill Heights for Various Sizes of Wood Foundation Studs for Exterior Walls with Suspended Wood Floor

(See Clause 10.1.)

Maximum building width (parallel to floor joists)		Lumber		Stud size, in × in (nominal), 12 ft length					
				2 × 4		2 × 6		2 × 8	
With centre support	No centre support	Strength grouping*	Grade	Stud spacing, in, oc					
				16	12	16	12	16	12
				Maximum backfill when supporting one storey above foundation, no brick veneer, ft-in					
23 ft	16 ft	Spec 1	SS	5– 7	6– 4	7– 9	8– 3	8–10	10– 0
			No. 2	3– 1	5– 3	7– 3	7–10	8– 2	8–11
		Spec 2	SS	2–10	5– 2	7– 2	7– 8	8– 3	9– 1
			No. 2	2– 0	3– 4	6– 9	7– 4	7– 8	8– 3
33 ft	26 ft	Spec 1	SS	3–10‡	6– 4	7– 9	8– 3	8–10	10– 0
			No. 2	2– 0	3–11†	7– 1	7– 9	8– 1	8–10
		Spec 2	SS	2– 0	3– 7‡	7– 2	7– 8	8– 2	9– 0
			No. 2	2– 0	2– 2	6– 7	7– 2	7– 6	8– 2
				Maximum backfill when supporting two storeys above foundation, no brick veneer, ft-in					
23 ft	16 ft	Spec 1	SS	4– 1‡	6– 4	7– 9	8– 3	8–10	10– 0
			No. 2	2– 0	4– 2‡	7– 2	7–10	8– 1	8–10
		Spec 2	SS	2– 0	3–10‡	7– 2	7– 8	8– 2	9– 0
			No. 2	2– 0	2– 5†	6– 7	7– 2	7– 6	8– 2
33 ft	26 ft	Spec 1	SS	2– 0	5– 3§	7– 9	8– 3	8–10	10– 0
			No. 2	2– 0	2– 5†	6–11	7– 7	7–11	8– 9
		Spec 2	SS	2– 0	2– 0	6–11	7– 8	8– 0	8–10
			No. 2	2– 0	2– 0	6– 7†	7– 0	7– 4	8– 0

(Continued)

Table D10B (Concluded)

Maximum building width (parallel to floor joists)		Lumber		Stud size, in × in (nominal), 12 ft length					
				2 × 4		2 × 6		2 × 8	
With centre support	No centre support	Strength grouping*	Grade	Stud spacing, in, oc					
				16	12	16	12	16	12
				Maximum backfill when supporting one storey above foundation, with brick veneer, ft-in					
33 ft	26 ft	Spec 1	SS	na	na	7– 9	8– 3	8–10	10– 0
			No. 2	na	na	7– 0	7– 8	7–11	8– 9
		Spec 2	SS	na	na	7– 0	7– 8	8– 1	8–11
			No. 2	na	na	6– 7	7– 1	7– 5	8– 0
				Maximum backfill when supporting two storeys above foundation, brick veneer on first storey, ft-in					
33 ft	26 ft	Spec 1	SS	na	na	7– 8	8– 3	8–10	10– 0
			No. 2	na	na	6– 9	7– 6	7–10	8– 7
		Spec 2	SS	na	na	6–10	7– 6	7–11	8– 9
			No. 2	na	na	6– 2‡	6–10	7– 3	7–11
				Maximum backfill when supporting two storeys above foundation, brick veneer full height, ft-in					
33 ft	26 ft	Spec 1	SS	na	na	7– 6	8– 3	8–10	10– 0
			No. 2	na	na	6– 8	7– 4	7– 9	8– 6
		Spec 2	SS	na	na	6– 8	7– 5	7–10	8– 8
			No. 2	na	na	5– 6‡	6– 9	7– 2	7–10

Strength grouping for purposes of these tables is described in Table 1 and its Notes.
†Where marked, the tabulated value shall be reduced by 4 in for 'no centre support' floor cases.
‡Where marked, the tabulated value shall be reduced by 8 in for 'no centre support' floor cases.
§Where marked, the entry shall read "na" for 'no centre support' floor cases.

Notes:

(1) *Backfill height is defined in Clause 2.*

(2) *Design assumptions of Clause 4.3 apply.*

(3) *Buildings are assumed to have masonry-veneer cladding, supported on the preserved wood foundation wall, where indicated (=) and conventional siding consisting of wood, metal, plastics, stucco or other nonmasonry cladding elsewhere.*

(4) *When masonry veneer is carried on a knee wall conforming to Clause 13.1.2, the sections of the table headed "no brick veneer" shall apply.*

(5) *When "na" is indicated, use of this Table not applicable.*

Proposition de modification

N'hésitez pas à nous faire part de vos suggestions et de vos commentaires. Prière d'utiliser le formulaire qui suit pour formuler les propositions de modification aux normes CSA et autres publications CSA. Il est recommandé d'inclure

- le numéro de la norme/publication
- le numéro de l'article, du tableau ou de la figure visé
- la formulation proposée
- la raison de cette modification.

Proposal for change

CSA welcomes your suggestions and comments. Please use the following form to submit your proposals for changes to CSA Standards and other CSA publications. Be sure to include the

- Standard/publication number
- relevant Clause, Table, and/or Figure number(s)
- wording of the proposed change
- rationale for the change.

Nom/Name: _____

Affiliation: _____

Adresse/Address: _____

_____

Ville/City: _____

État/Province/State: _____

Pays/Country: _____ **Code postal/Postal/Zip code:** _____

Téléphone/Telephone: _____ **Télécopieur/Fax:** _____

Date: _____

Proposition de modification/Proposed change:

(Si l'espace est insuffisant, utiliser le verso et des feuilles volantes/Use reverse and additional pages as required.)