Self Build Construction Manual

Rural and Native Housing Program
Canada Mortgage & Housing Corporation

CMHC SCHL

Helping to house Canadians

Question habitation, comptez sur nous

Project Information:

Self-Build Clients: _____ Phone: _____

House Location: _____

Legal Description: _____

Mailing Address: _____

Account Number: _____

Construction Manger: _____ Phone: _____

CMHC Contact: _____ Branch: _____ Phone: _____

Trades & Suppliers: _____ _____

_____ _____

_____ _____

_____ _____

Acknowledgements

The Self-Build Construction Manual was prepared by the Buildings Division of ADI Limited, architects and engineers, under contract to Canada Mortgage and Housing Corporation.

Disclaimer

The interpretations and recommendations of this manual are those of the consultant and do not necessarily reflect the views of Canada Mortgage and Hosing Corporation or those divisions of the Corporation that assisted in this publication.

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Canada Mortgage and Housing Corporation
Société canadienne d'hypothèques et de logement

Canadian Housing Information Centre
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INTRODUCTION

This simplified construction manual has been prepared by Canada Mortgage and Housing Corporation for individuals and families building their own home through the Self-Build option of the Rural and Native Housing (RNH) Program.

It is our hope that this Self-Build Construction Manual will give you a better understanding of what is involved in building your own house.

The project you are about to begin can be expected to last up to 3-6 months, depending on how much of the work you plan to do yourself and how much will be done by sub-trades.

You will be provided with house plans, building materials, site services, construction supervision and inspections and sub-trade labour for those items of construction which you are unable to do yourself.

As a Self-Build client under the RNH program, you will be assisted by a Construction Manager who will supervise your work, provide you with advice and assistance and will ensure you follow building codes and good construction practices. The Construction Manager will also encourage you to work together with other people who are building their own house so that you can benefit from each other's experience and the extra help.

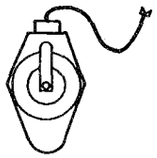
The sections of this manual have been arranged in the suggested sequence in which various stages might proceed, and builder's notes have been provided for practical advice. If there are any necessary changes to the details shown, due to variations in local or provincial building regulations, these will be brought to your attention by the Construction Manager.

You, the homeowner, are responsible for building your house through your own efforts, with the help of relatives, friends and neighbours. Although this will require a great deal of time and effort, it will be a rewarding experience for you and your family.

SECTION 1

INTRODUCTION

HARD HAT



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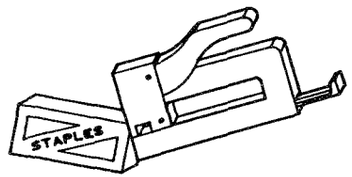
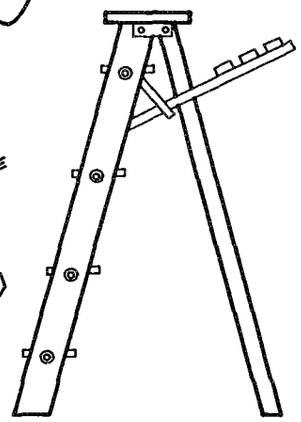
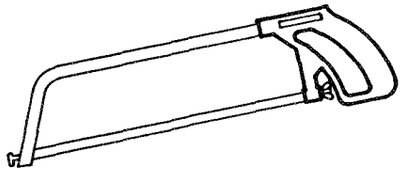


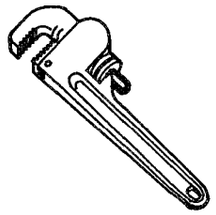
STAPLE GUN



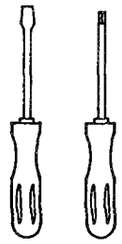
STEP LADDER



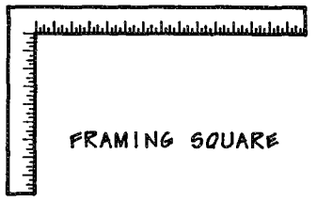
HACKSAW



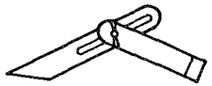
PIPE WRENCH



SCREWDRIVERS

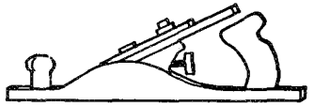


FRAMING SQUARE

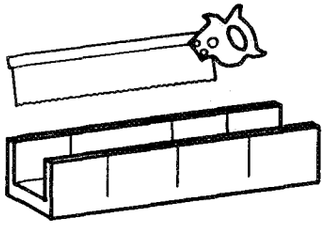


BEVEL

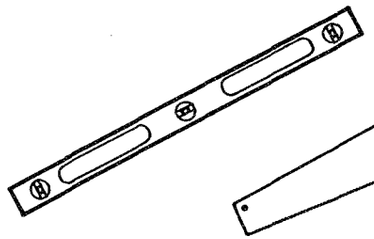
GLOVES



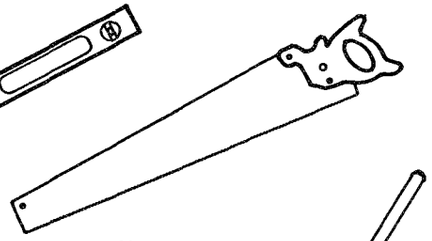
PLANE



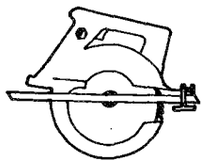
MITRE SAW AND BOX



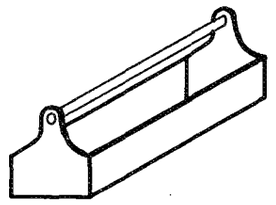
LEVEL



HAND SAW

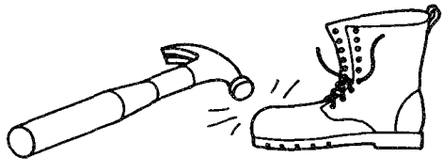


CIRCULAR SAW



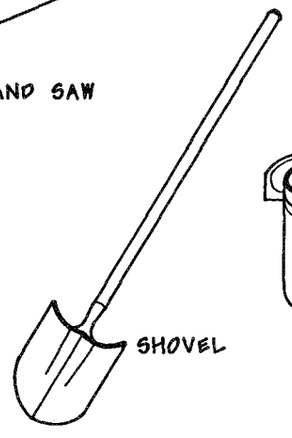
TOOL BOX

SAFETY GOGGLES

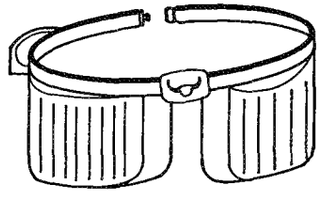


HAMMER

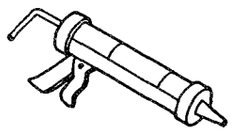
STEEL TOED BOOTS



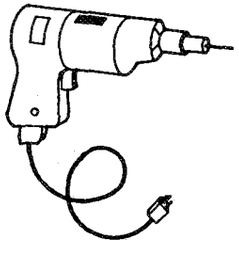
SHOVEL



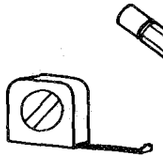
CARPENTERS APRON



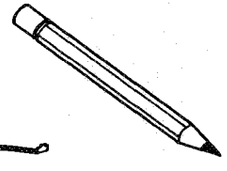
CAULKING GUN



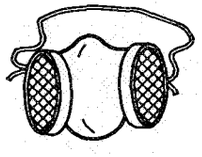
ELECTRIC DRILL



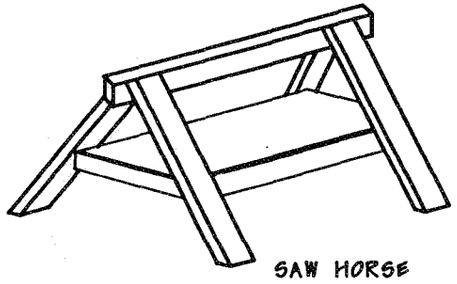
TAPE MEASURE



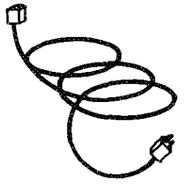
PENCIL



FILTER MASK



SAW HORSE



EXTENSION CORD

NOTES:

To do the job properly and easier, you need the right tools.

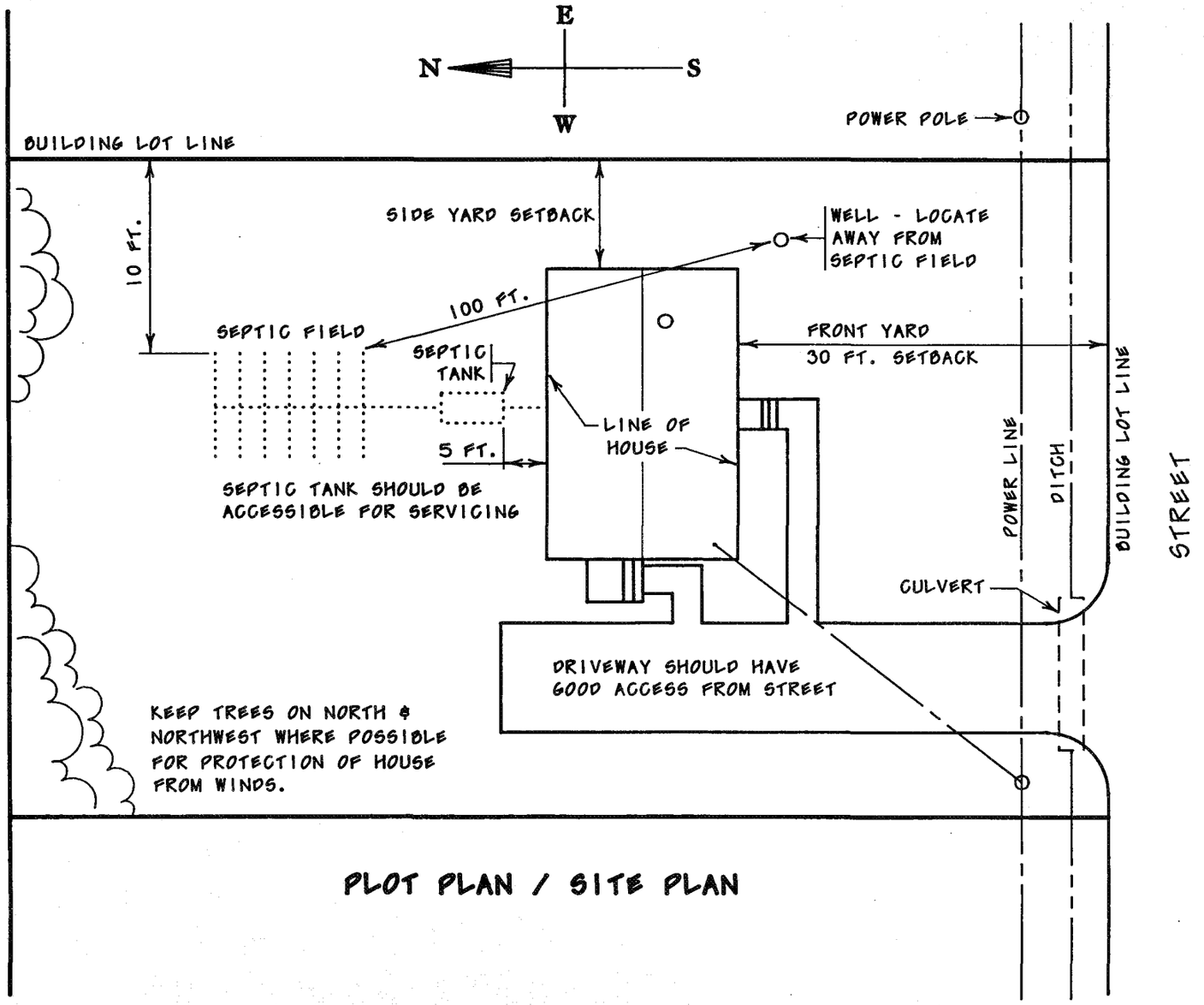
1. *This page shows the most common tools needed to build your house. These are the basic tools you may wish to purchase or borrow for the construction of your home.*

2. *There are many varieties of tools and manufacturers from which to choose. It pays to shop around and talk to tradesmen before purchasing tools and equipment.*

3. *Once you have purchased your tools, you will want to protect your investment by properly storing them while not in use.*

4. *Proper care of tools is important: clean off rust immediately; keep power saw blades sharpened; keep small tools in a single tool box for convenience; keep hand saws, mitre saws, chisels, knives and axes sharp for ease of cutting.*

To ensure the safety of yourself and your volunteer helpers, you must make sure the following safety equipment items are available and used:
- *steel toed/soled boots*
- *hard hats*
- *gloves*
- *filter masks*
- *safety goggles*



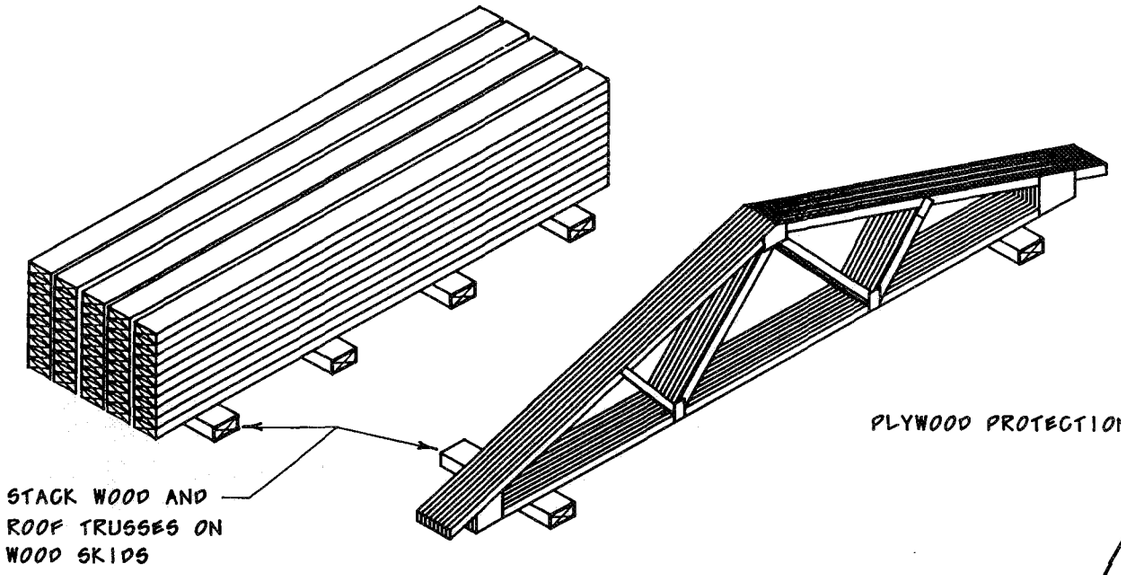
PLOT PLAN / SITE PLAN

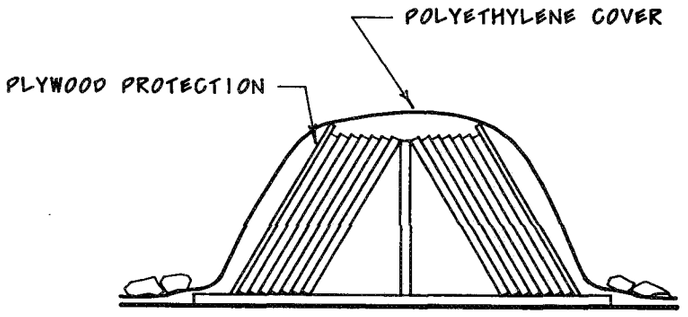
NOTES:

1. *The allowance for side yard setbacks and front yard setbacks are required by local municipalities.*
2. *The location of septic tank and septic field requires approval by local authorities.*

   An Engineer's Report may be required for determining the location of septic field and the elevation of the house in relation to septic field and street.
3. Locate well a safe distance from the septic field (usually 100 feet minimum).
4. Setting the height or elevation of the house is very important as the finished grade must provide natural drainage away from the house.
5. It is suggested that the living room or window side face toward the south.
6. Run weeping tile to ditch or drywell.
7. The electrical panel should be located on side of house closest to the power pole; otherwise an additional pole may be required.
8. The living room or "window side" should face toward the south.

BUILDING SITE PREPARATION	1-2



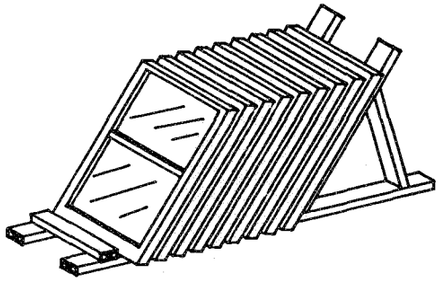


WOOD, BEING DURABLE AND RESILIENT, CAN WITHSTAND MUCH ABUSE WITHOUT DAMAGE, BUT LACK OF CARE BEFORE AND DURING CONSTRUCTION CAN AFFECT WOOD PRODUCTS ADVERSLY. WOOD'S TEXTURE, GRAIN, COLOUR AND SHAPE ARE IMPORTANT FEATURES OF A FINISHED STRUCTURE; PROPER STORAGE AND HANDLING CAN ASSURE GOOD QUALITY IS MAINTAINED.

WOOD SHOULD NOT BE DUMPED CASUALLY ON-SITE OR SET DOWN WITH A CRASH. THE MATERIALS WILL BE ALMOST CERTAINLY DAMAGED AND INJURY IS POSSIBLE.

THE BEST WAY TO ENSURE THAT YOUR LUMBER IS NOT DAMAGED IS TO ARRANGE FOR PROPER STORAGE BY PLACING BLOCKING UNDER THE LUMBER AND COVERING WITH PLASTIC SHEET.

WINDOWS ARE A COSTLY ITEM FOR YOUR HOME AND WHEN RECEIVED AT THE SITE THEY SHOULD BE HANDLED VERY CAREFULLY. SELECT A LEVEL AREA AND PLACE ON WOOD SKIDS. IT IS BETTER TO STAND WINDOWS AT SLIGHT ANGLE THAN TO LAY FLAT. AFTER ALL WINDOWS ARE STACKED, PLACE A SHEET OF PLYWOOD OVER THE GLASS AREAS AND WRAP IN POLYETHYLENE TO KEEP DRY.

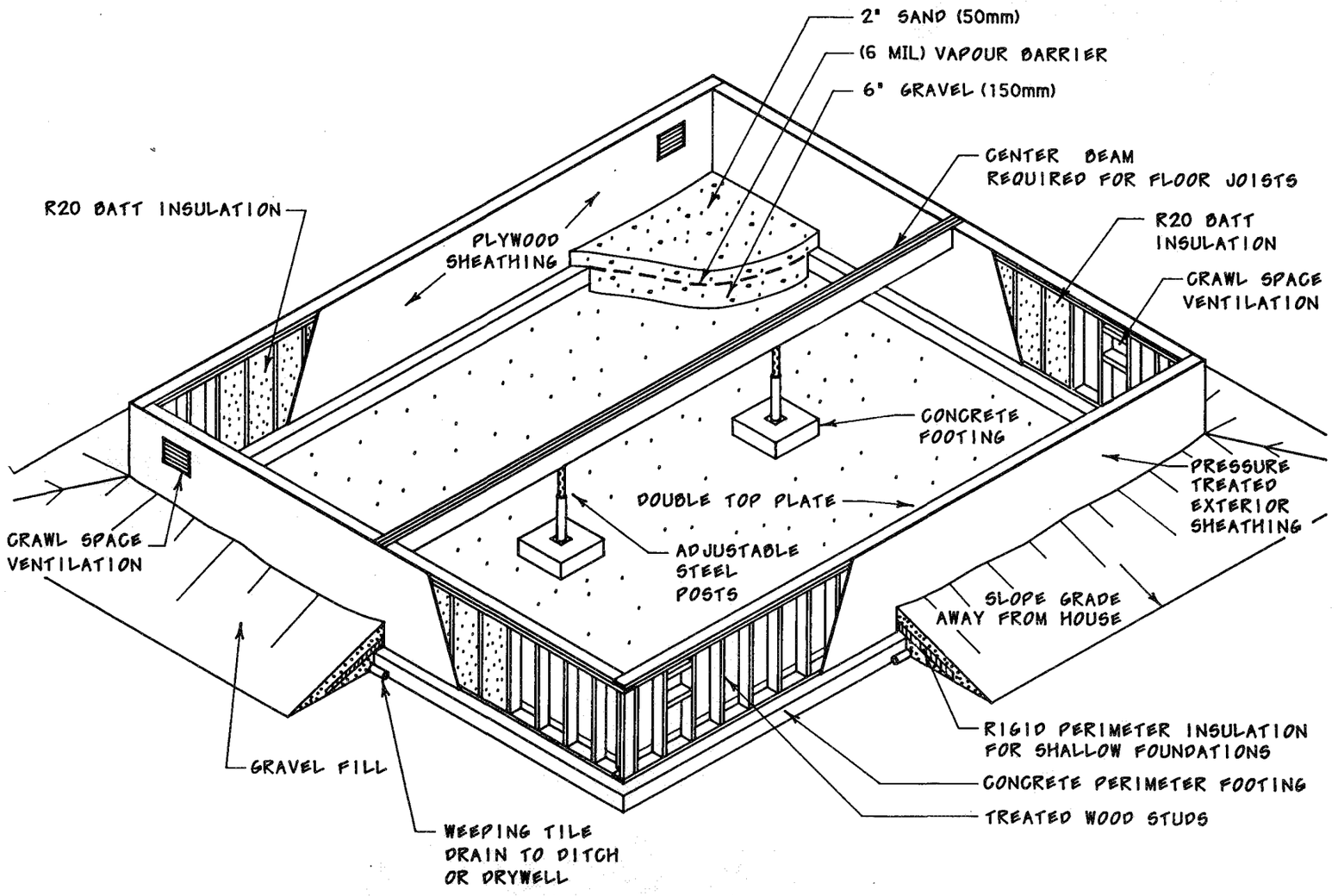


STACK WINDOWS OFF GROUND

MATERIALS

When a load of building materials arrives at your site there are certain precautions you should take to protect these materials from being damaged. Products such as plywood, gypsum board, insulation, windows and doors, wood siding, electrical materials should be stored on blocking and covered with polyethylene to keep them dry. Paint, stain and glue should be kept from freezing and polyethylene (vapour barrier) should be kept out of the sun to prevent deterioration. Framing lumber should be piled tightly to keep it from twisting.

It is very important that prefabricated items and materials be installed in accordance with manufacturer's recommendations and instructions. These instructions are usually supplied with each product.



CRAWLSPACE FOUNDATION

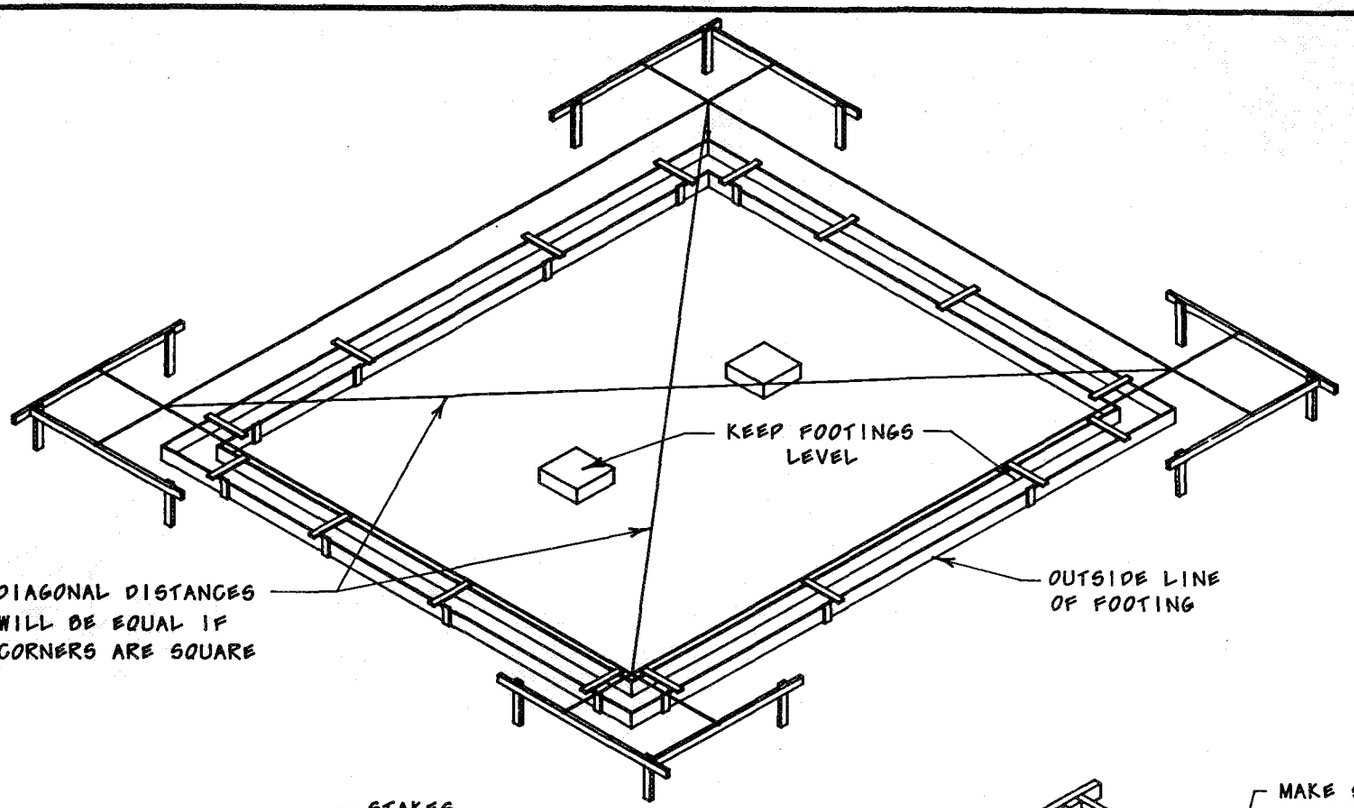
NOTES:

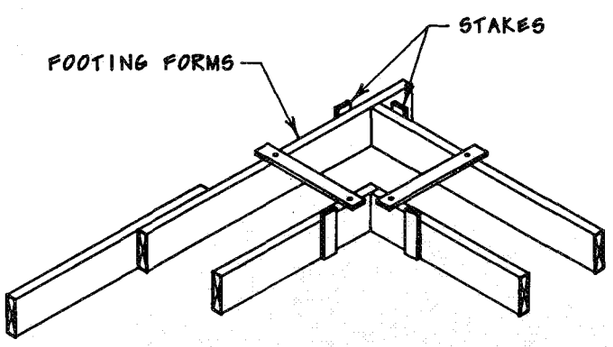
1. *This manual details the use of preserved wood for a 4'-0" high crawlspace foundation. This is the most common foundation used where self-builders are involved.*

   Since it is expected that a Contractor will be involved where poured concrete is used for a full basement, this method will not be detailed.

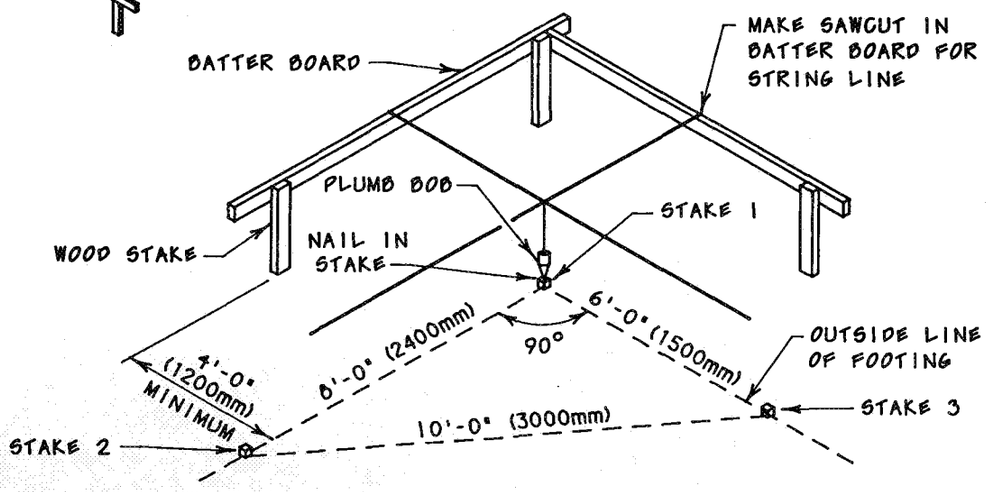
2. *This drawing shows gravel fill against the foundation walls without floor joists in place. In practice, no fill is placed against foundation until floor system is installed.*

3. *This type of foundation may not be possible in your area. Check with building authorities.*





DETAIL OF FORMWORK FOR FOOTINGS



CONSTRUCTION SEQUENCE

Layout the outside corners of the footings by placing wood stakes and using string lines and measuring tapes as shown. Laying out the corners and checking for squareness will require two people.

To ensure a square corner, measure along one side and put in stake 2. Then using 2 measuring tapes at the same time, measure along the second side and the diagonal. Cross the tapes at the dimensions shown to locate stake 3.

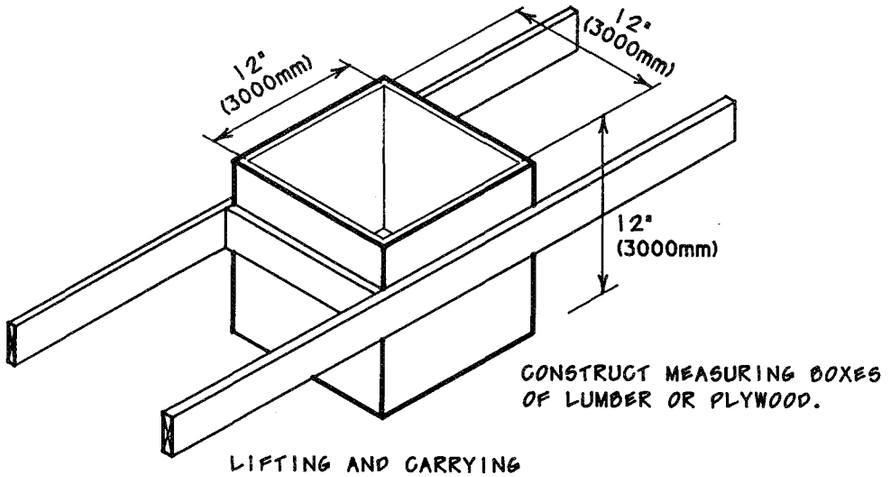
After the stakes are checked for squareness and outside corner dimensions are correct, erect batter boards a minimum of 4'-0" (1200 mm) to the outside of the corner stakes.

Batter boards are helpful in relocating the corners if the corner stakes are removed in order to construct footing formwork.

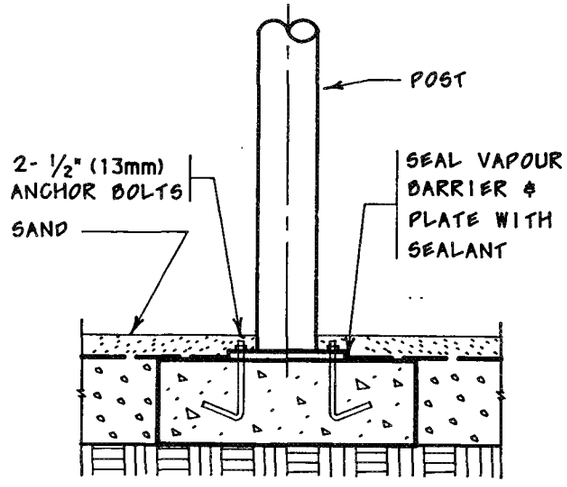
To mark batter boards, place a plumb bob on the line, in line with the stake and extend the string to the batter board and set in a 1/2" (13 mm) deep saw cut.

NOTES:

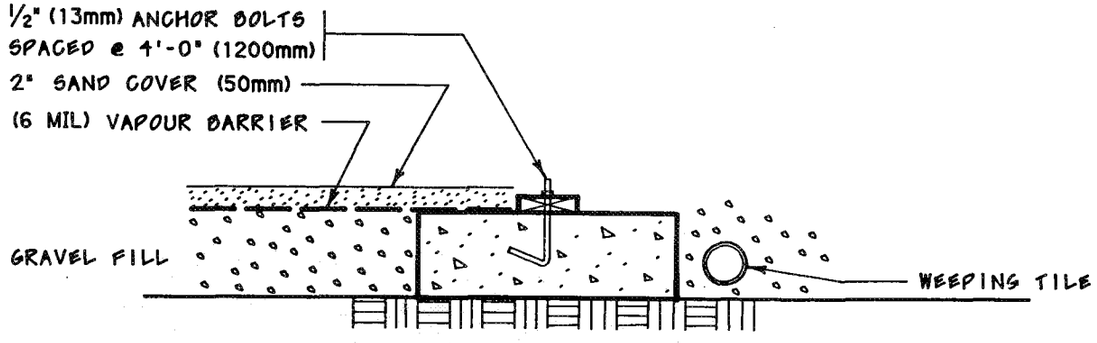
1. *Interior footings to be used for center posts to support floor framing.*
2. *Size of footings to be determined by construction manager dependent on soil conditions. Normally perimeter footings to be no smaller than 6" x 20" (150 mm x 500 mm)*
3. *Material for footings forms are to be reused for framing, therefore when using joists for forms overlap rather than cut.*



ONE CUBIC FOOT MIXING BOX



POST FOOTING DETAIL



CRAWLSPACE EXTERIOR WALL FOOTING DETAIL

ON SITE CONCRETE MIXING

Where ready-mix concrete is not available and concrete is mixed on site, careful attention must be taken to ensure the proper amount of cement, sand, stone and water go into the mix. To do this, use the 1 cubic foot box shown to measure the materials as follows for each batch:

2 boxes of cement
2 boxes of stones
3 boxes of sand

Mix materials well, add water and continue mixing well before placing in forms. Do not add too much water as this will reduce the strength of the concrete.

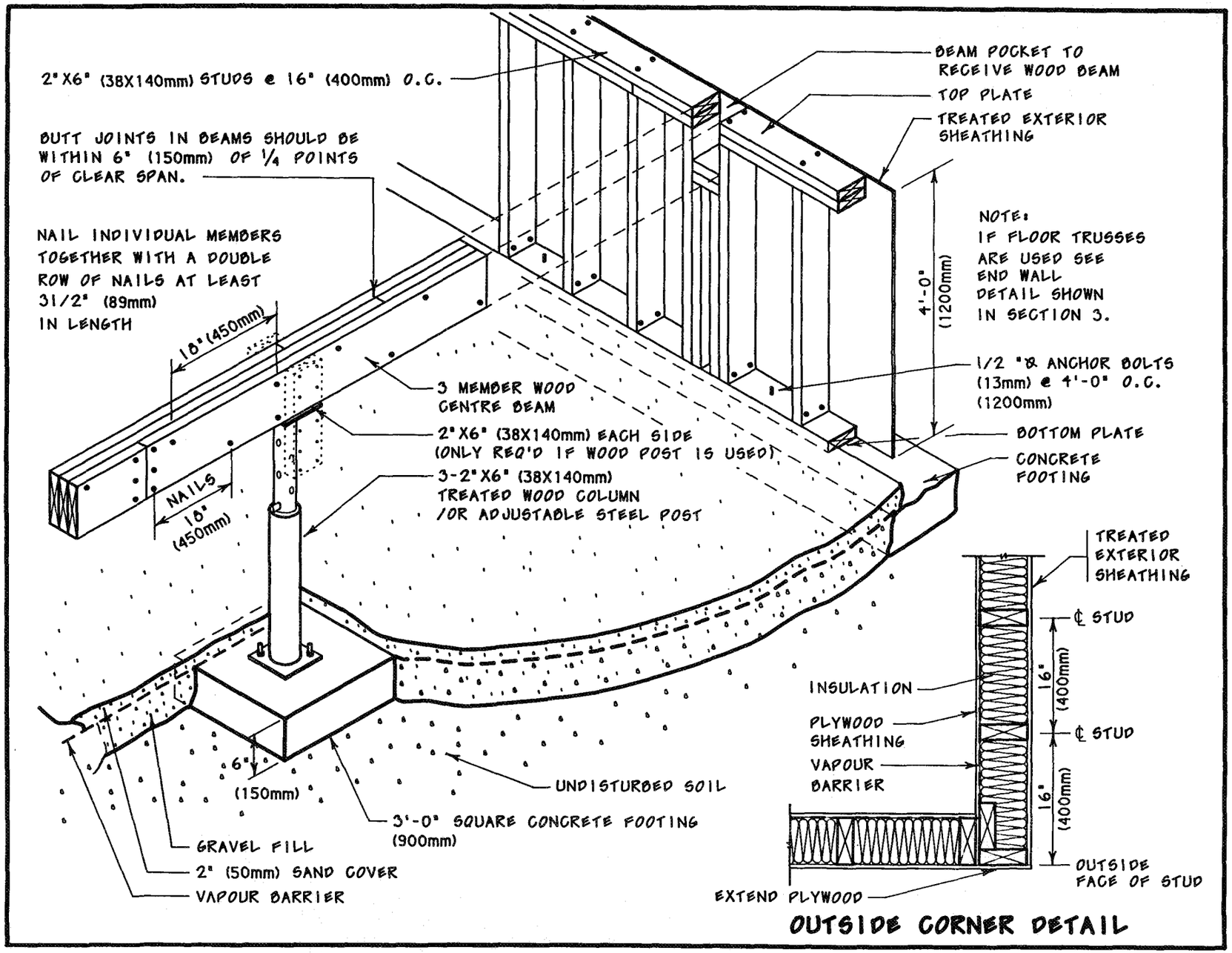
Allow concrete to harden overnight before removing forms and continuing construction. Do not allow concrete to freeze for at least 5 days.

Place anchor bolts at 4'- 0"o.c.(1200 mm) after concrete is placed in forms and is still fresh. Place anchor bolts in centre of footing making sure they are vertical and that they extend above the concrete at least 2 1/2" (60 mm).

NOTE:

Run weeping tile around perimeter of house and out to the ditch or drywell. Place holes downwards.

An alternative to anchor bolts is to install pressure treated 2"x6" nailers into footing forms every 4'. Bottom wall plates may be nailed to the nailers in the footing.



OUTSIDE CORNER DETAIL

CONSTRUCTION SEQUENCE

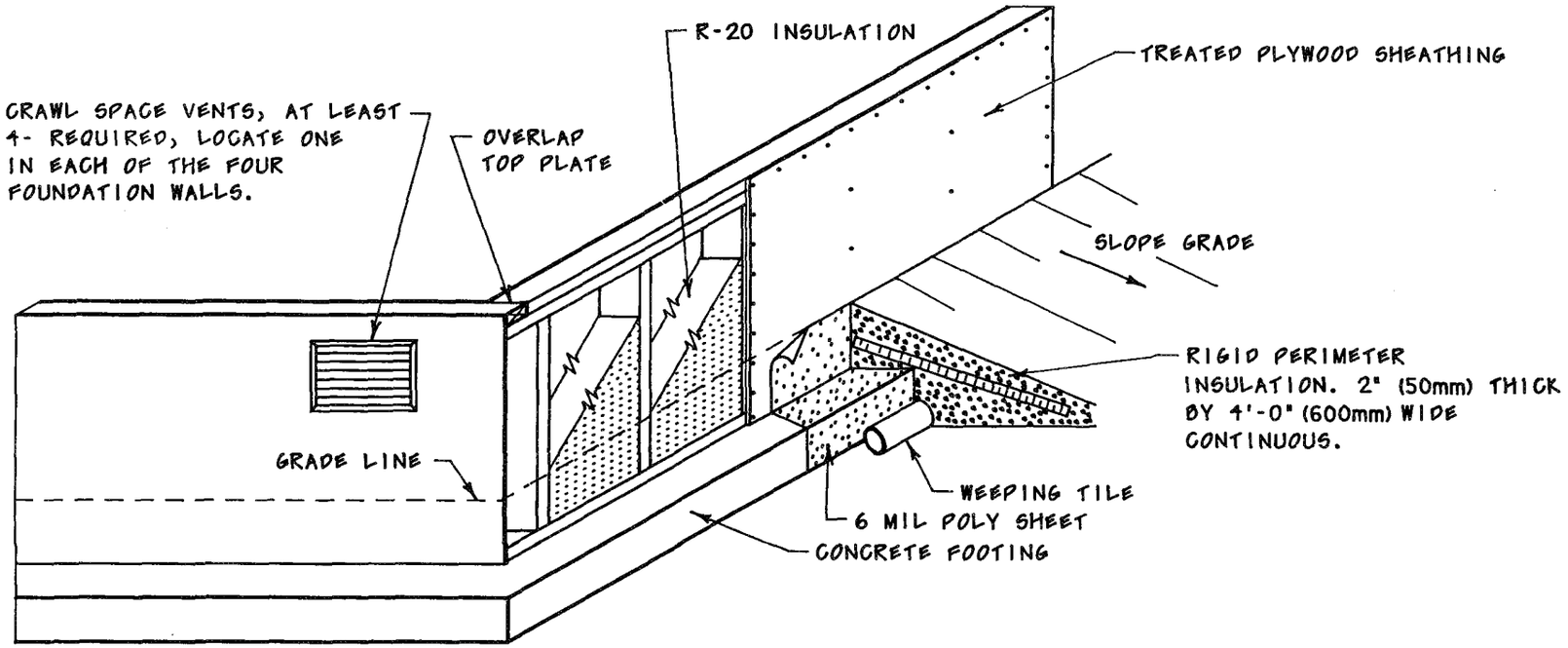
1. Mark wall locations on footing and take accurate measurements of wall lengths, location of any openings or beam-pockets in the foundation walls.
2. Construct wall framing on the ground. Check for squareness and install exterior sheathing. Leave a slight space between sheets.
3. After the exterior sheathing is installed, fill the slight space between sheets with a good quality exterior grade caulking.
4. Drill holes in bottom plate for anchor bolts, stand up the wall and install the nuts & washers.
5. Install insulation, vapour barrier and interior plywood.

NOTES:

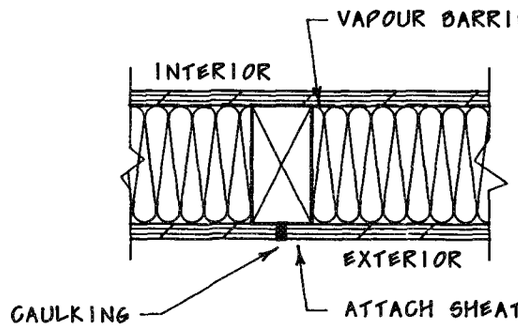
1. *Wood studs, wood columns, wood plates and exterior plywood to be pressure treated.*

   (Pressure treated lumber and plywood used for the foundation walls is always green in colour and labelled.)
2. *If pressure treated columns are used, build them with uncut ends downward.*
3. *Treat all cut ends of pressure treated lumber and plywood with 2 coats of brush applied wood preservative.*
4. *Butt joints in wood beams shall be located over a supporting post or within 6" (150 mm) of the quarter points in the span. Only one joint at each location is permitted.*

PRESERVED WOOD FOUNDATION FRAMING



FOUNDATION WALL DETAILS



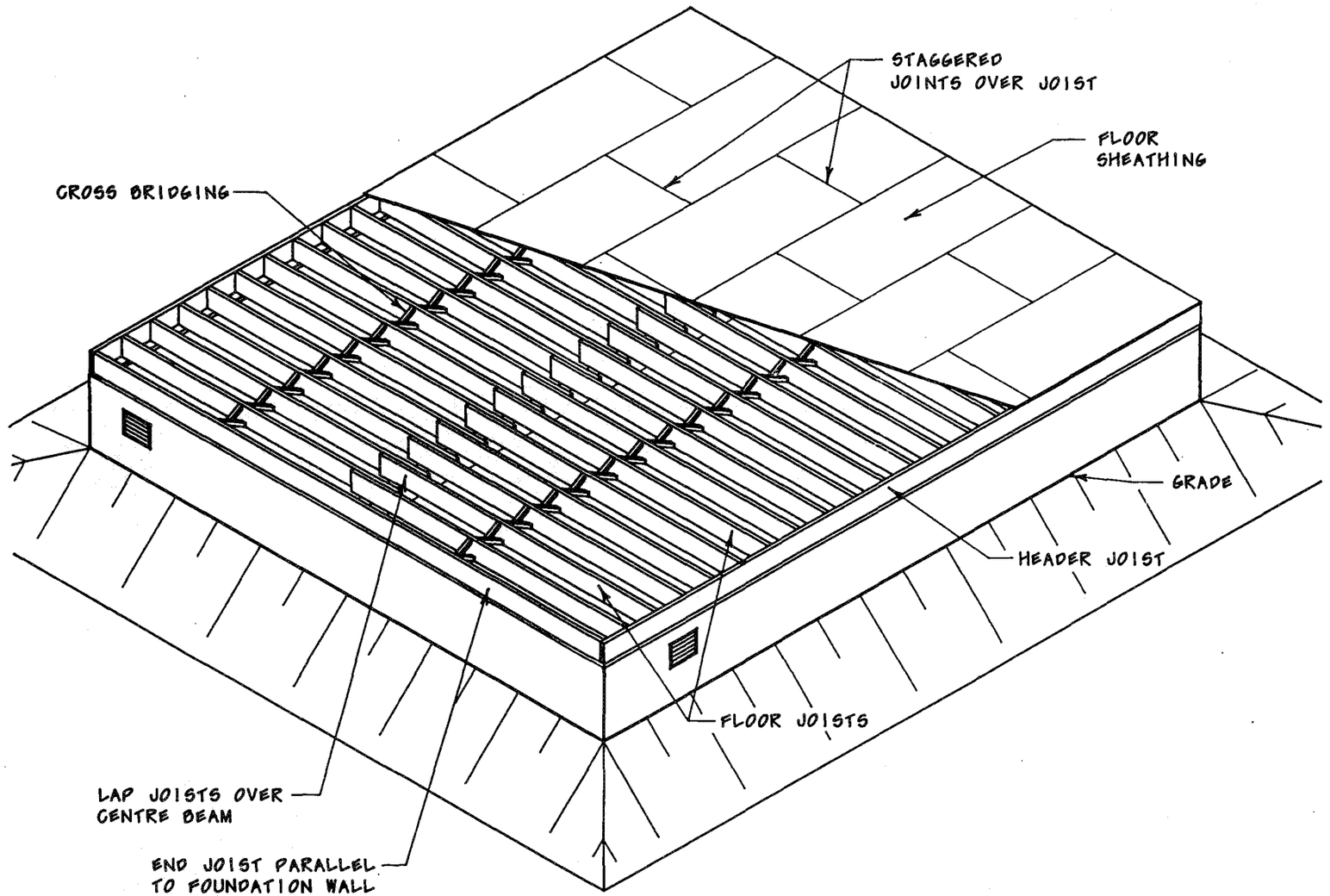
DETAIL AT EXTERIOR JOINT IN PLYWOOD SHEATHING

CONSTRUCTION SEQUENCE

NOTES:

1. *Install one crawl space vent in each of the four foundation walls. Place vent just below the double top plates of wall.*
2. *Vents should be located so as not to be obstructed by exterior steps, electrical entrance, oil tank etc.*
3. *Vents shall be screened, operable louvre type in order to be opened in the summer and closed in winter.*
4. *When poly sheet is used to dampproof the foundation wall a " x 12" wide PWF plywood grade board (not Shown) is installed to protect the poly at grade.*
5. *Poly sheet is never sealed at bottom of wall.*
6. *Bitumastic (tar) may be used as dampproofing stead of poly sheet.*

FOUNDATION WALL DETAILS | 2-4

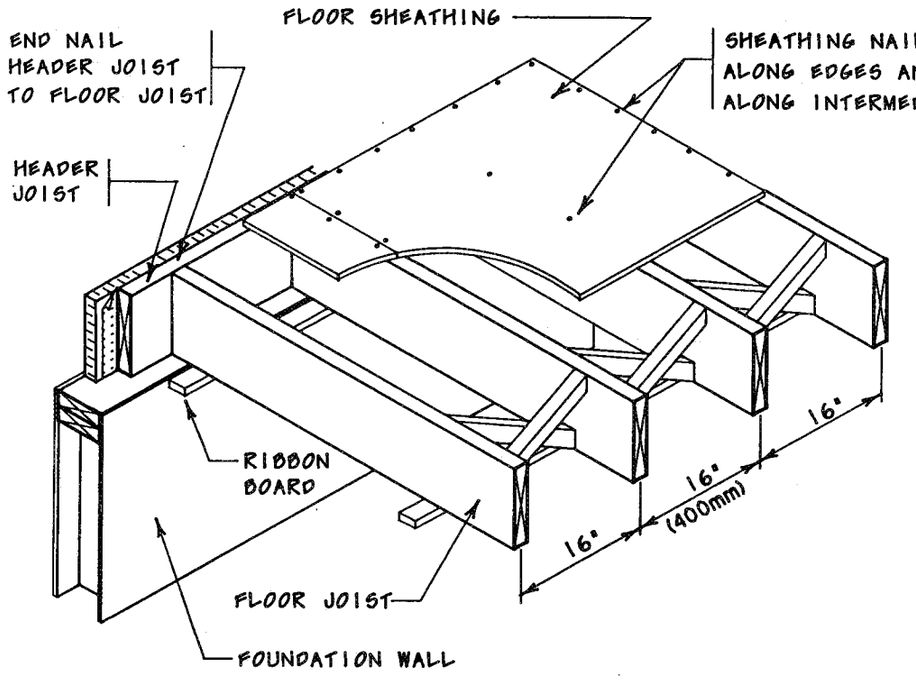


Once the footing and foundation walls are complete, the next step is to construct the floor framing. This can be done either using lumber joists supported on a centre beam or by using clear span floor trusses.

It is very important that the floor sheathing be nailed properly to the floor framing to avoid a squeaky floor.

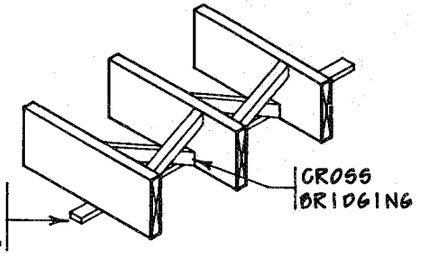
SECTION 3

FLOOR CONSTRUCTION

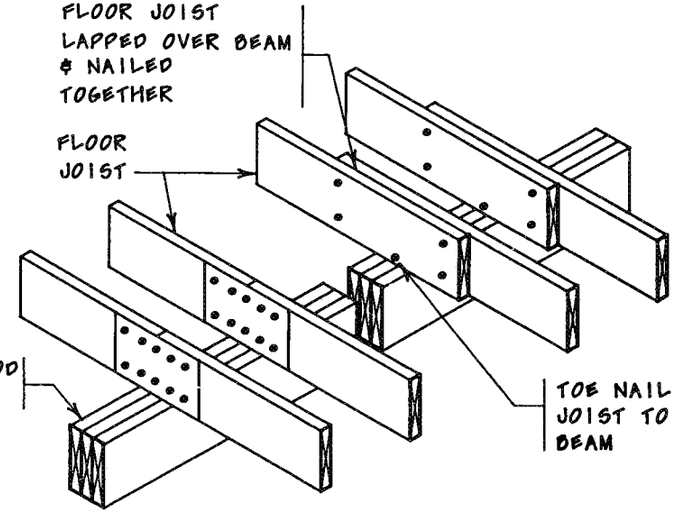


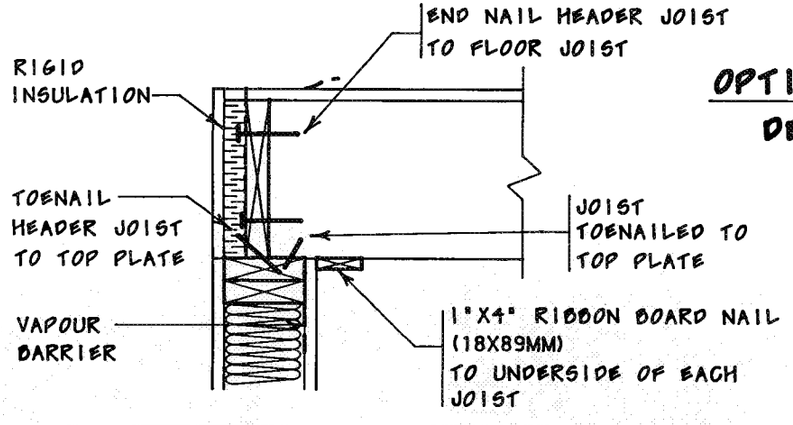
DETAIL OF FLOOR JOIST AT EXTERIOR WALL

NOTE: SOLID BLOCKING MAY BE USED INSTEAD OF CROSS BRIDGIDNG.



DETAIL OF CROSS BRIDGING





OPTION 'A' BUTT JOINT OPTION 'B' LAP JOINT

DETAIL OF FLOOR JOIST OVER CENTRE BEAM

NAILING FOR FRAMING	MIN. LENGTH OF NAIL	MIN. NUMBER OF NAILS OR SPACING
FLOOR JOIST TO PLATE-TOENAIL	3¼" (82)	2
DOUBLE TOP WALL PLATES	3" (76)	24"o.c.(600)
STUD TO WALL PLATE	2½" (63)	4
TOENAIL OR ENDNAIL	3¼" (82)	2
BUILT - UP WOOD BEAM	3½" (89)	18" (450) APART IN EACH ROW.
PLYWOOD TO STUD ⅜"TO 1⅜" (10) (20)	2" (51)	6" (150)o.c. ALONG EDGES AND 12" (300)o.c. ALONG INTERMEDIATE SUPPORTS.

CONSTRUCTION SEQUENCE

Install header joist along outside perimeter of floor area, over foundation walls.

Mark off header joist and centre beam for joists at 16" o.c. (400 mm).

Install joists with bow or "crown" up.

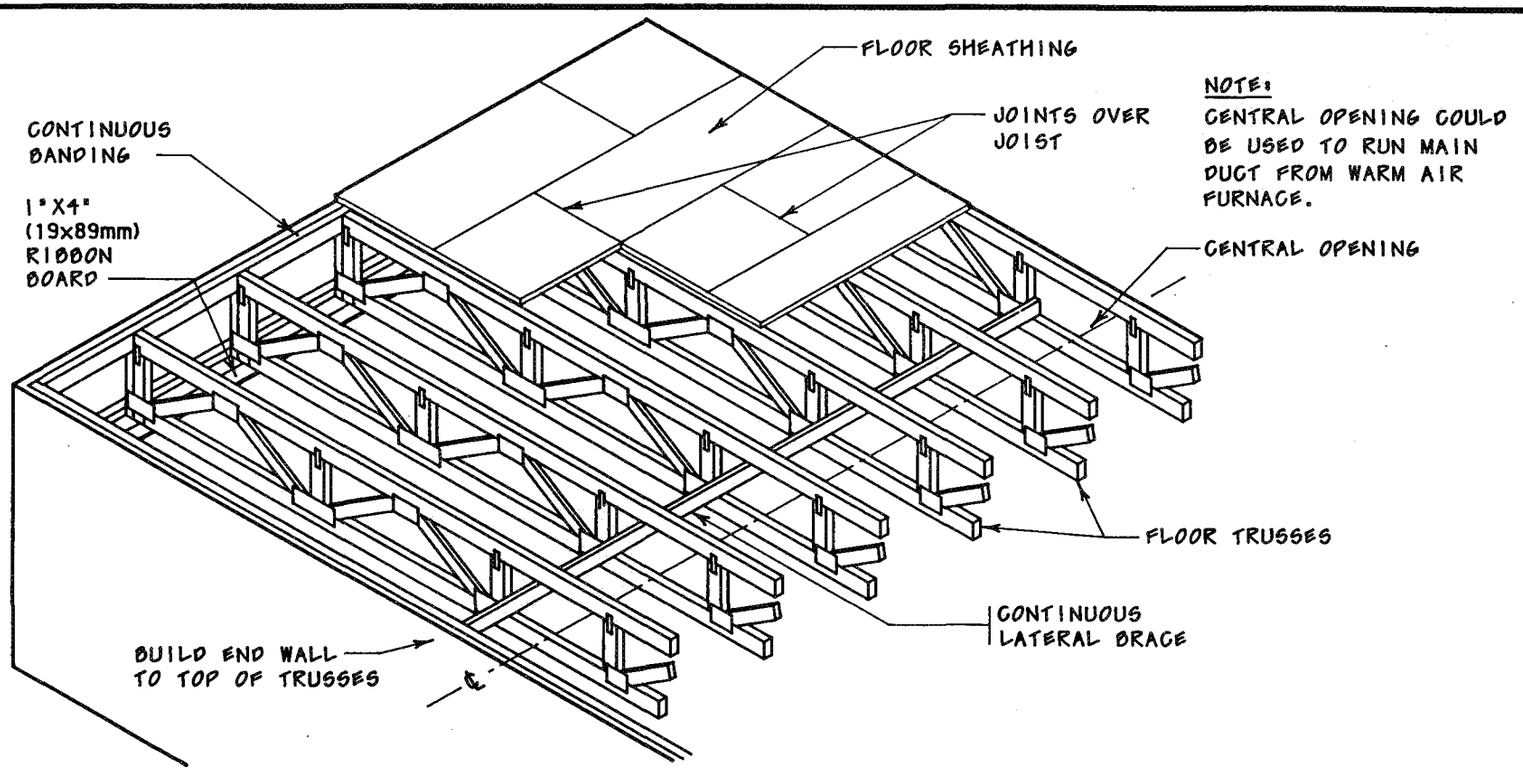
Place joists against header joist and end nail in place. Overlap floor joists at centre beam and nail together and toenail joist to centre beam. Toenail header joist and each floor joist to top plate.

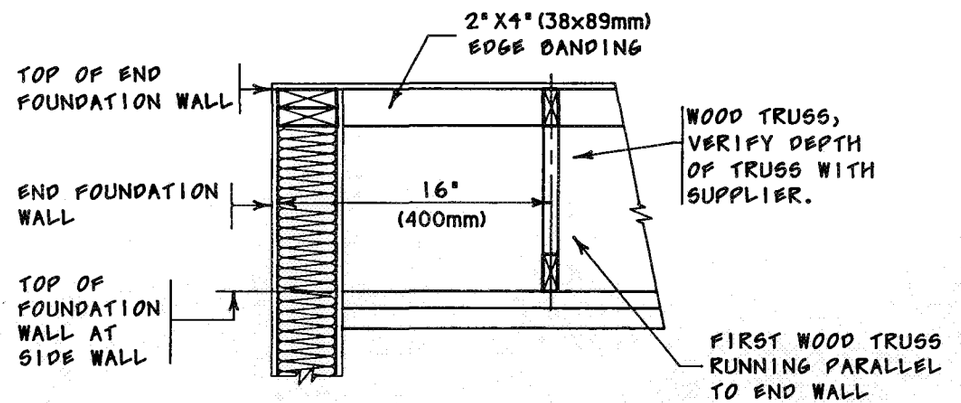
Nail continuous ribbon board to underside of joists tight against foundation wall.

Install 1½" x 1½" (38 mm x 38 mm) bridging or 1½" (38 mm) thick solid blocking securely nailed between joists together with continuous 1" x 3" (19 x 64) wood strapping nailed to bottom of joists and fastened at each end to the wall top plate.

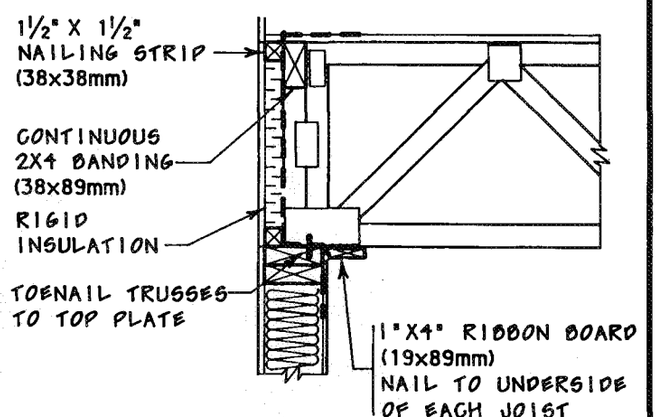
Install header joists around toilet and bathtub drainage piping as required.

Place sheathing over joist and nail as shown. Centre edges of sheet over joints. Stagger joints in sheathing.





DETAIL OF END WALL AND FIRST WOOD TRUSS



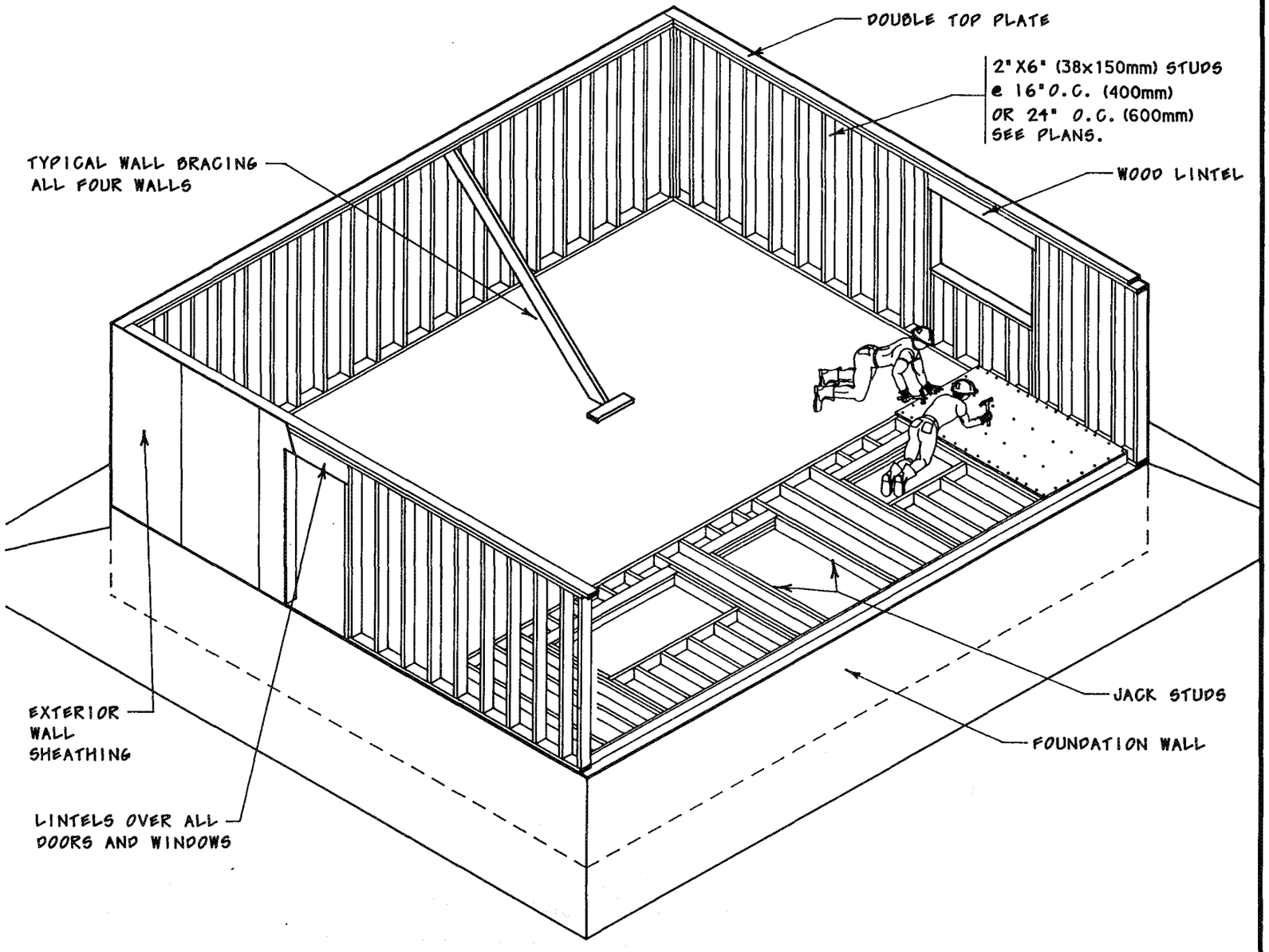
BOTTOM CHORD BEARING TRUSS

CONSTRUCTION SEQUENCE

1. Mark off top of foundation wall plate at 16"o.c. (400 mm).
2. Place floor trusses on side wall plates "foundation wall" in an upright position at one end of the house. Fit the lateral brace through the trusses at the locations shown on the truss drawings.
3. Move the trusses to the locations marked on the foundation wall and toenail to the top plate with 2-3¼" (82 mm) nails.
4. Nail continuous end bridging and lateral bracing to the trusses keeping top spacing in line with spacing marked on the top plate.
5. Nail continuous ribbon board to the underside of trusses.
6. Place sheathing over trusses and nail as shown. Centre edges over trusses and stagger joints in the sheathing.

NOTES:

1. *Trusses to be installed in accordance with manufacturer's recommendations.*



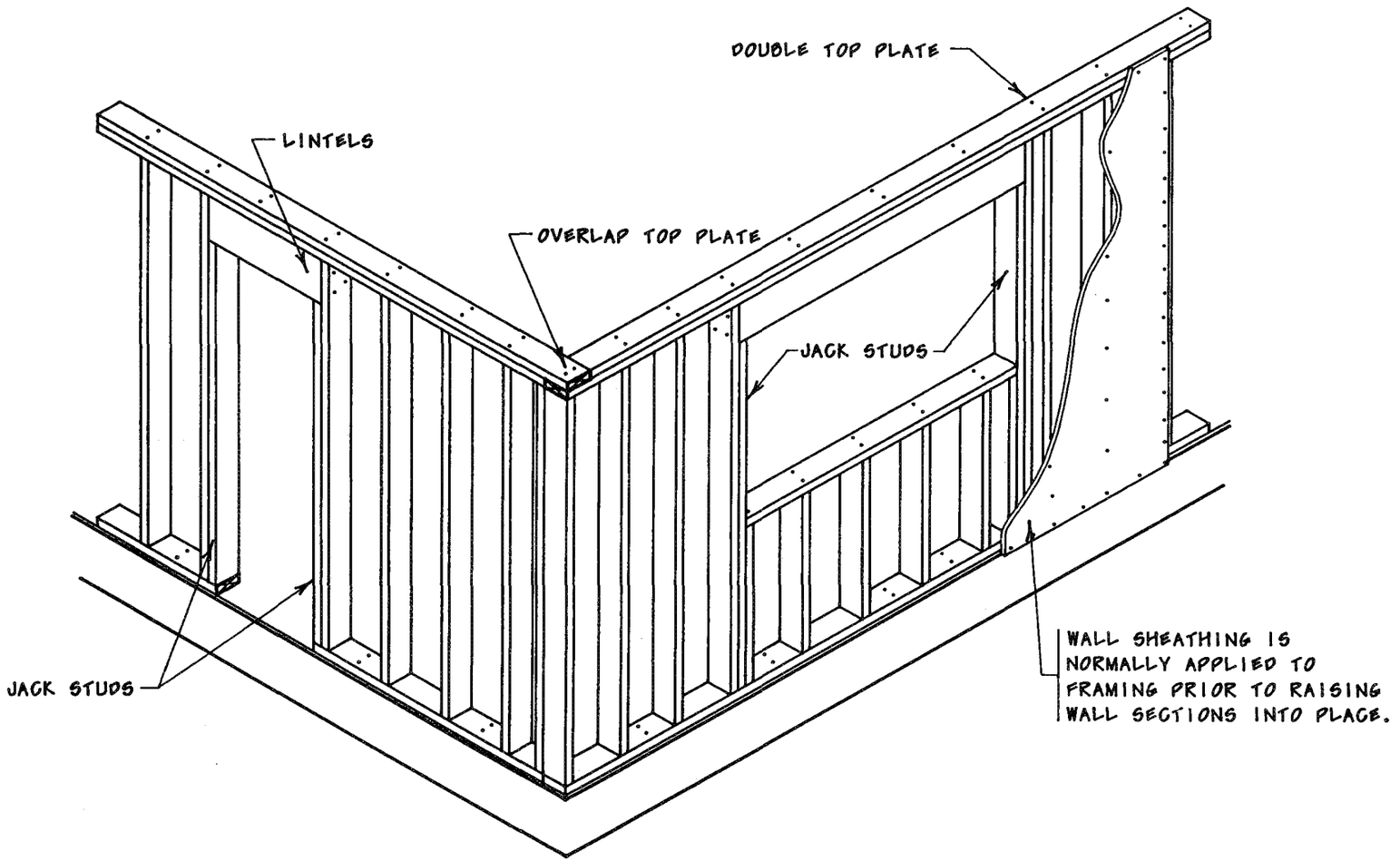
Following completion of the floor construction, the exterior walls are next. The walls are generally assembled on the floor and are then raised into place. Raising these walls requires several people working together as the walls are rather heavy.

Important here is accurate measurement for the window and door openings. These openings should be 1" wider (25 mm) and 1" (25 mm) higher than the actual window door unit to allow clearance for adjustments.

Remember when laying out studs that first stud from corner is spaced 15 1/4" from the corner then succeeding studs are spaced 16" o.c..

SECTION 4

EXTERIOR WALL FRAMING



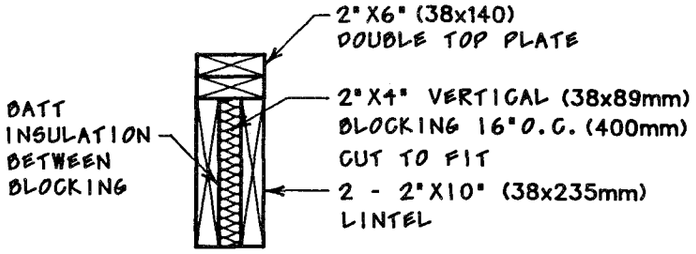
CONSTRUCTION SEQUENCE

With the floor sheathing nailed in place, use the floor area as a work space to construct the exterior walls.

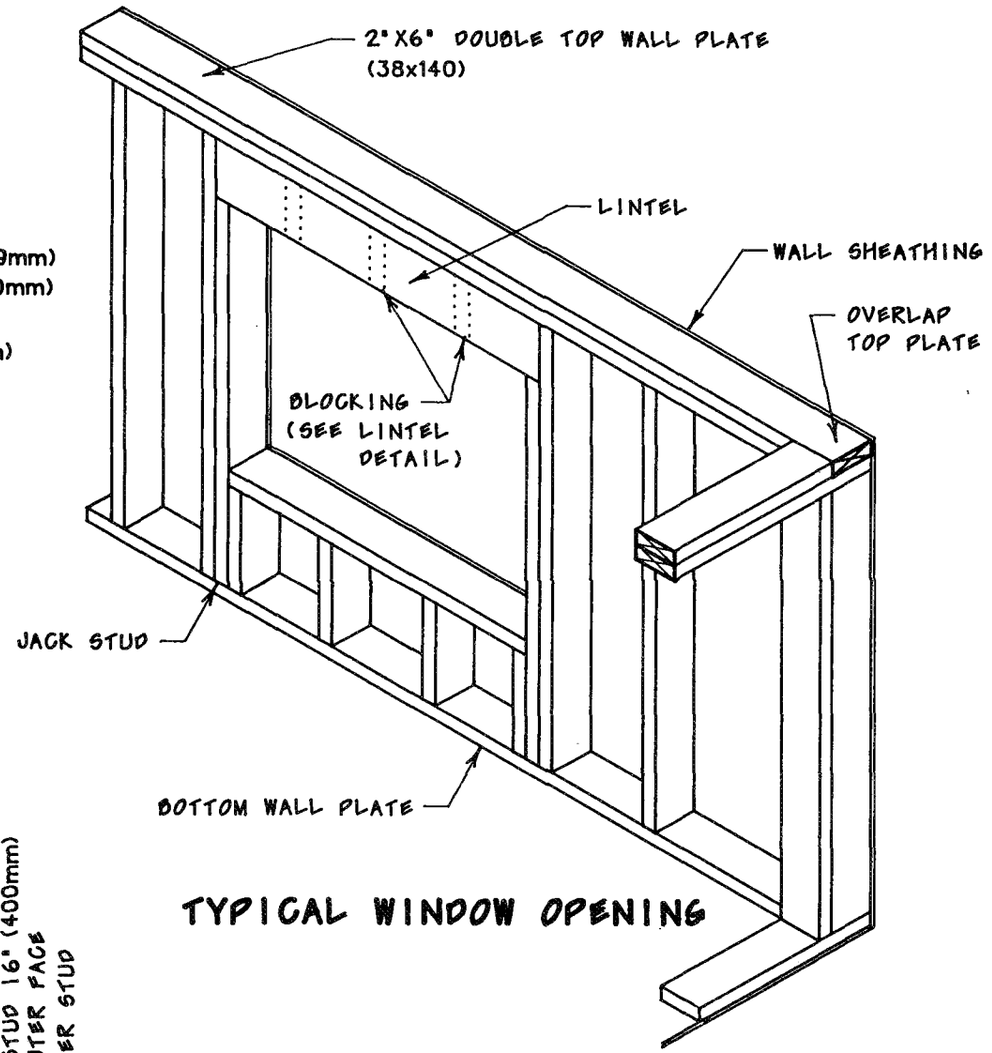
1. Mark location of exterior walls on floor deck, checking squareness (use chalk line to mark inside of wall).
2. Select good straight lumber for the top and bottom plates and mark off both plates for the wall studs and door/window openings while they are together.
3. Separate the top and bottom plates and nail in the pre-cut wall studs and door/window jack-studs.
4. Top and bottom plates are end nailed with three nails to each stud. Double up on studs at openings.
5. The jack stud is cut to receive the lintels which are placed and end nailed through the outer studs.
6. Wall sheathing is usually applied to the framing while laying on the floor to eliminate the need for scaffolding.
7. The wall sections are then raised into place. Temporary braces are added the bottom plates nailed to the floor joists.
8. The second top plate is then added. Ensure the plates overlap at the corners.

NOTES

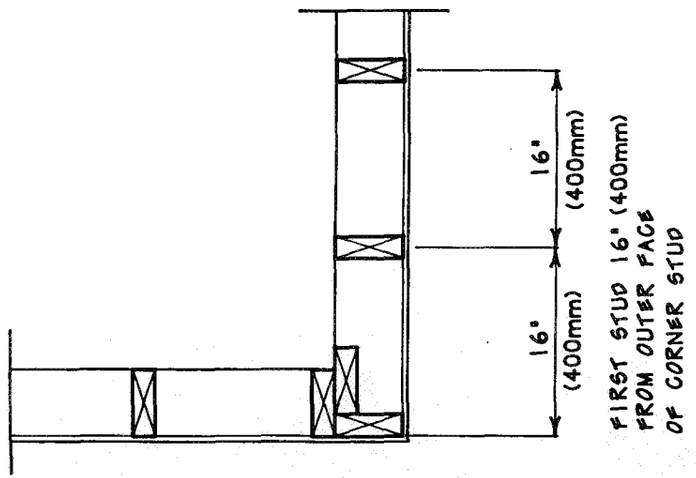
1. Insulate corners and stud spaces which may be closed in by framing or intersecting walls.



TYPICAL LINTEL



TYPICAL WINDOW OPENING



TYPICAL CORNER FRAMING

NOTES:

1. *First stud from corner should be measured from outside of corner stud so that the edge of the plywood sheathing will be centered over a stud.*

2. *Nailing schedule for framing:*

   - *Floor joists to plate:*
     3 - 3 (89 mm) nails, toenail

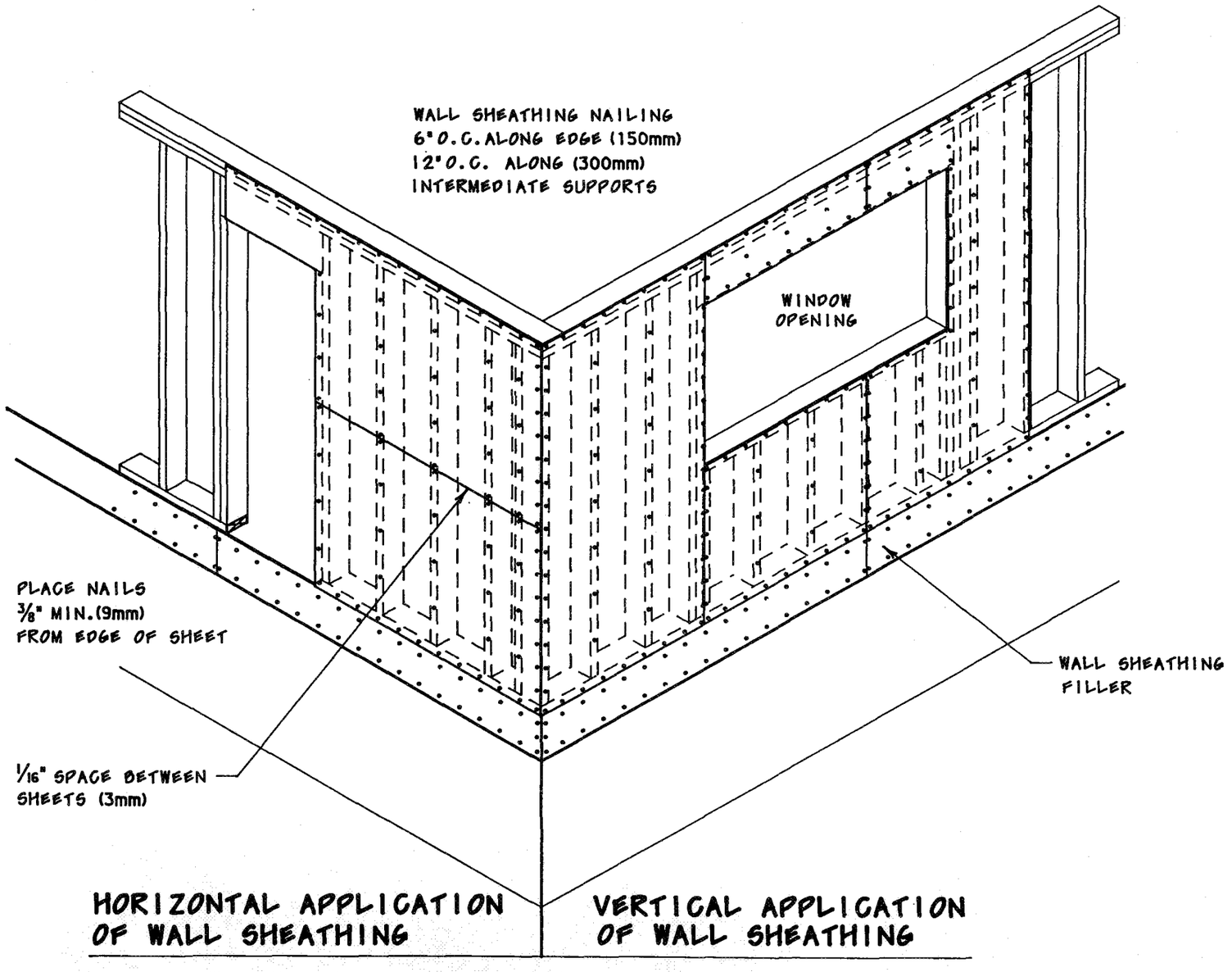
   - *Stud to top wall plate, each end:*
     3 - 3 (89 mm) nails

   - *double wall plates:*
     three 3" (76 mm) nails at 24"o.c (600 mm)

   - *bottom wall plate, exterior walls:*
     three 3 " (89 mm) nails at 16"o.c. (400 mm)

   - *lintels to studs:*
     3 - 3 (89 mm) nails

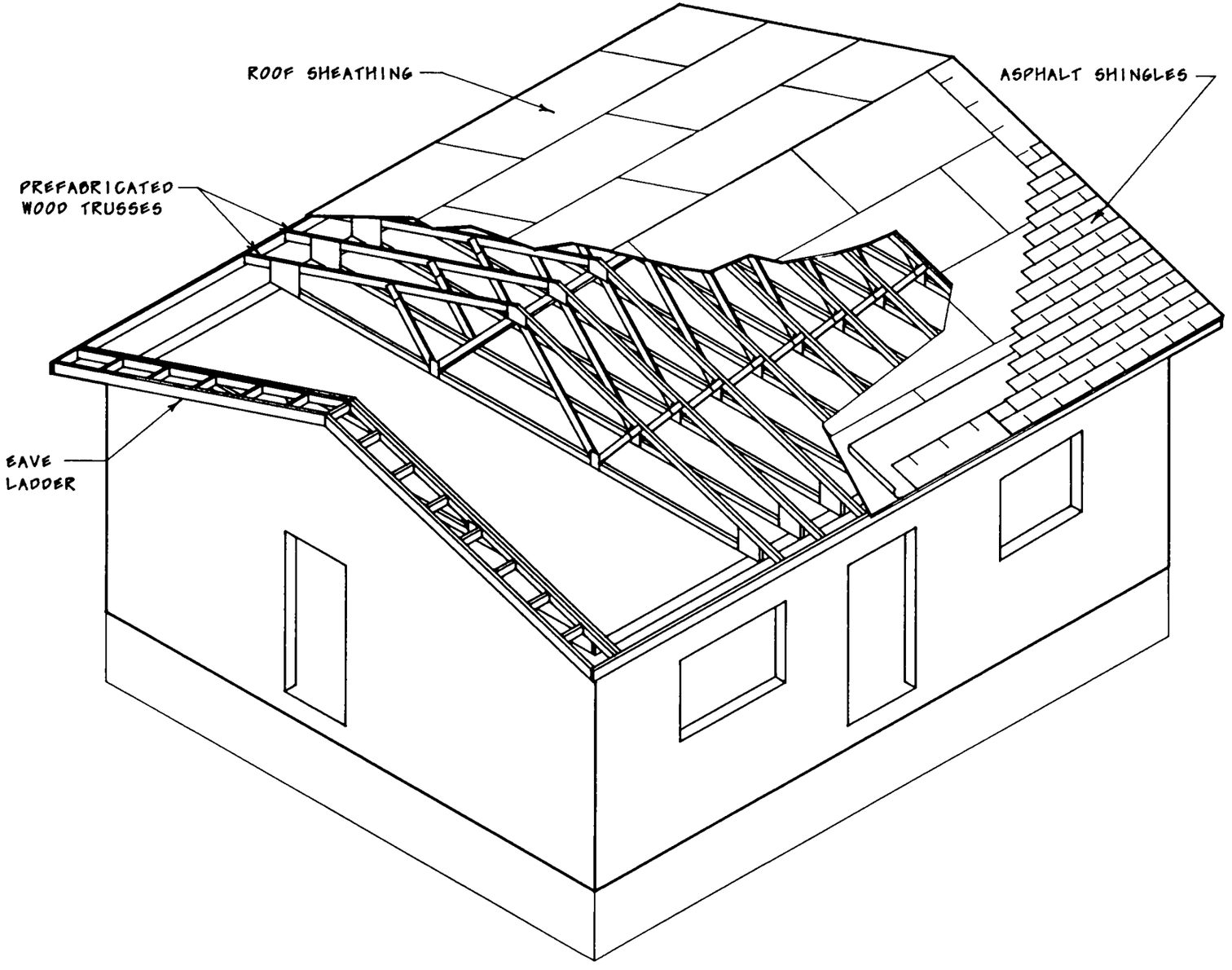
   - *double lintel to blocking between (each side)*
     3 "(89 mm) nails at 16"o.c. (400 mm)



CONSTRUCTION SEQUENCE

Install wall sheathing to the studs using either the vertical or horizontal method, with galvanized nails. Ensure that the joints occur at the studs.

Once the walls have been raised and nailed in place, install a strip of sheathing over the rigid insulation at the floor level.



With the exterior walls raised in place, plumbed, braced and sheathing applied, the next step is to frame the roof.

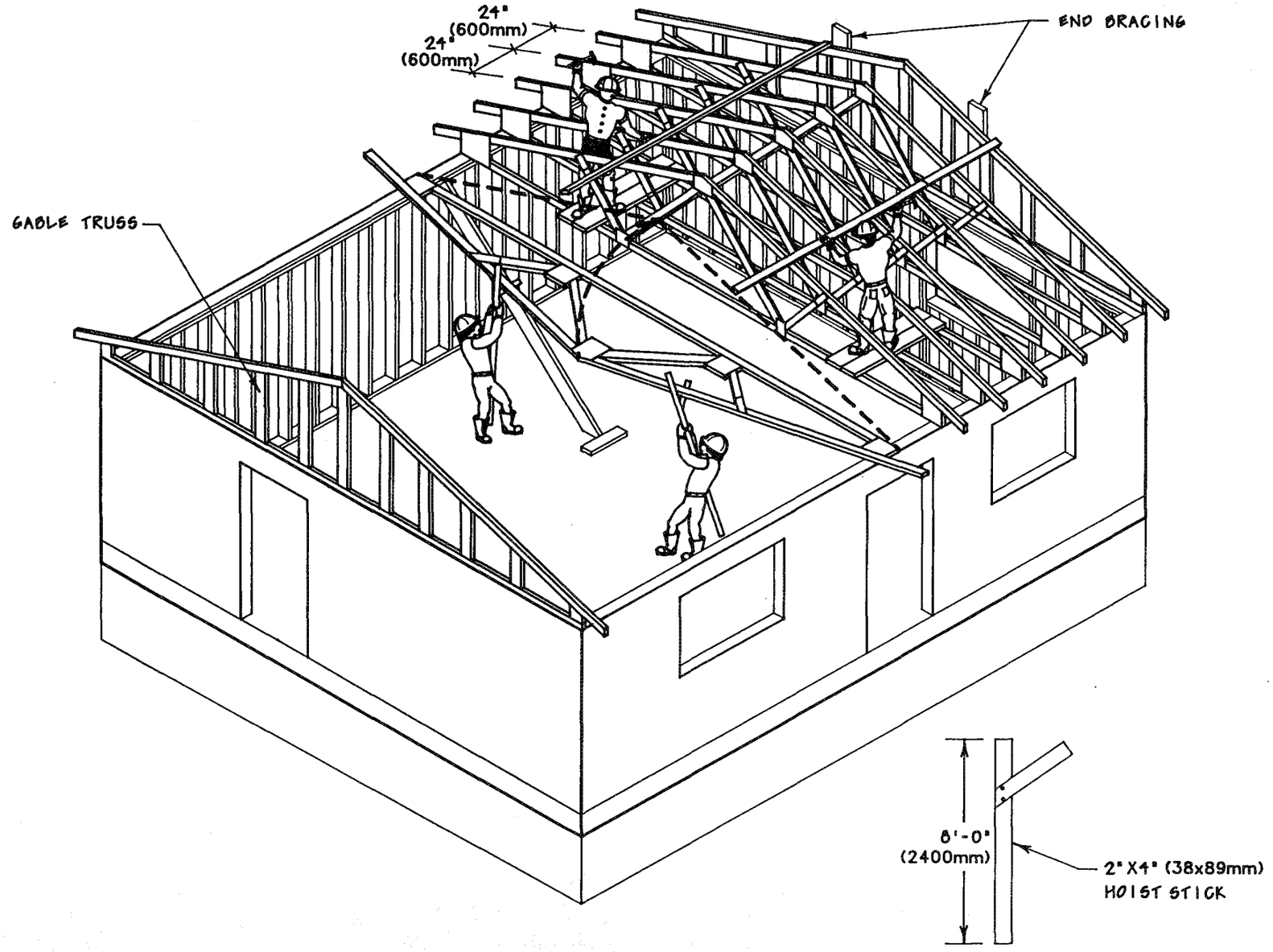
Although some roofs are still framed with dimensional lumber, prefabricated trusses are most commonly used by self-builders.

This manual will detail the installation of prefabricated roof trusses and ladders (over-hangs).

Prior to installation of sheathing, the soffit vent chutes should be installed between each truss at the side walls.

Note: When ordering trusses, it may be preferable to purchase dropped down gable trusses and build ladders that cantilever one truss space on either side of the gable wall.

SECTION 5
ROOF FRAMING



CONSTRUCTION SEQUENCE

1. Mark off exterior wall top plate at 2' 0" o.c.(600 mm) to receive roof trusses. Place trusses on the exterior walls with the roof peak facing downward. Stack all roof trusses at end of the house.

2. You will also need two people on ladders or staging to secure the trusses as they are raised. Install one gable truss, brace the gable truss to the end wall, by nailing 2 - 2 x 4 (38 x 89 mm) to the wall and the gable truss.

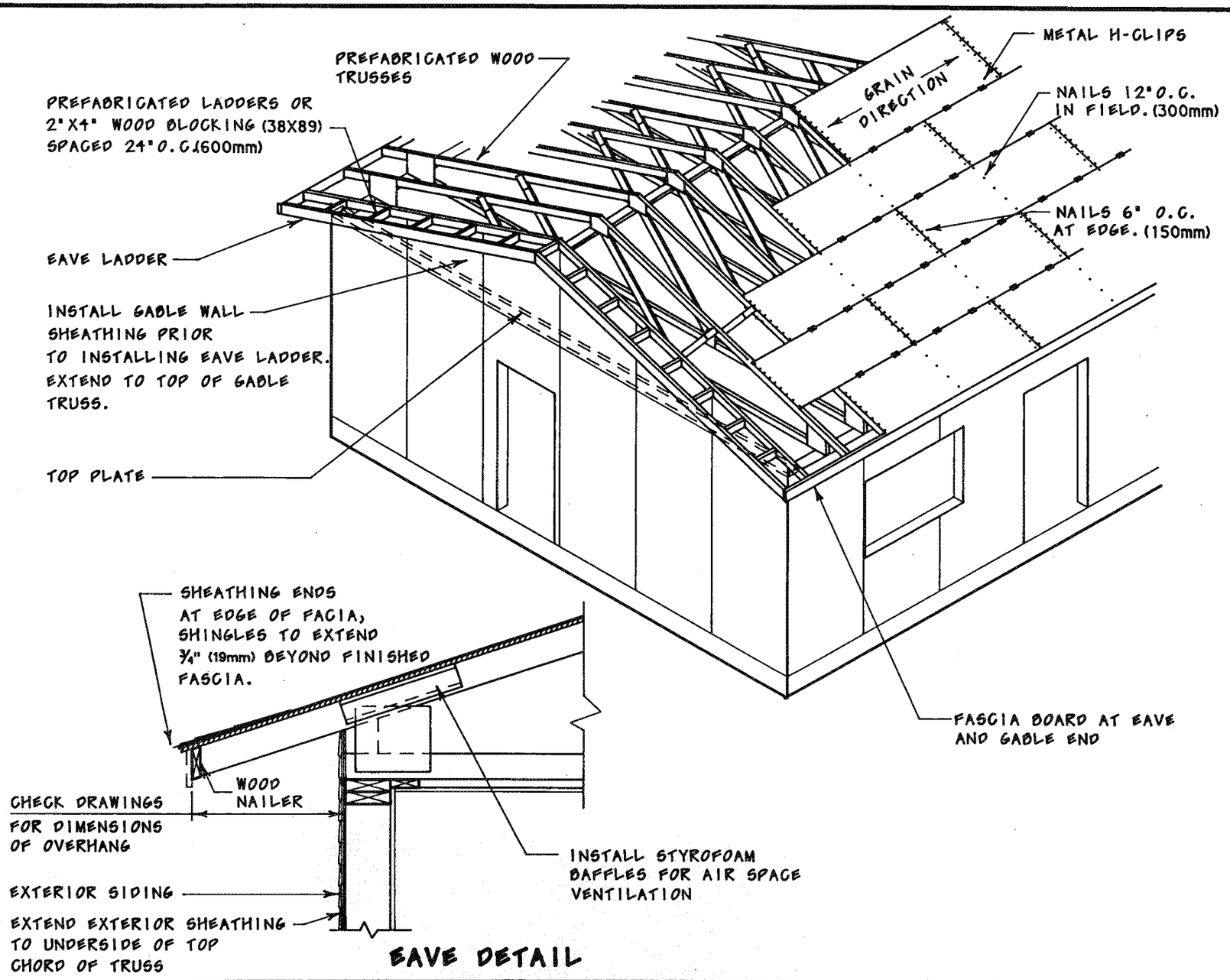
3. Slide one truss at a time toward the opposite end of the house and raise into place. Using hoist sticks, turn the truss upright.

4. Line up the truss heel with the outside face of the stud wall and check proper spacing and vertical alignment. Toenail trusses to top wall plate.

5. Install temporary bracing across the trusses. This temporary bracing will remain in place until the roof sheathing is installed.

   Install wall sheathing of the gable truss similar to wall sheathing.

ERECTION OF ROOF TRUSSES	5-1



EAVE DETAIL

CONSTRUCTION SEQUENCE

Following erection of the roof trusses:

Your house plans will show the width of the soffit overhang and the prefabricated wood trusses will provide for this width.

A string line should be extended along the outside edge of the trusses to make sure they were installed true to line. If necessary adjust by cutting to make the ends line up.

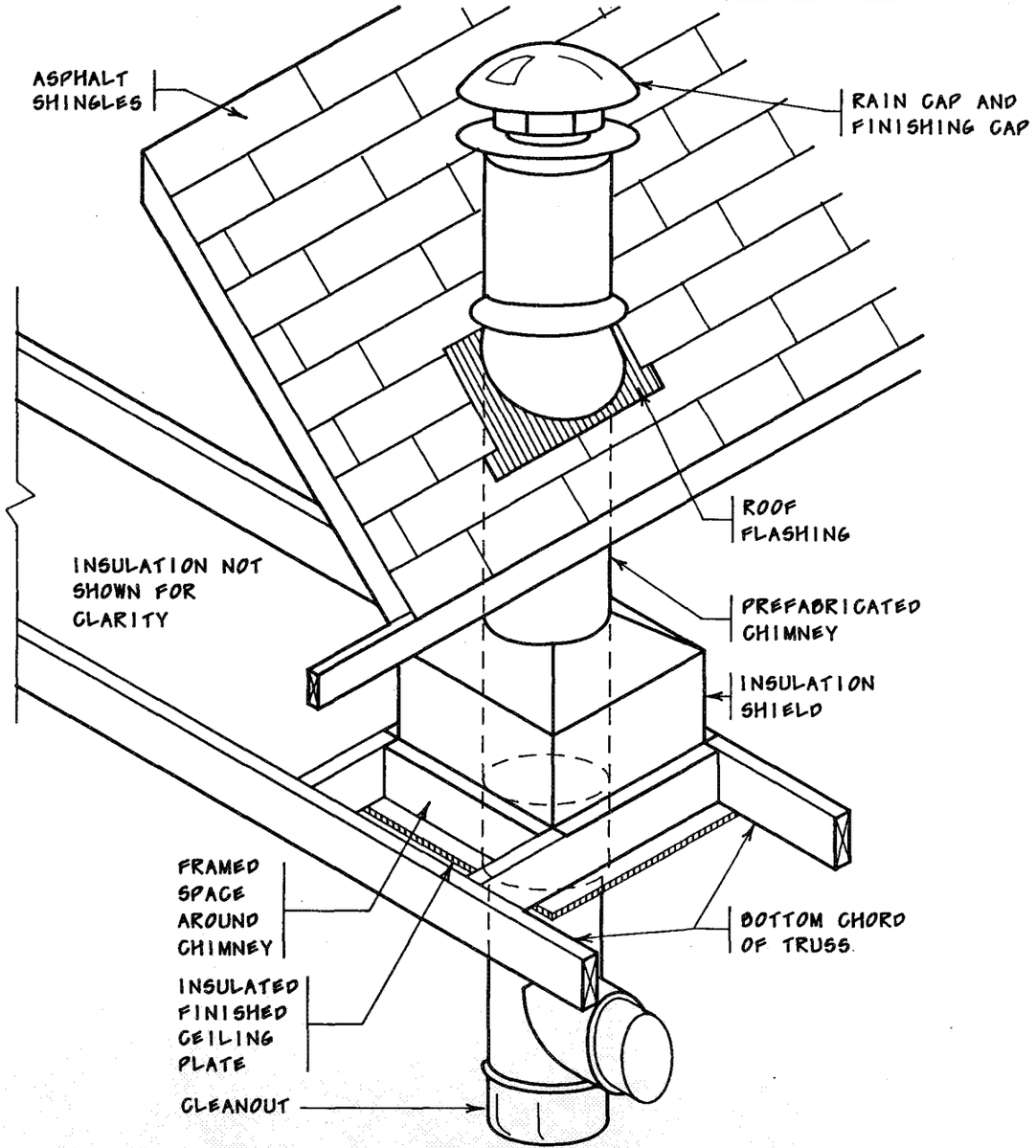
Install a wood nailer along the eave and nail to the end of each truss. This nailer will keep the end of the truss extension from twisting and will provide a nailer for the wood fascia board.

Install prefabricated eave ladder to gable framing with 2 - 3¼" (82 mm) nails at 24" (600 mm)o.c.

Apply the roof sheathing. Place the first sheet so that the edge is centered over a truss and project remainder to cover the eave ladder. Make sure the sheet is flush with the fascia board at the eave and along the rake. Complete the first full length row of roof sheathing before moving up the roof.

Install h-clips at mid points between the trusses to reduce deflection of sheathing. Repeat this procedure to the roof peak. Upper most sheet must be cut to fit at the peak.

ROOF SHEATHING AND EAVE DETAIL | **5-2**



DETAIL OF INSULATED CHIMNEY

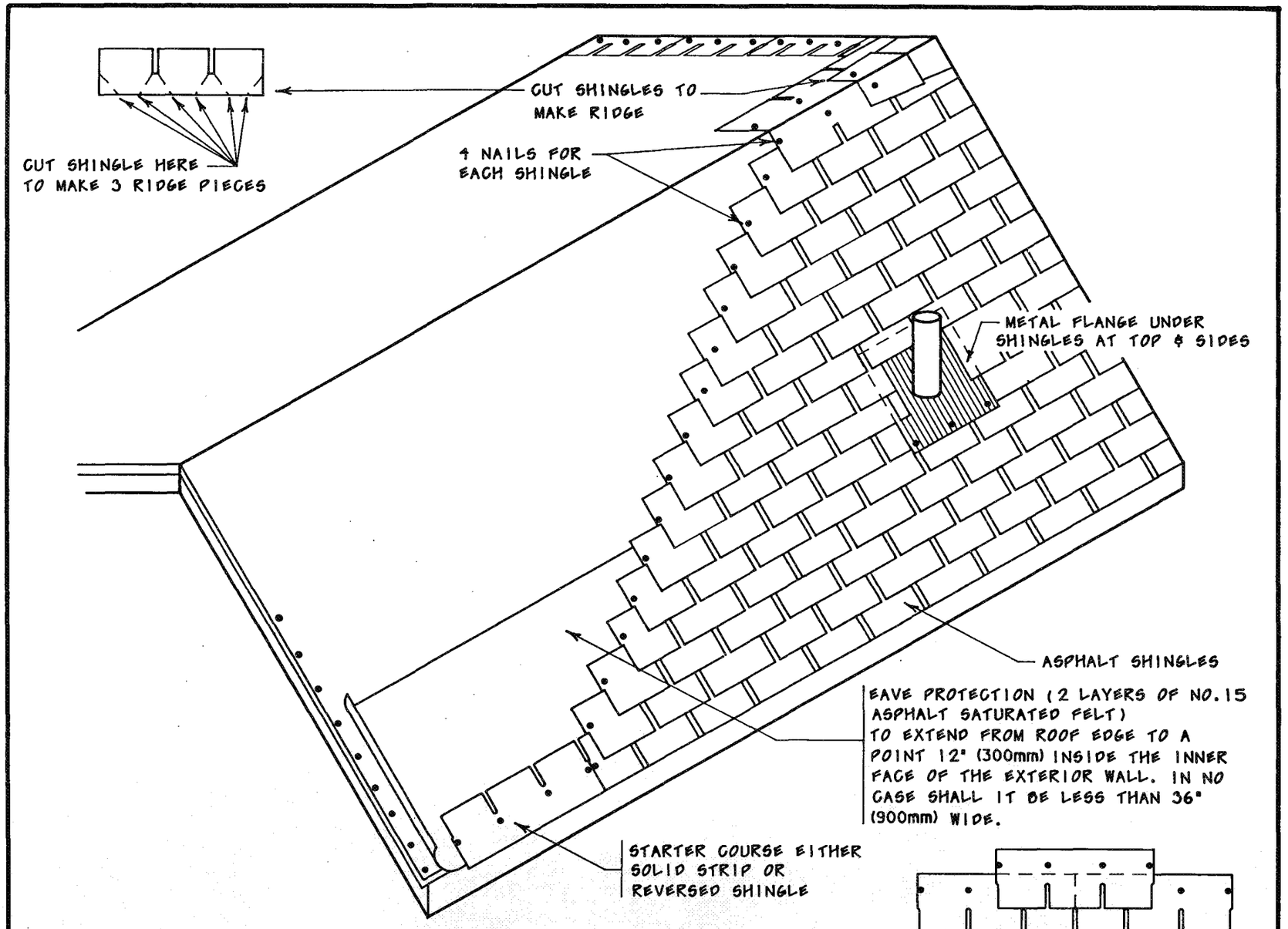
CONSTRUCTION SEQUENCE

Plan to locate prefabricated chimney between two roof trusses if possible. Frame between trusses is to provide support around the chimney opening for the roof and ceiling. Provide minimum 2" (50 mm) clearance around chimney.

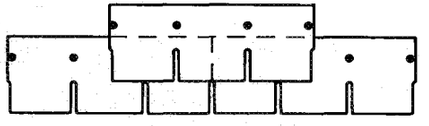
NOTES

The prefabricated chimney should be listed by underwriters laboratories of Canada (ULC) as suitable for use with solid fuel- fired appliances.

FRAMING AROUND CHIMNEY	5-3



APPLICATION OF ASPHALT SHINGLES

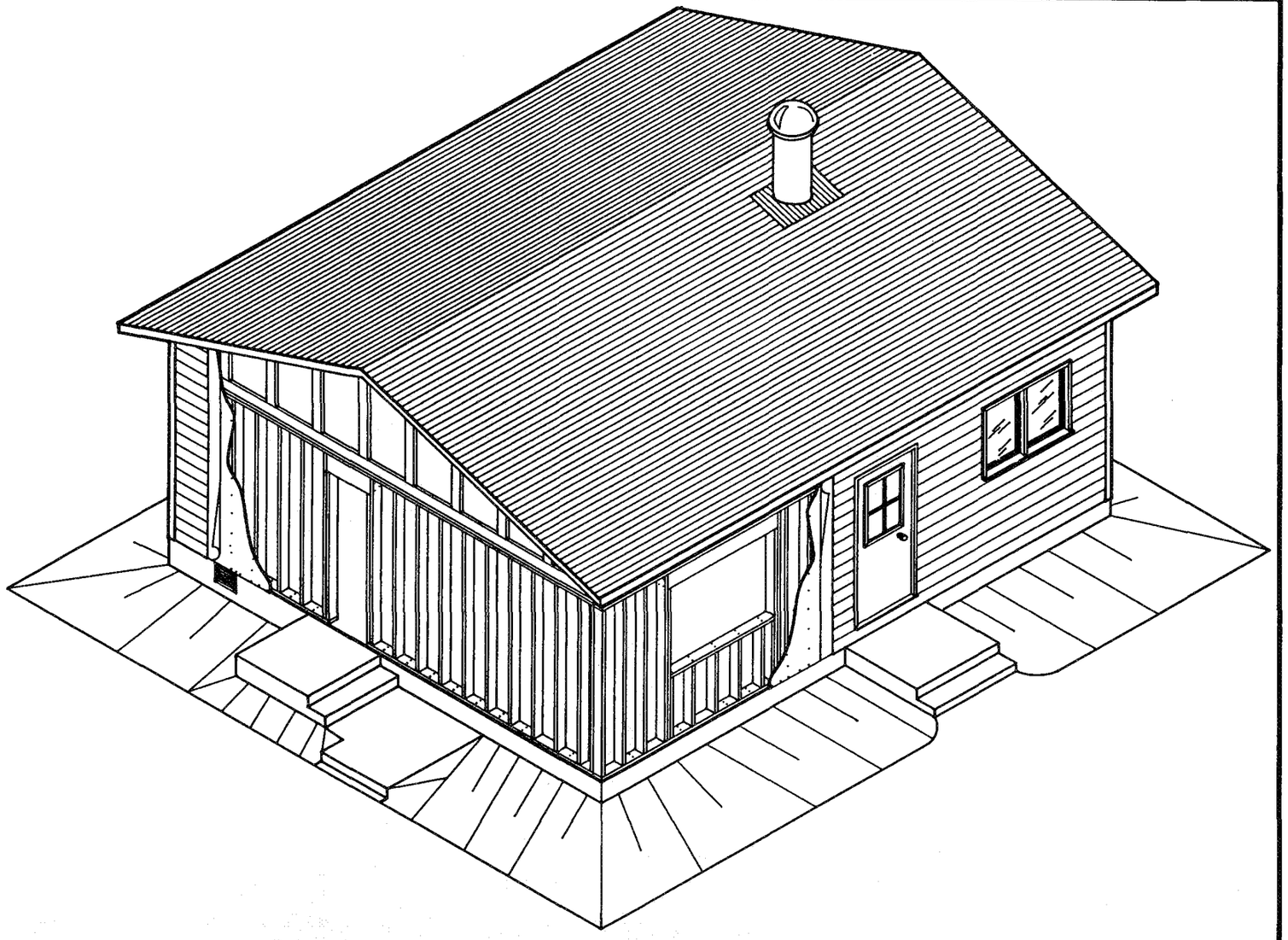


NAIL & OVERLAP DETAIL

CONSTRUCTION SEQUENCE

Now that the roof sheathing is installed, you are ready to apply asphalt shingles.

1. Install No. 15 asphalt-saturated felt eave protection in two plies lapped 18" (480 mm) and cemented together with lap cement.
2. Install starter strip along eave extending 3/4" (20 mm) beyond roof sheathing nail bottom edge at 12" (300 mm) centres.
3. Install first row of shingles directly over the starter strip with joints staggered. Layout string lines and apply shingles in accordance with manufacturers printed instructions.
4. Nail each shingle with four roofing nails placed 1/2" (13 mm) above the cutouts and 1⅝" (40 mm) in from each end.
5. Install flashings for vent piping and chimney as the work proceeds.
6. Prepare and install ridge cap pieces using shingles cut into three sections and placed sideways over the roof peak. Stick down with roofing cement, the tabs of each ridge cap shingle. Fasten with 2 roof nails and overlap each layer so that only the finish layer shows.

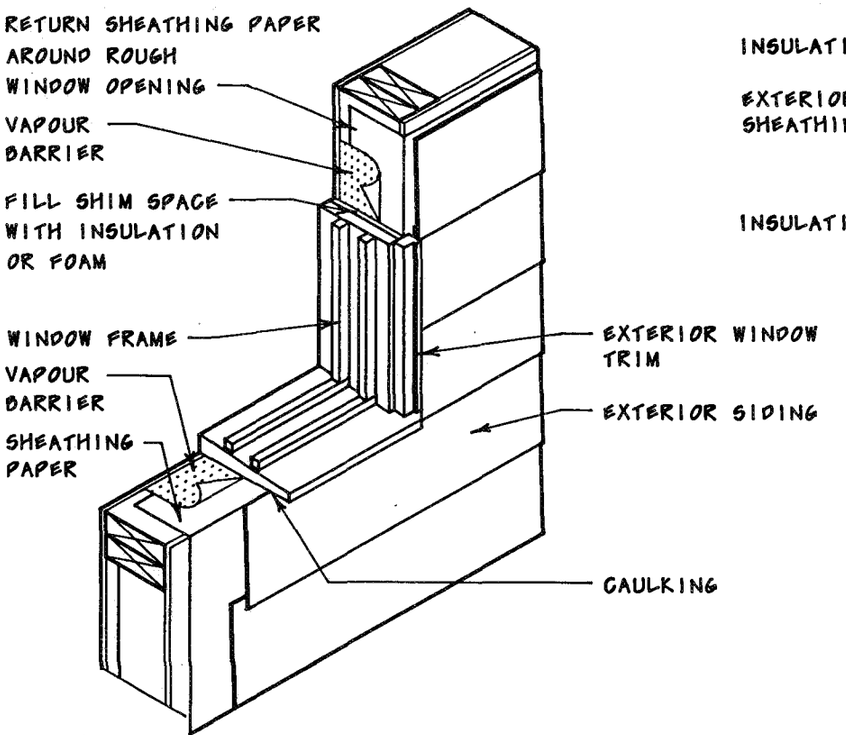


EXTERIOR DOORS, WINDOWS AND FINISHES

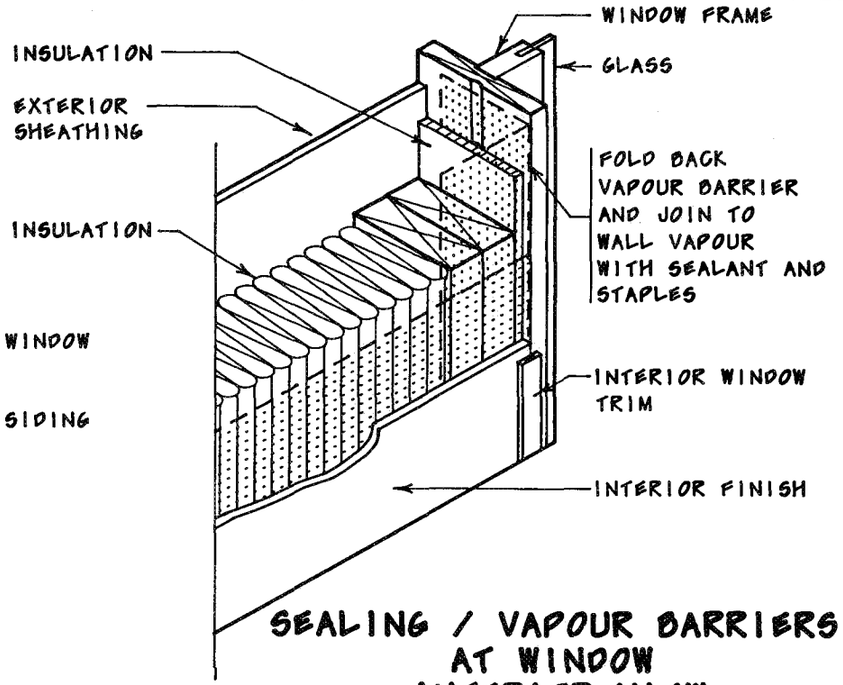
Now that roof is on, it is recommended to continue on the exterior to make the house weather tight by installing the windows, doors, siding, soffits, fascia, steps and landing.

SECTION 6

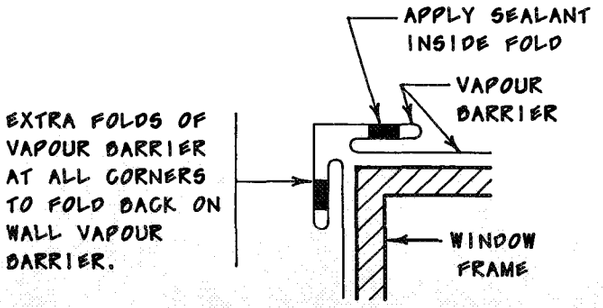
EXTERIOR FINISHES



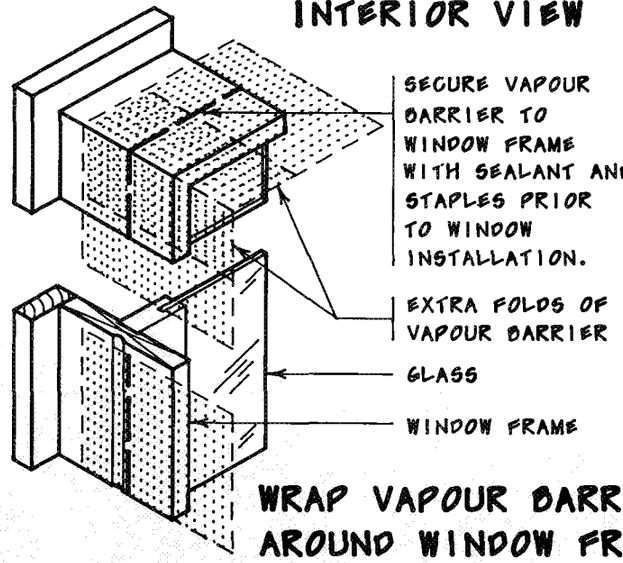
INSTALLATION OF WINDOW EXTERIOR VIEW



SEALING / VAPOUR BARRIERS AT WINDOW INTERIOR VIEW



METHOD OF FOLDING VAPOUR BARRIER AROUND CORNERS OF WINDOW FRAME



WRAP VAPOUR BARRIER AROUND WINDOW FRAME

CONSTRUCTION SEQUENCE

Most manufacturers make complete window units with sash, glazing, weatherstripping, and exterior trim. Many units are now prefinished at the factory.

1. Prior to placing the window unit in the rough opening, wrap a strip of air/vapour barrier around the window frame, overlap and seal with caulking.

2. Use wedges or shims to level the unit in the opening, when in position nail the window through the exterior trim to the wall framing. Do not install wedges at the top of the window frame.

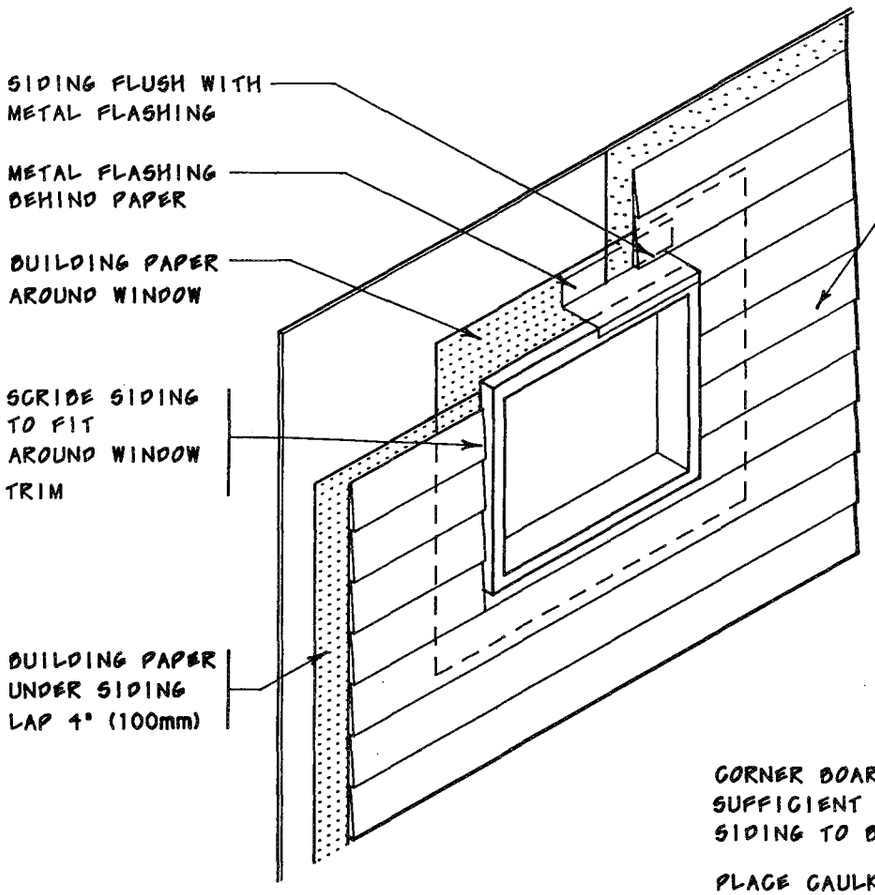
3. Once the window is secured in place insulation or foam should be placed in the gap between the rough opening and the window frame. *Caution: Too much foam can bend window frames. Do not use too much.*

4. The window frame and wall air/vapour barriers are then joined with sealant and stapled. Special attention should be paid to the sealing of the air/vapour barrier folds at the window corners.

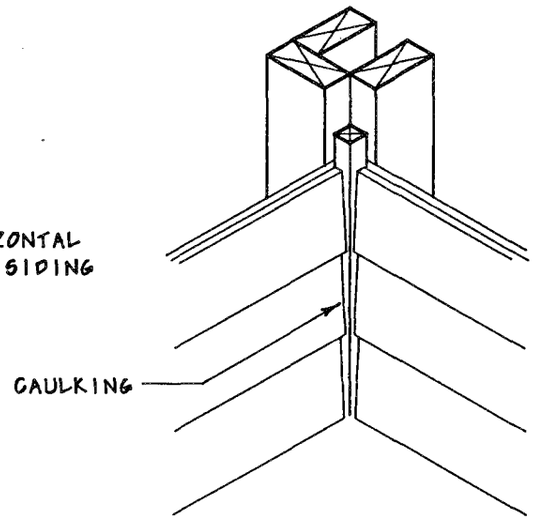
Exterior door frames are installed and sealed similar to window frames.

NOTES

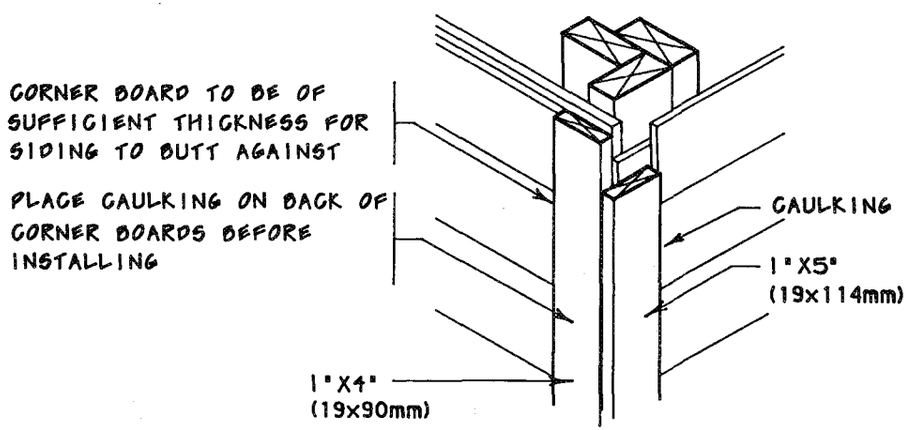
1. The above method of anchoring window frames and door frames is common for most manufacturer's units; however, read manufacturer's printed installations before installing.



TYPICAL EXTERIOR SIDING AROUND WINDOWS



INTERNAL CORNER WITH 2"X2" (50X50mm) CORNER
(FOR WOOD SIDING)



EXTERIOR CORNER WITH CORNER BOARDS
(FOR WOOD SIDING)

CONSTRUCTION SEQUENCE

Measure down from the eaves to the bottom of the first course at the foundation wall at all four corners, to determine the number of board spaces.

Take the longest distance and mark that distance to each corner by driving a nail. Run a chalkline horizontally around the house from nail to nail.

Install external and internal corner boards.

Nail on the starter strip using the chalkline as a level reference. Nail the siding over the starter strip placing the nails ½" (13 mm) from the top edge. Do not countersink nailheads. Start nailing at one end of the siding strip and proceed along the strip to prevent rippling. Ensure the siding is flat against the wall. To allow for expansion leave a 3/16" (5 mm) gap between the ends of each strip of siding and around windows and doors.

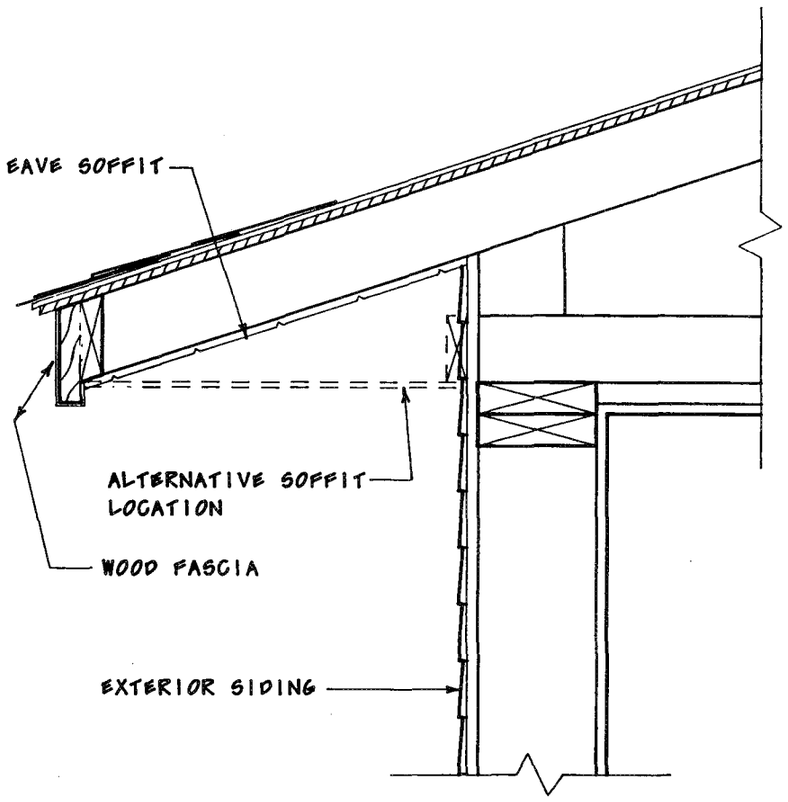
Install metal flashings over doors and windows.

Where possible, the bottom of the board that is placed over the top of the window should coincide with the top of the window flashing.

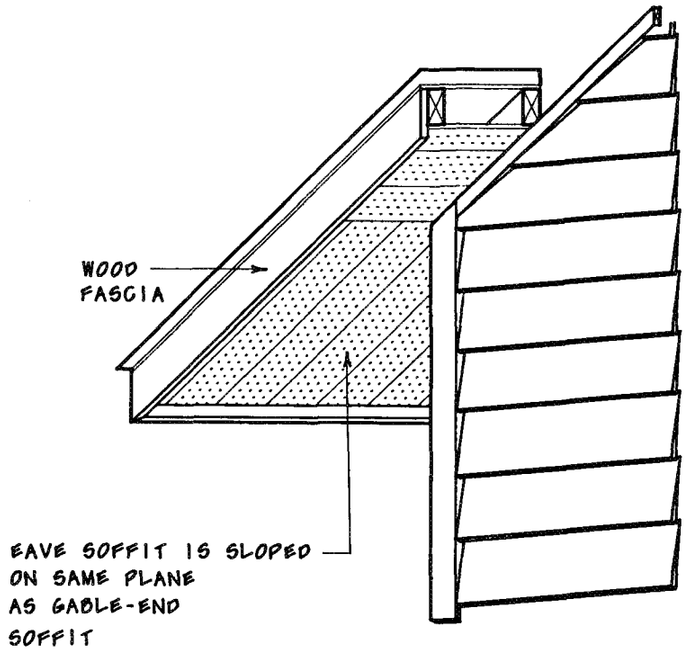
Finish by caulking around the windows, doors, trim, external and internal corners.

NOTES

1. *If vinyl or hardboard siding is used, internal and external corners and accessories will be provided with the siding. Install the siding in accordance with the manufacturer's instructions.*



FASCIA AND SOFFIT DETAIL



EAVE AND GABLE-END INTERSECTION

CONSTRUCTION SEQUENCE

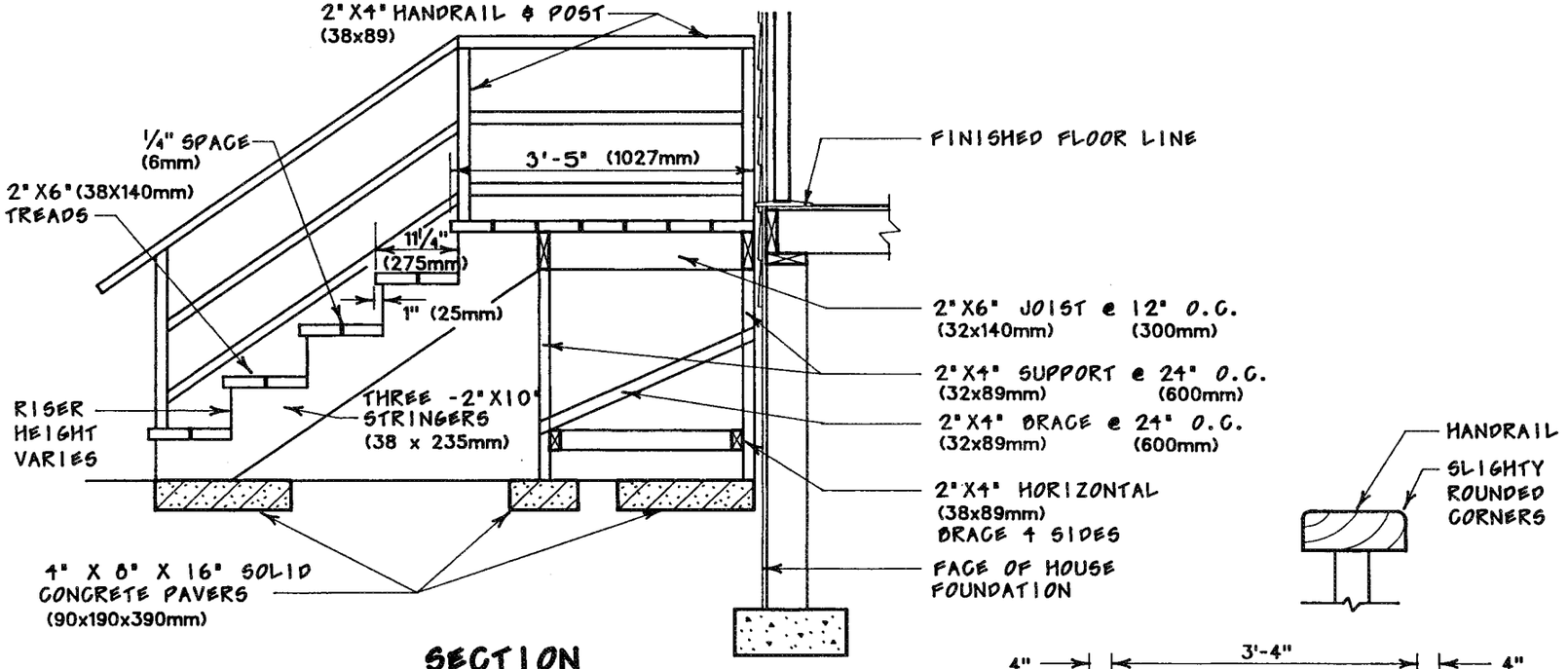
The soffit may be finished by installing continuous perforated aluminum or vinyl or painted plywood directly to the bottom of the roof truss extension.

The eave soffit will continue up the gable-end on the same slope as the gable-end soffit. The gable-end soffit does not need to be perforated.

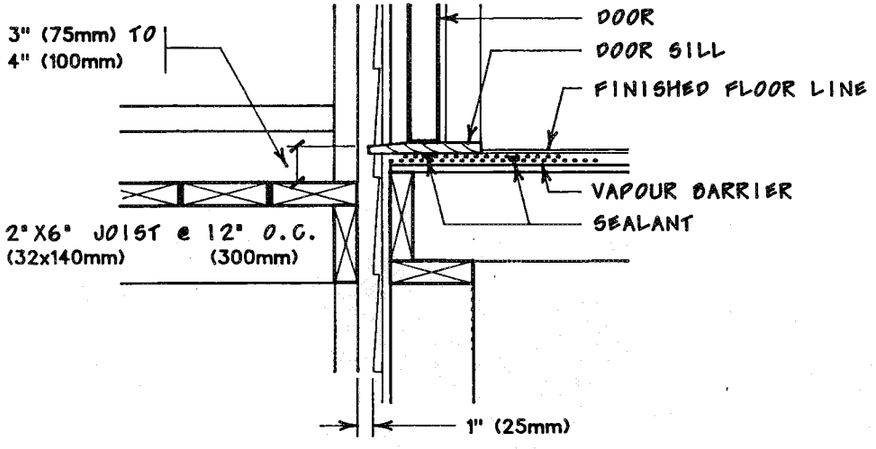
The alternative method of enclosing the soffit is by placing a continuous wood nailer along the house in line with the bottom of the projected wood truss. The soffit is then applied horizontally.

The wood fascia can be finished by applying shellac to all knots, applying one primer coat and two finish coats of latex or alkyd paint. The fascia board may also be covered with an aluminum or vinyl cladding formed to suit the fascia profile.

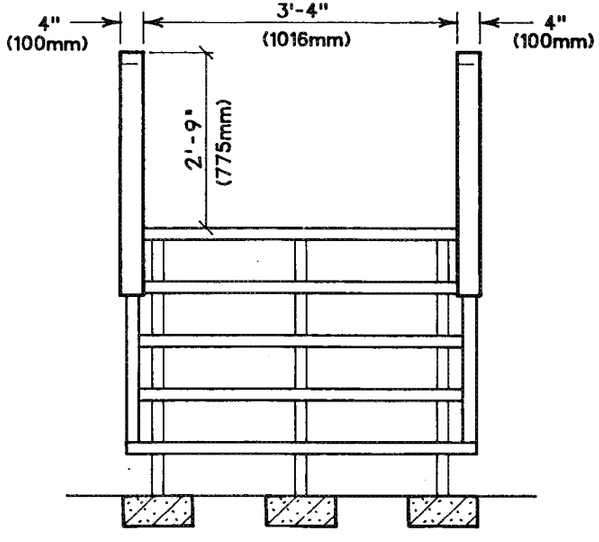
Ensure soffit vent chutes are installed prior to installing soffits.



SECTION



SILL DETAIL



FRONT ELEVATION

CONSTRUCTION SEQUENCE

Place and level the solid concrete pavers under the stringers and landing.

Set the landing level 3" (75 mm) to 4" (100') below the floor level and measure the height from the conc. paver to the top of landing.

Determine the number of risers needed, each riser should be the same height. The recommended height for risers varies from 6½" (165 mm) to 8" (200 mm).

Construct the landing framing and supports.

Select 3 straight pieces of 2" x 10" (38 mm x 238 mm) and step off the riser / tread dimensions with a framing square and cut out the stringers. Place the stringers on the concrete paver supports and nail to the landing framing.

Nail the 2" x 6" (38 mm x 140 mm) treads and landing floor to the framing and stringers.

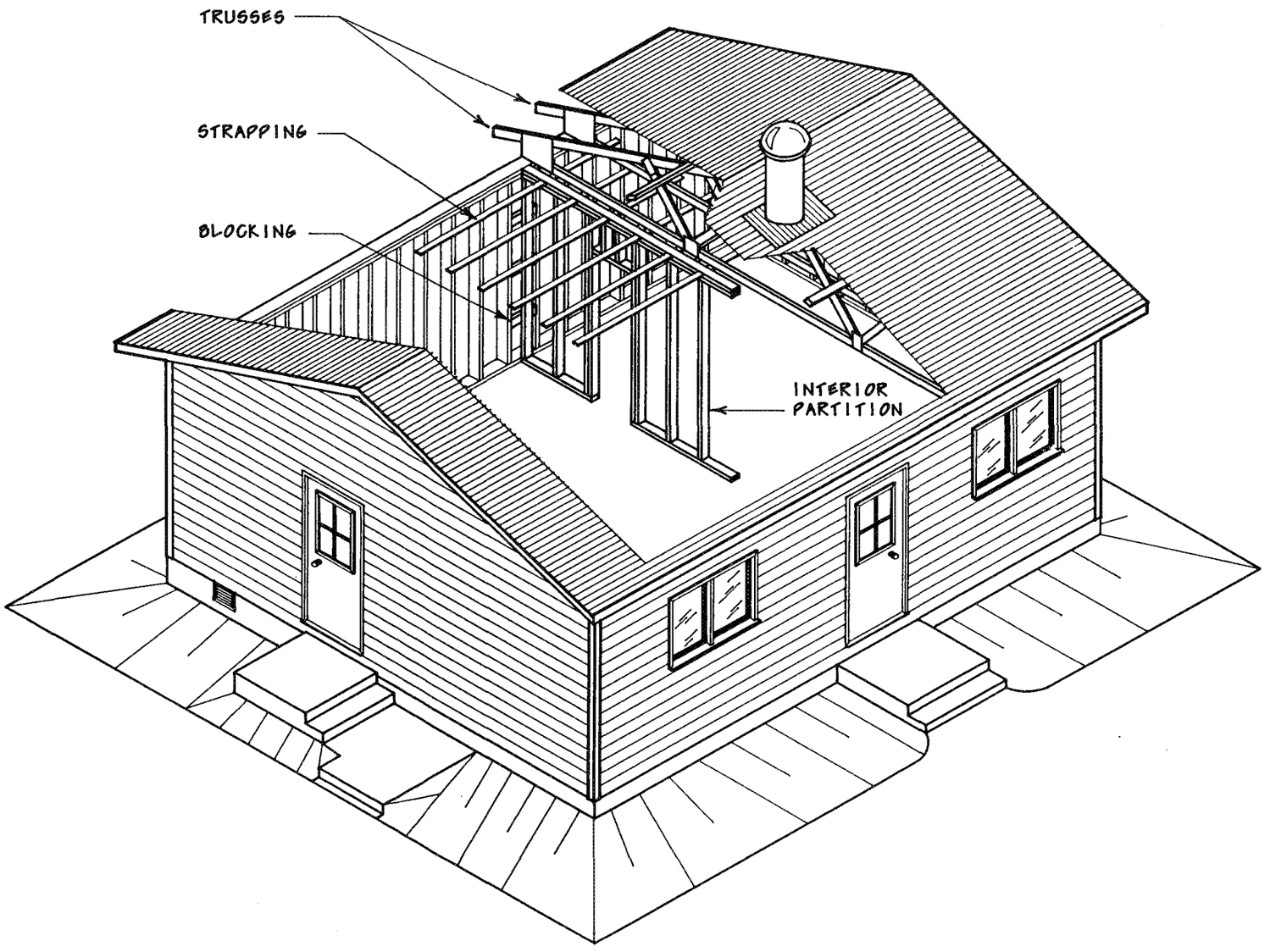
Assemble the handrail and post and nail to the threads and landing.

The complete stair assembly should be treated with wood preservative.

NOTES

1. *Use 3½" (89 mm) galvanized common nails for all framing.*
2. *When pavers are used, landing should not be fastened to the house to allow for frost movement.*

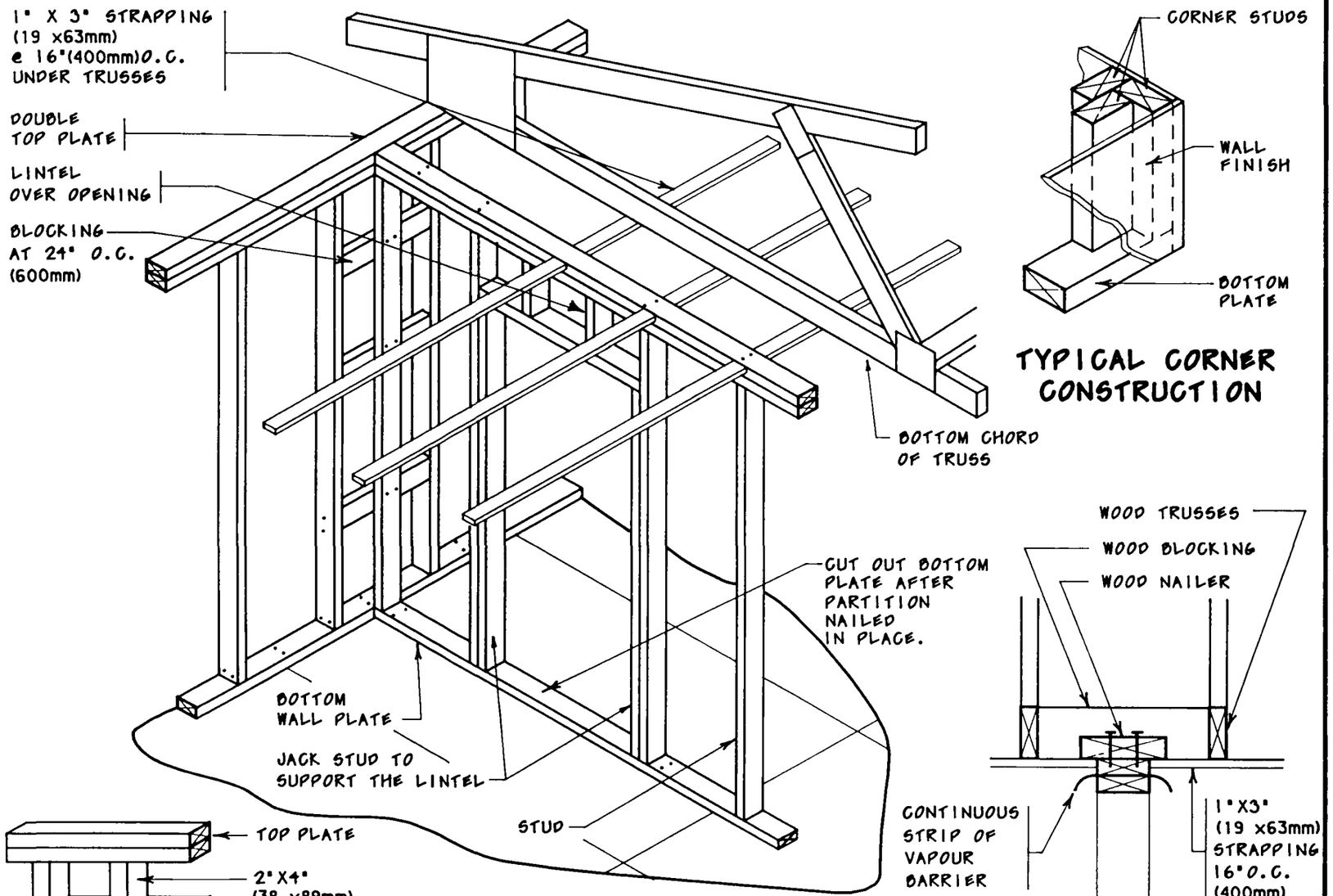
EXTERIOR STEP AND LANDINGS | **6-4**



Now that the house is weather tight, it is time to start working on interior partitions and finishes.

SECTION 7

INTERIOR CONSTRUCTION



DOOR FRAMING
INTERIOR PARTITION

NON-LOAD BEARING
PARTITION

TYPICAL CORNER
CONSTRUCTION

PARTITION PARALLEL
TO TRUSSES

CONSTRUCTION SEQUENCE

Interior non-load bearing partitions are normally constructed similar to exterior walls; that is, they are constructed on the subfloor and raised into place.

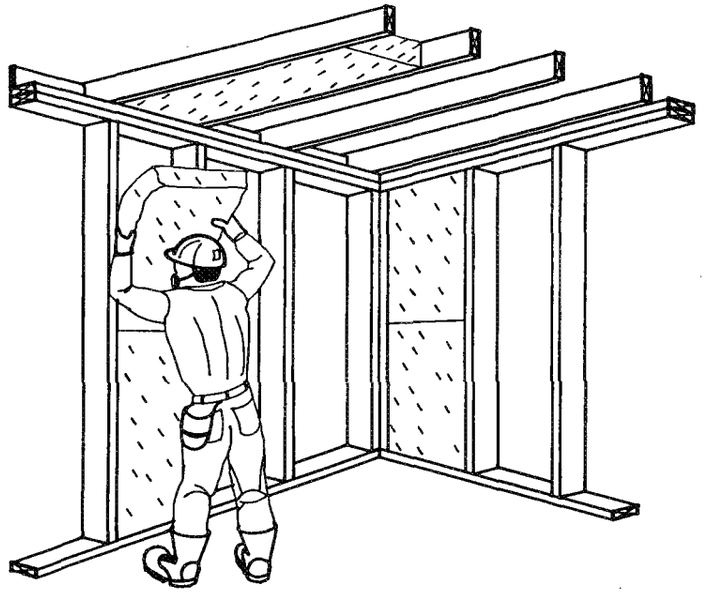
The top and bottom plates are nailed to each stud with two nails.

Once the assembled sections are raised and plumbed, they are nailed together at corners and intersections. A second top plate, with joints located at least one stud space away from the joints in the first top the plate, is added.

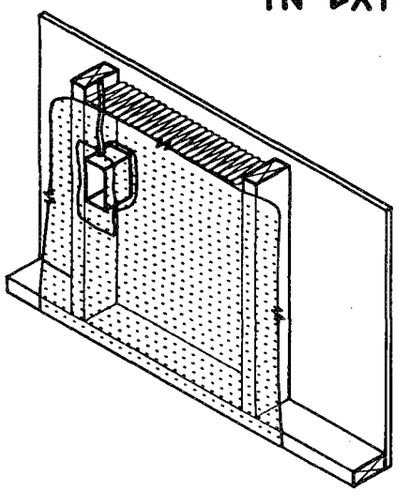
Where partitions run parallel to roof trusses, provide wood blocking between trusses, normally 4'-0" (1200 mm) o.c. and, nail the interior partition to the wood blocking. Install wood nailers to top of partition for nailing strapping.

After interior partitions are complete, sub-trades will install the roughed-in for electrical/plumbing services.

INTERIOR FRAMING DETAILS	7-1

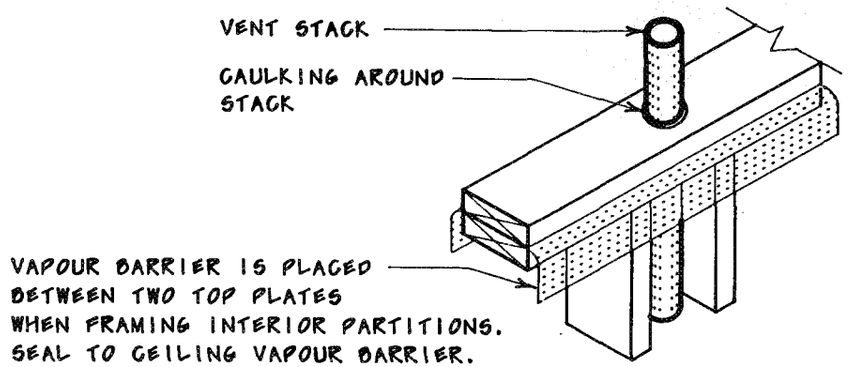


INSTALLING BATT INSULATION
IN EXTERIOR WALLS

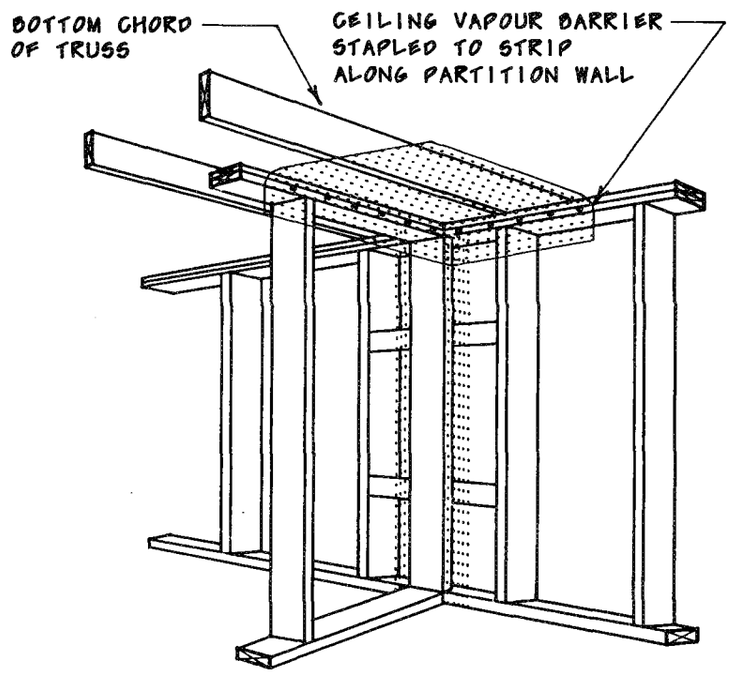


- WRAP A PIECE OF VAPOUR BARRIER AROUND THE BOX PRIOR TO FASTENING ELECTRICAL BOX.
- INSTALL WALL VAPOUR BARRIER.
- CUT SMALL OPENING IN VAPOUR BARRIER AT FACE OF ELECTRICAL BOX.
- PULL OUT EDGES OF VAPOUR BARRIER WRAPPED AROUND ELECTRICAL BOX & SEAL TO FACE OR WALL VAPOUR BARRIER WITH SEALANT.

SEALING VAPOUR BARRIER
AROUND ELECTRICAL RECEPTACLES
IN EXTERIOR WALL



VAPOUR BARRIER AT TOP OF
INTERIOR WALL PARTITION



VAPOUR BARRIER DETAIL WHERE PARTITION
WALL JOINS EXTERIOR WALL AND CEILING

CONSTRUCTION SEQUENCE

Ceiling

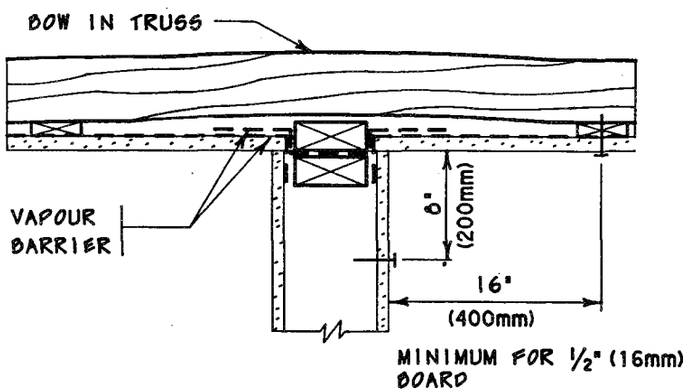
1. Install ceiling batt insulation from below prior to installing strapping and vapour barrier.
2. Place ceiling batts snugly between bottom chords of trusses making sure all voids and spaces are filled. Ceiling strapping should follow close behind the installation of batts to hold them in place.

Walls

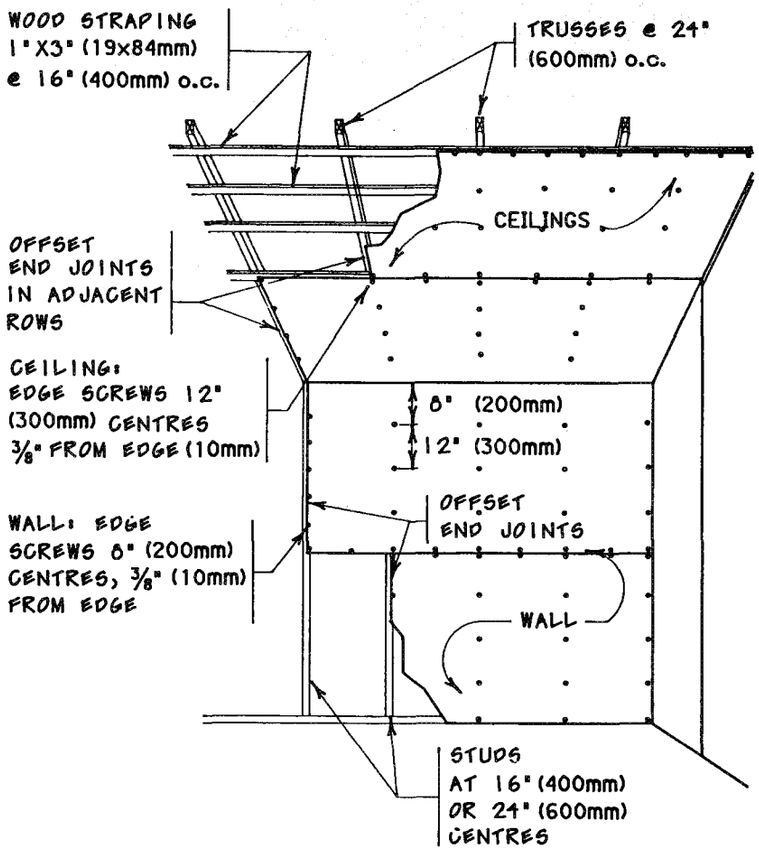
1. Place batt insulation between exterior wall studs and press firmly against the exterior wall sheathing then pull interior face forward to completely fill wall cavity. Fit insulation around and behind electrical boxes, registers, blocking etc.
2. Install vapour barriers over the strapping. Overlap vapour barrier side and end joints over solid backing and seal with sealant. Patch any tears in vapour barrier with tape, staple vapour barrier to framing members at 6" (150) spacing. Extend down walls and partitions 6" (150).
3. Apply sealant and seal vapour barrier at top and bottom wall plates.

NOTES:

1. *Electrical and plumbing rough-in must be completed before insulation is installed.*
2. *Insulation may cause temporary skin irritation after contact. Wash with soap and cool water after handling. During installation it is best to wear loose clothing, snug work gloves and a hat. When working overhead, lightweight goggles and a filter mask that fits over the nose and mouth are also recommended.*



FLOATING CORNER DETAIL



GYPSUM BOARD APPLICATION

CONSTRUCTION SEQUENCE

Install gypsum board across framing members. Locate end joints over supporting members, arrange end joints to occur on different studs on opposite sides of a partition.

Start fastening in centre of gypsum board and work toward the ends and edges. Hold board firmly against the framing members while installing.

Perimeter fasteners should not be less than 3/8" (10 mm) nor more than 1/2" (13 mm) from the edges and ends or gypsum board. End and edge fasteners should be located opposite the fasteners on the adjacent sheets.

Drywall screws are the preferred fastener - especially for ceiling installation; however, blue-ringed drywall nails are acceptable. Drive screws with a screw gun and countersink heads slightly below surface of the board.

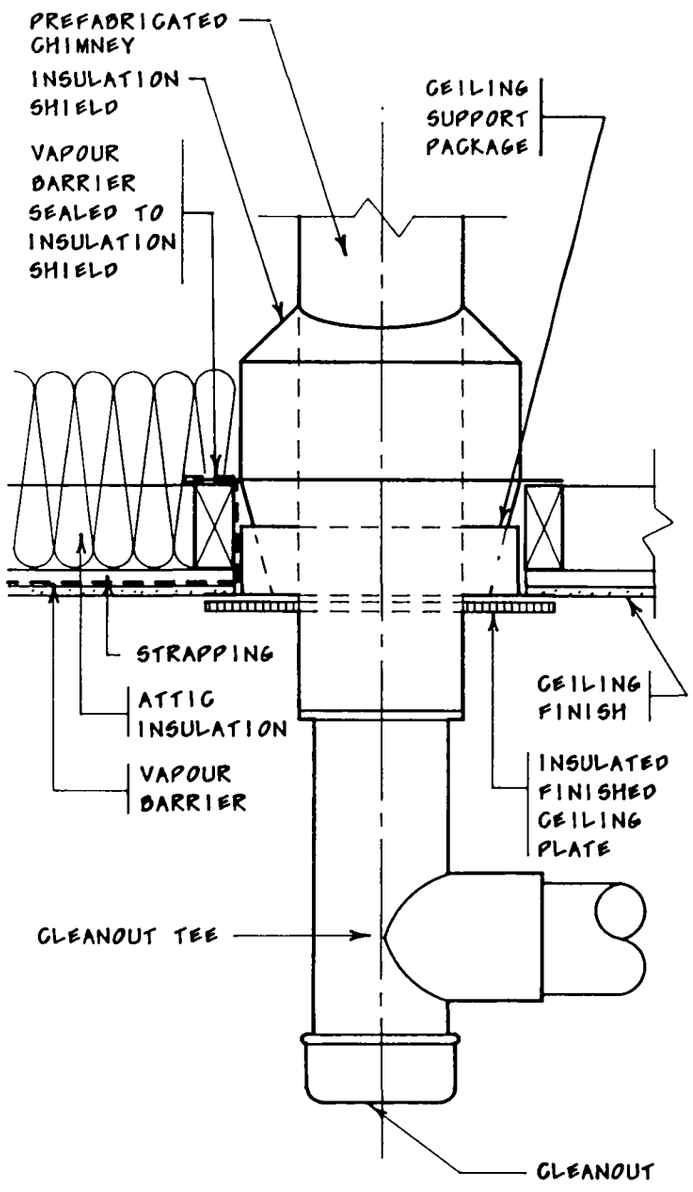
Floating corners should be used at wall/ceiling junctions. For 1/2" (13 mm) gypsum board, install fasteners as shown on detail.

Install metal corner beads on all external corners.

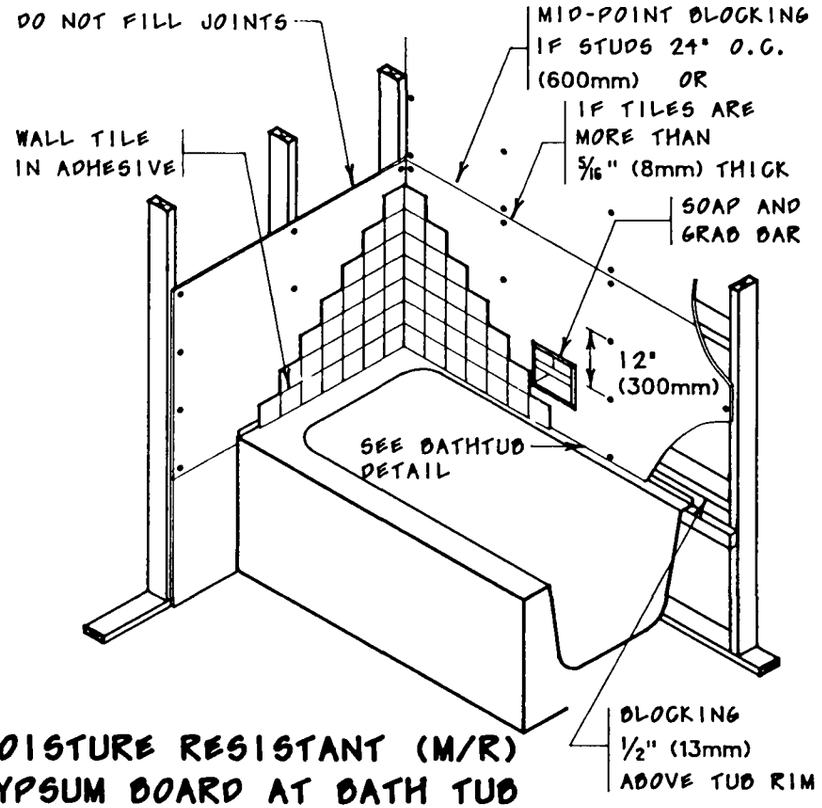
Joint taping and filling, and spotting over fastener heads to be done according to directions on the joint compound container.

Apply three coats, allow to dry between each coat, and sand.

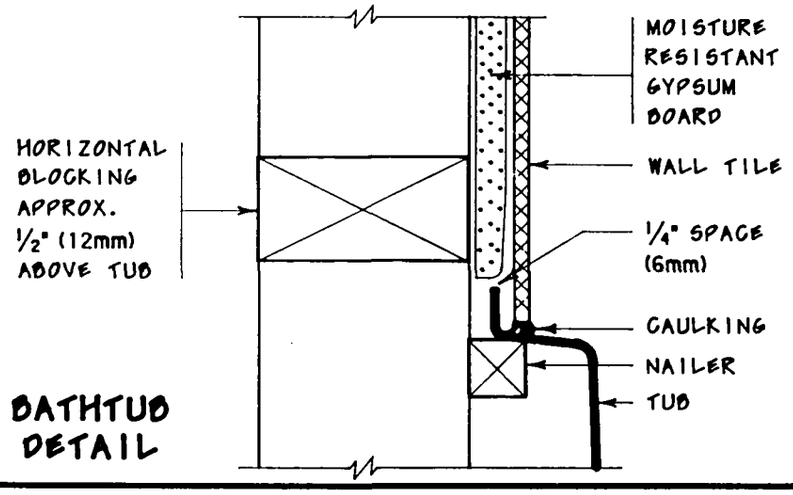
The finished work should be smooth seamless, true and flush with square neat corners.



INSULATION AROUND PREFABRICATED CHIMNEY



MOISTURE RESISTANT (M/R) GYPSUM BOARD AT BATH TUB



BATHTUB DETAIL

CONSTRUCTION SEQUENCE

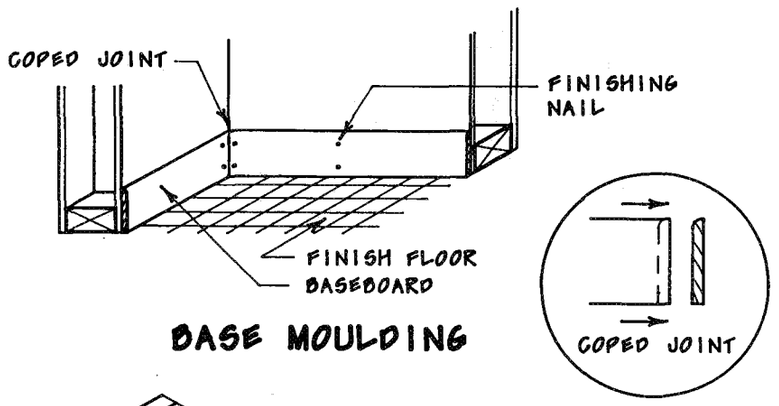
Prefabricated Chimneys

Install the prefabricated chimney according to manufacturer's instructions. Minimum clearances must be maintained.

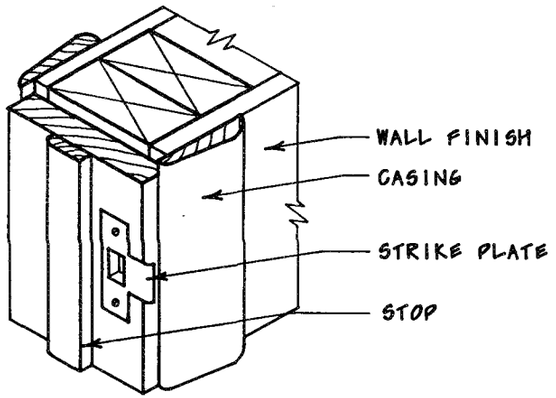
Bath Tub

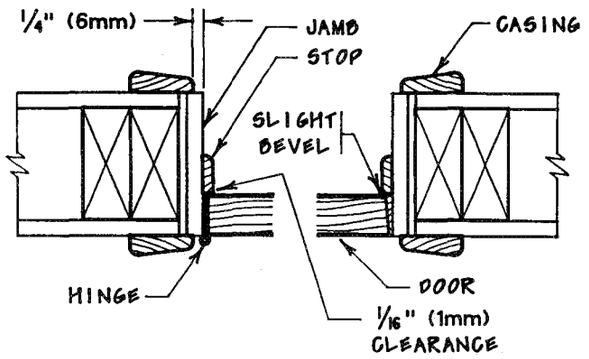
1. Set bath tub in place.
2. Install as shown moisture resistant gypsum board around the tub, if available.
3. Install accessories and wall tiles per manufacturers recommendations.
4. Apply caulking between wall tiles and bath tub.

Note: Bath tub installation is normally followed by roughed-in plumbing prior to wall finishes.

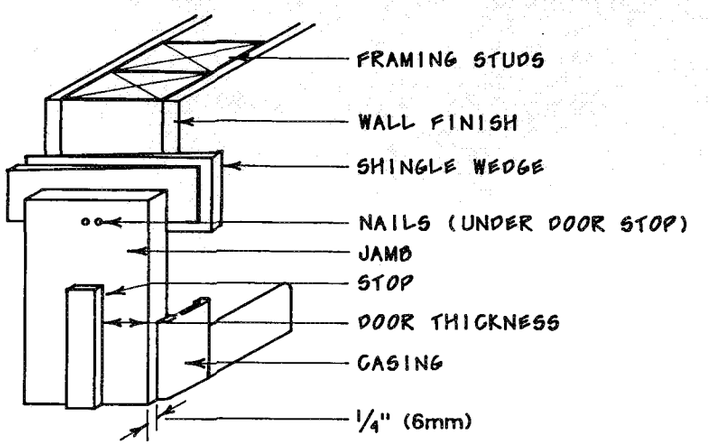


BASE MOULDING

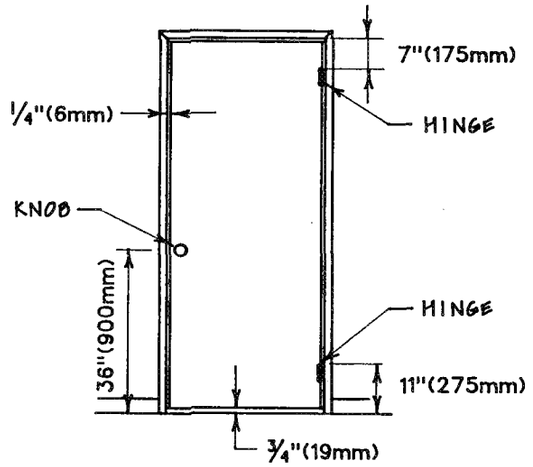




TYPICAL STRIKE PLATE AND STOP



DOOR FRAME AND TRIM SHOWING FRAME BLIND-NAILED UNDER DOORSTOP



SUGGESTED DOOR CLEARANCES AND LOCATION OF HARDWARE
(INTERIOR DOOR)

CONSTRUCTION SEQUENCE

Setting door frames, installing doors, hardware and trim will require a high degree of skill and experience. It is advisable to have your Construction Manager start you off at each stage of this finish work.

Door frames will be single boards cut and marked to suit various door widths. Assemble frames to suit door size and set in rough opening. Your rough opening should have provided for the frame with allowance for wedges. Place wedges near the top and bottom, behind hinges and strike plate. Cut off excess shingle extension and install casing. Mitre casing at top by cutting at 45° in a mitre box.

Mark off hinges on the door and cut out to depth of hinge using a chisel or router. Drill holes to receive cylindrical locks and strike plate.

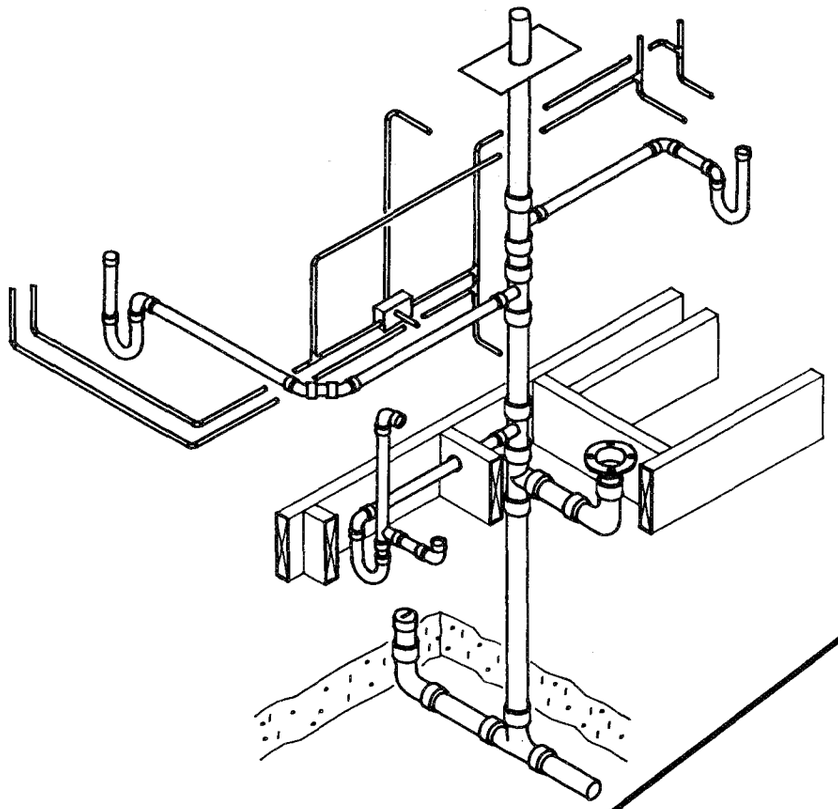
Set door in place with a shim at bottom for clearance and mark off hinges at jamb. Cut out to depth of hinge and install hinges. Hang door and install cylindrical locks and strike. Install door stop after door is hung.

Interior window casing is installed similar to door casing.

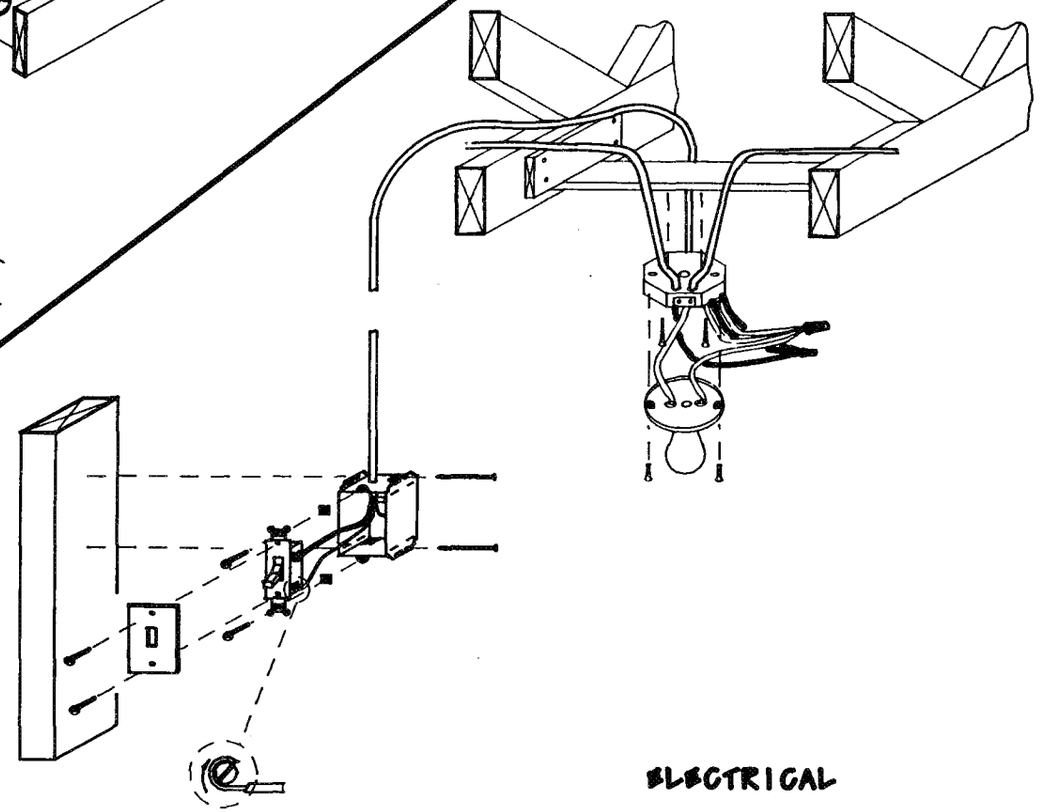
After flooring is installed, install baseboard in the longest practical lengths without joints. Cope inside corners and mitre outside corners. To make a coped joint install one piece of baseboard with a square edge against the wall. Cope the second piece by cutting the end at 45° and then cutting along the 45° cut line with a coping saw.

NOTE:

1. *Wood trim and casing to be finished natural should be hand selected for grain and color to match adjacent pieces.*



MECHANICAL

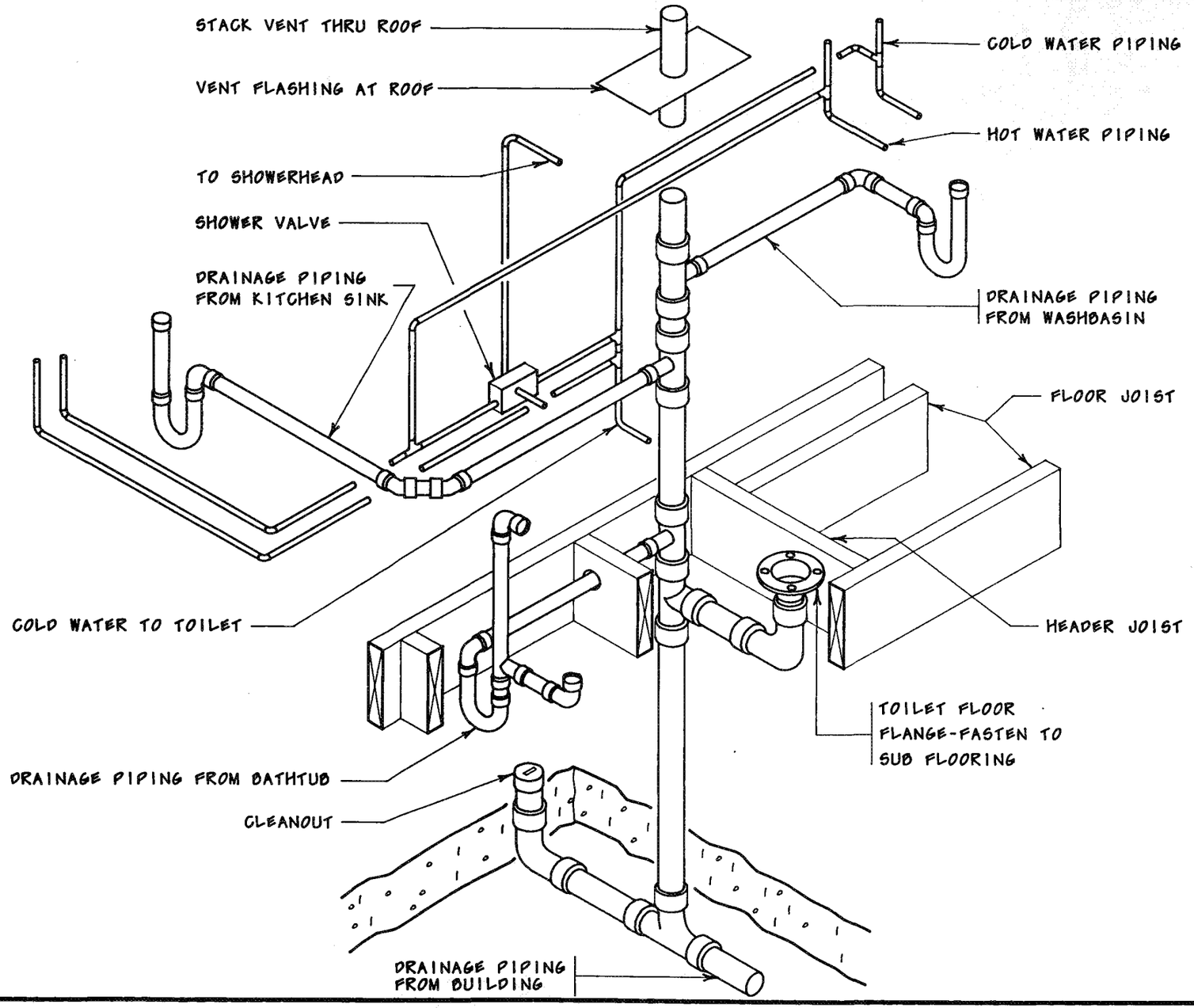


ELECTRICAL

Work in this section is usually done by qualified trades people. The following information is provided as a basic guide only for the homeowner who wishes to assist with this work, and for maintaining the systems after construction is completed.

SECTION 8

MECHANICAL & ELECTRICAL



CONSTRUCTION SEQUENCE

Rough-in plumbing is installed before insulation, vapour barrier and interior finishes.

A. DRAINAGE PIPING AND VENTS

Measure, cut and assemble drain piping for plumbing fixtures in sections before applying joint solvent.

Clean all fittings and pipe ends and apply solvent to both surfaces at the connection points, assemble and ensure proper alignment before solvent has time to set.

Slope all horizontal drain lines in direction of flow. Size and slope of piping as per plumbing code.

B. WATER PIPING

For copper piping, thoroughly clean inside of fittings and outside of pipe end with steel wool or emery cloth. Apply paste, assemble piping in sections and solder each joint.

Anchor piping to wood framing to avoid rattling of the piping.

NOTES

1. *To avoid freezing, do not install piping in exterior walls.*
2. *For drainage use ABS-DWY pipe and fittings.*
3. *For cold and hot water use copper, Type M.*

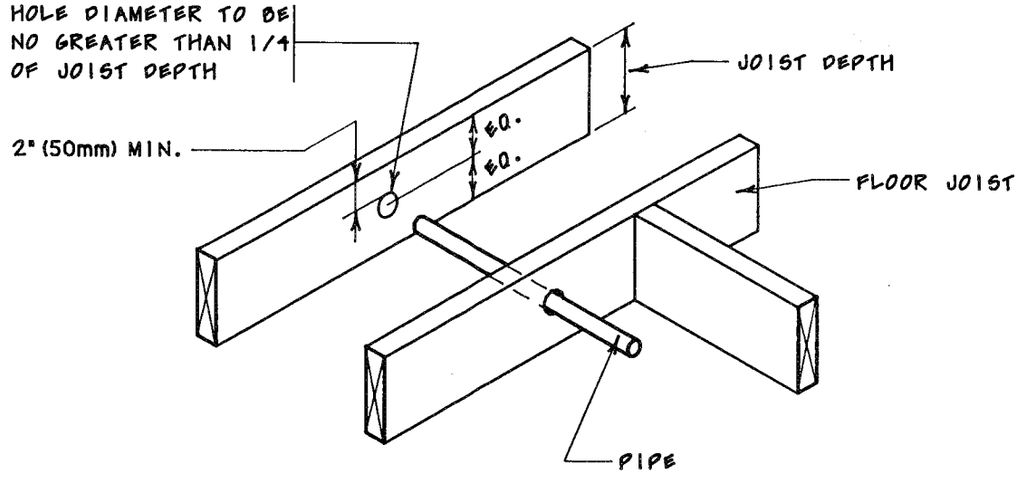


FIG. (A)

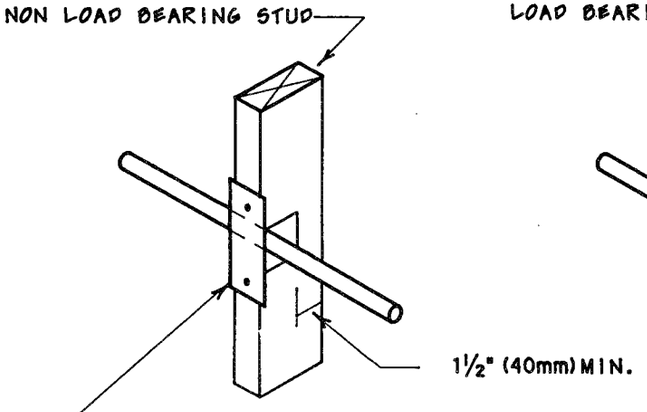


FIG. (B)

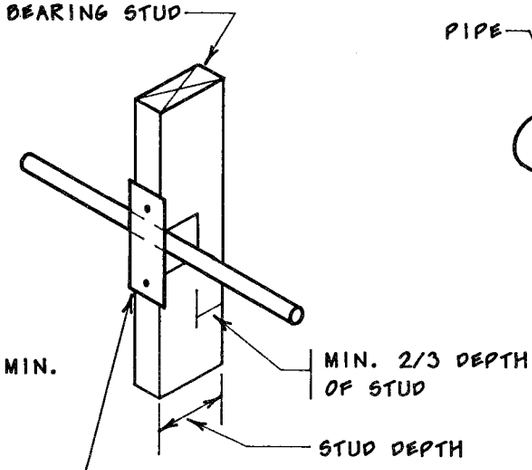


FIG. (C)

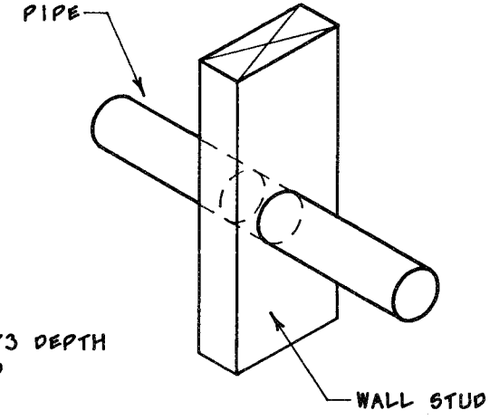
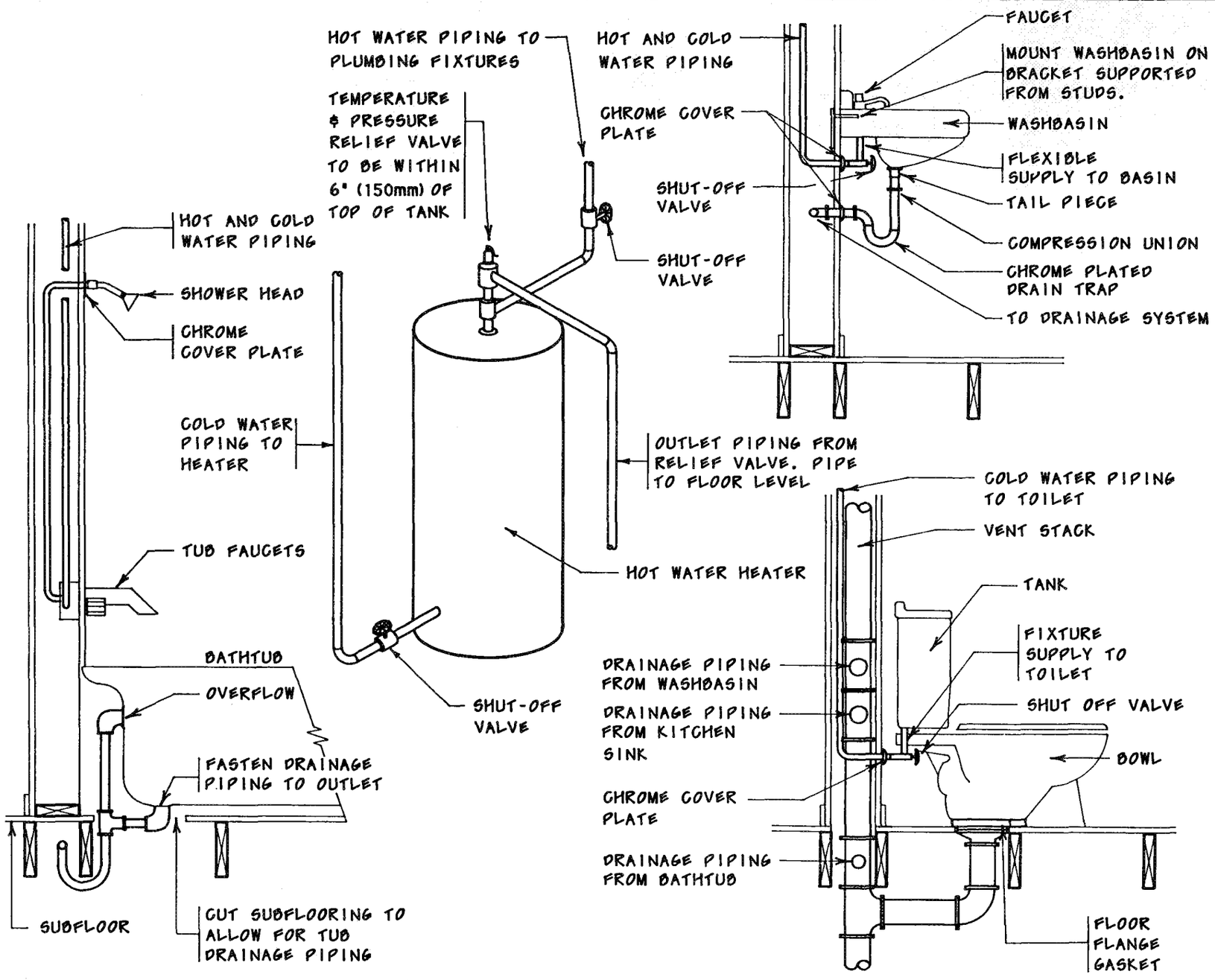


FIG. (D)

16 GAUGE (1.52mm) GALVANIZED STEEL PLATE 2" (50mm) WIDE X 4" (100mm) LONGER THAN THE NOTCH HEIGHT. STEEL PLATE REQUIRED TO STOP WALL SHEATHING NAILS FROM PENETRATING PIPES.

NOTES:

1. *Fig.(A), Drill holes for piping through joist leaving at least 2" (50 mm) of wood above and below the hole. Do not notch the bottom of a joist.*
2. *Fig.(B), Stud reinforcing not needed if remaining portion is at least 1½" (40 mm) for a 2" x 4" (38 mm x 89 mm) stud.*
3. *Fig.(C), Stud reinforcing not needed if remaining portion is at least 2/3 depth of stud.*
4. *Fig.(D), Holes may be drilled provided the remaining portion of stud is at least 1½" (40 mm) for non-load bearing walls and at least 2/3 stud depth for load bearing walls.*



CONSTRUCTION SEQUENCE

A. BEFORE THE INTERIOR WALL FINISH IS INSTALLED:

Place the bathtub level against wall and make connections for hot and cold water, drain and overflow. Remove the cartridges from the taps before soldering the pipe connections.

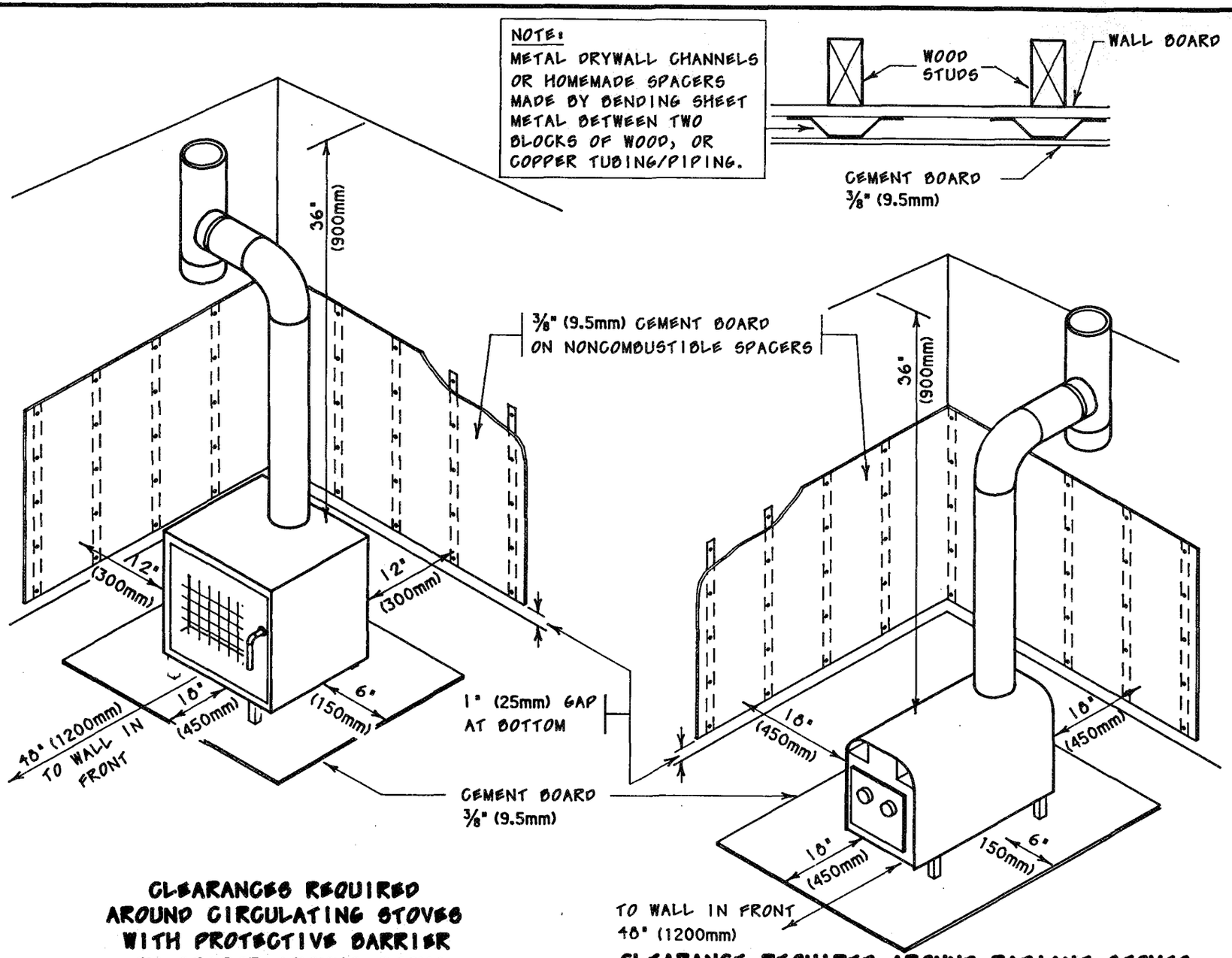
Install basin mounting brackets.

B. AFTER WALL FINISH IS INSTALLED:

Reinstall taps, spout, showerhead and coverplates and caulk around tub.

Install basin on bracket and install drain and water piping from roughed-in lines to the basin. Ensure that valve assemblies are removed prior to soldering and then reinstalled.

Assemble the toilet bowl and tank and install flapper valve, overflow and flush handle. Place wax seal over floor flange and fasten down the toilet using 2 flange bolts. Make the cold water connections.



CLEARANCES REQUIRED AROUND CIRCULATING STOVES WITH PROTECTIVE BARRIER ON SPACER AROUND STOVE

CLEARANCE REQUIRED AROUND RADIANT STOVES WITH PROTECTIVE BARRIER ON SPACER AROUND STOVE

1. When radiant stoves without legs are used, a combustible floor should be protected by two courses of 4" (100 mm) thick hollow masonry blocks arranged so that the hollow cores are lined-up to permit the circulation of air through them. The hollow cores in the top course of block should run at right angle to those in the bottom course.

2. If a more decorative floor finish is desired, clay tiles can be placed on top of the cement boards.

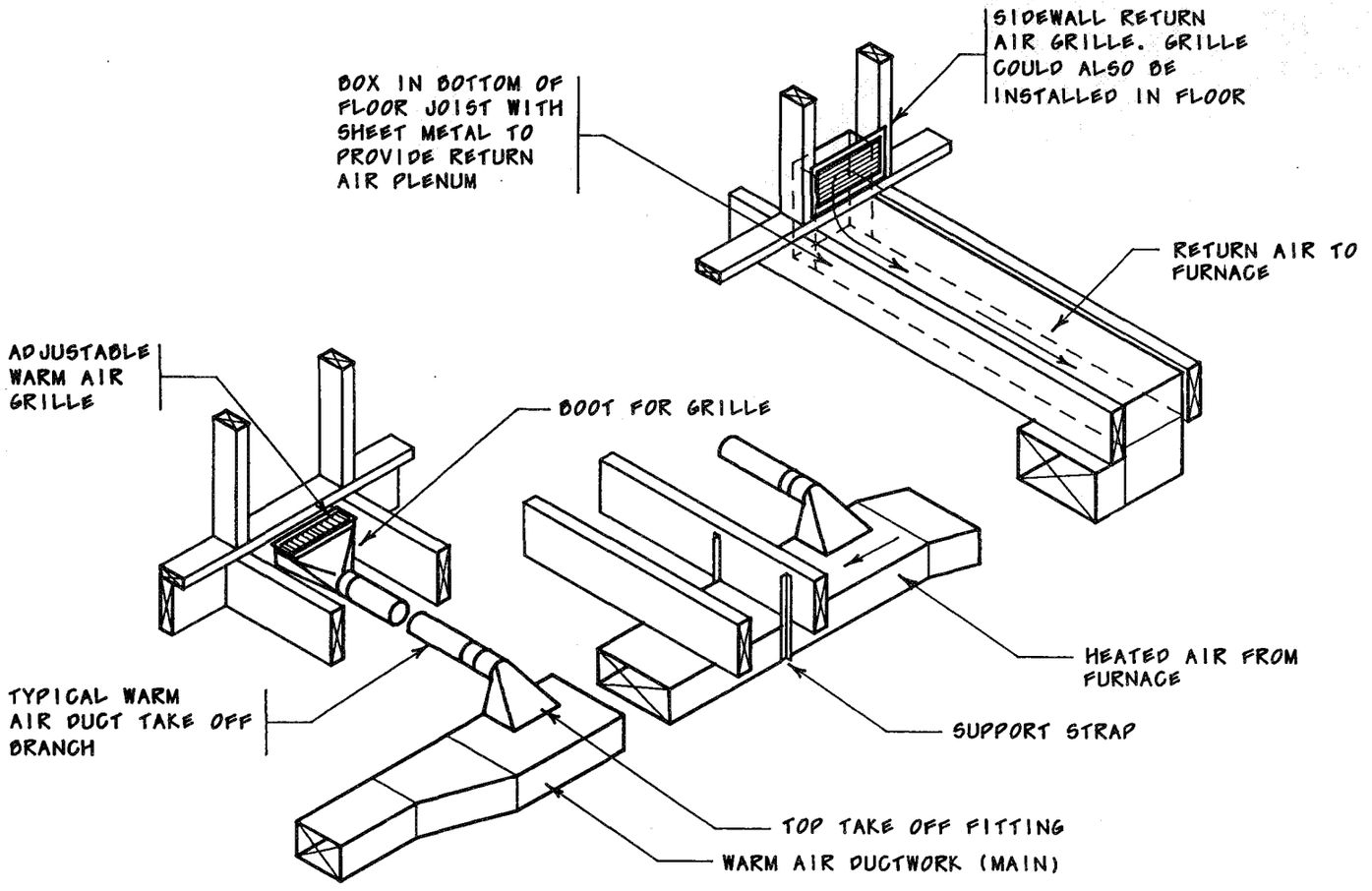
3. Clearances shown are minimum clearances except where approved otherwise by authorities for manufacturer.

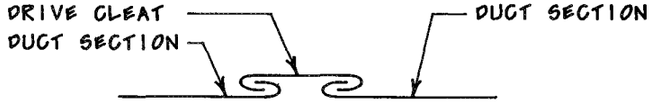
NOTES

1. *All clearances must be to manufacturer's instructions.*

2. *Recommend Can. Standards Association (C.S.A.) approved stoves (not oil drums).*

3. *Double-walled insulated chimney with approved collars etc. for through ceiling/wall installation.*





DUCT CONNECTION DETAIL

CONSTRUCTION SEQUENCE

Install furnace. Ensure that all codes and manufacturer's recommendations are followed.

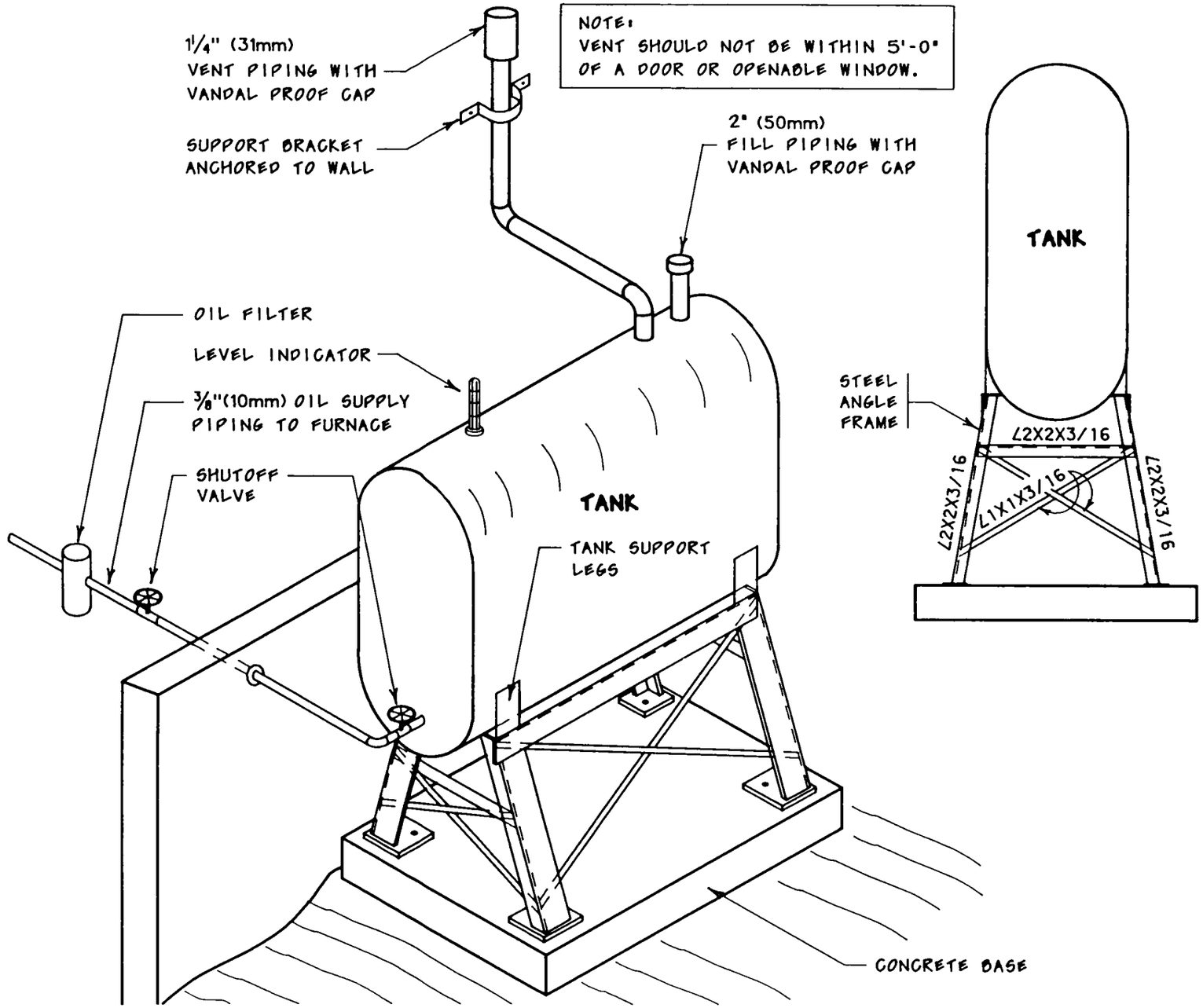
Assemble main sections of ductwork using drive cleats. Support from floor joists as required. Seal joints with duct tape. Cut holes and install take off fittings using sheet metal screws. Cut holes in subflooring and install boots for grilles. Connect branch ducts from boot to take off fitting using sheet metal screws at the joints. Seal joints with duct tape.

Install grilles after flooring has been laid.

NOTES

1. *Different types of furnaces can be used depending upon local conditions. Ductwork will be similar for all hot air furnaces. Your furnace will be provided with the building material for your home.*
2. *Provide power wiring to furnace and emergency switch box located by access door.*
3. *Provide control wiring from furnace control box to thermostat. Locate thermostat on an interior wall of the living space at approximately 4'-0" (1200 mm) above floor level.*

HEATING FURNACE INSTALLATION	8-5



CONSTRUCTION SEQUENCE

Locate tank on base and anchor to frame.

Attach level indicator and install vent and fill piping using Teflon tape on all joints. Extend vent piping at least 7'-4" (2200 mm) above ground level.

Measure, cut and prepare all joints for soldering in a manner similar to that used for water piping (Drawing 8-1.1). Provide caulking around pipe where it passes through the foundation wall.

Remove valve assemblies and solder valve bodies into the piping. Reinstall the valve assemblies.

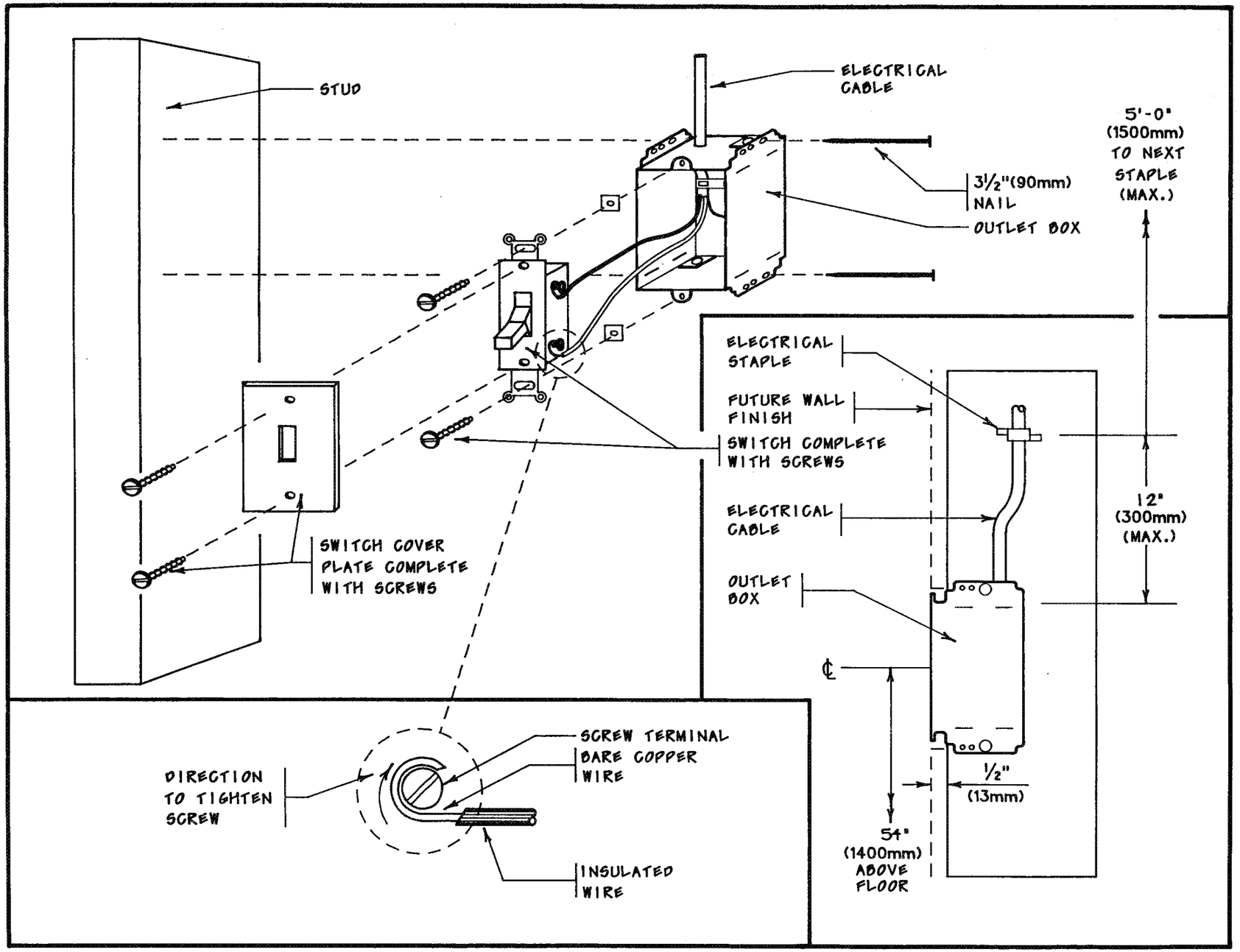
Solder fittings into the piping for the filter assembly. Connect filter to fittings with a wrench.

NOTES

1. *Tank support stand designed for a 250 gal (1135 L) tank.*

2. *Fuel Piping Material*
   - *Galvanized steel for fill and vent piping.*
   - *Type K copper for oil supply piping to furnace.*
   - *Valves rated for oil service.*

HEATING OIL TANK INSTALLATION	8-6



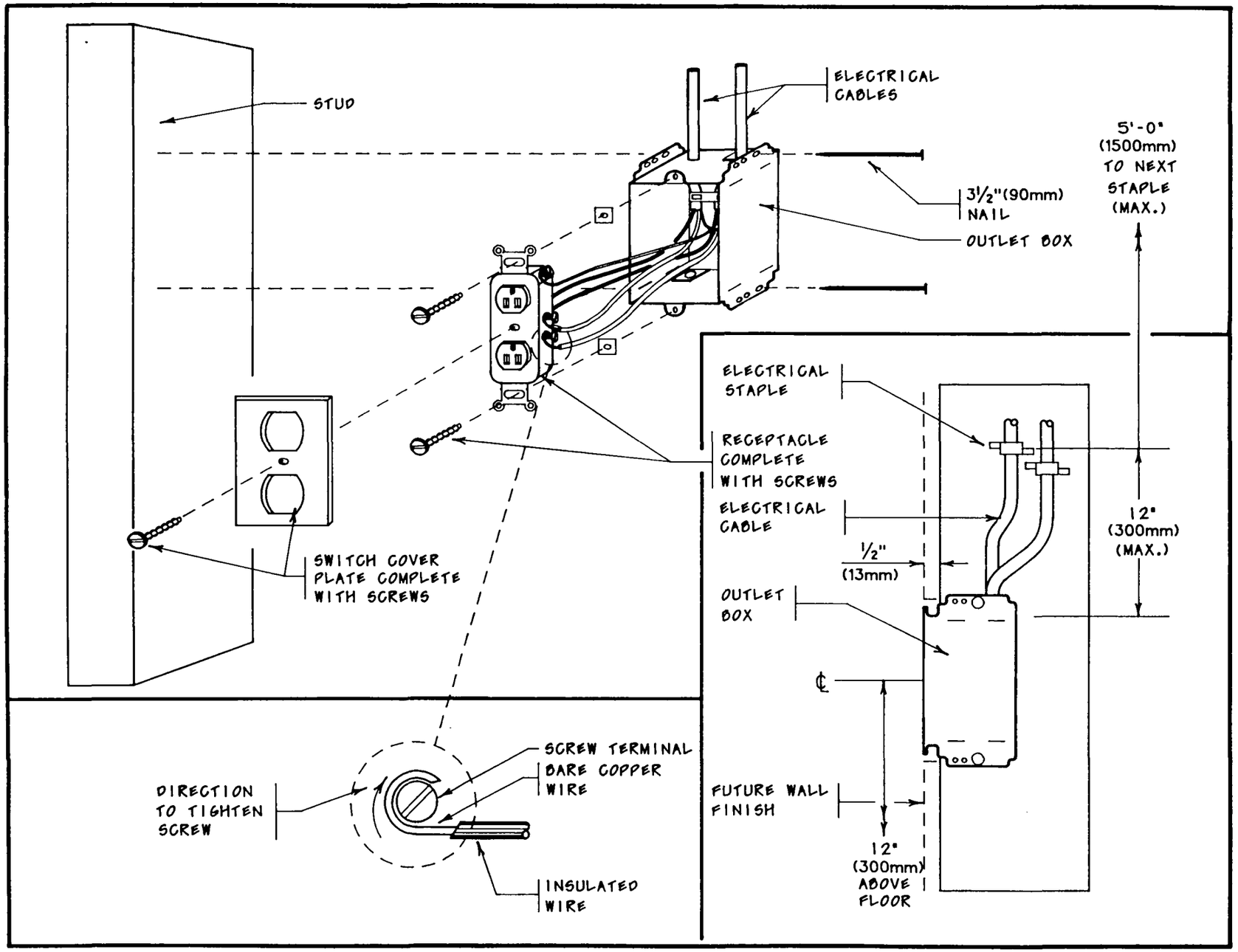
1. Mount outlet boxes to studs using two 3½" (90 mm) nails.
2. Strip back cable insulation approximately 8" (200 mm). Remove knockout on outlet box with screwdriver and run stripped cable into the box. Tighten cable clamp securely making sure that the cable is clamped over the insulation and not the wires.
3. Secure cables to studs, joists and trusses with electrical staples before walls are finished. Leave the installation of light switches for your electrician.
4. Once walls are finished mount switch to the outlet box with the wires packed neatly. Attach cover plate to switch.

NOTES

1. *For any maintenance work on electrical system always ensure circuit breaker is turned OFF.*

WALL SWITCH MOUNTING

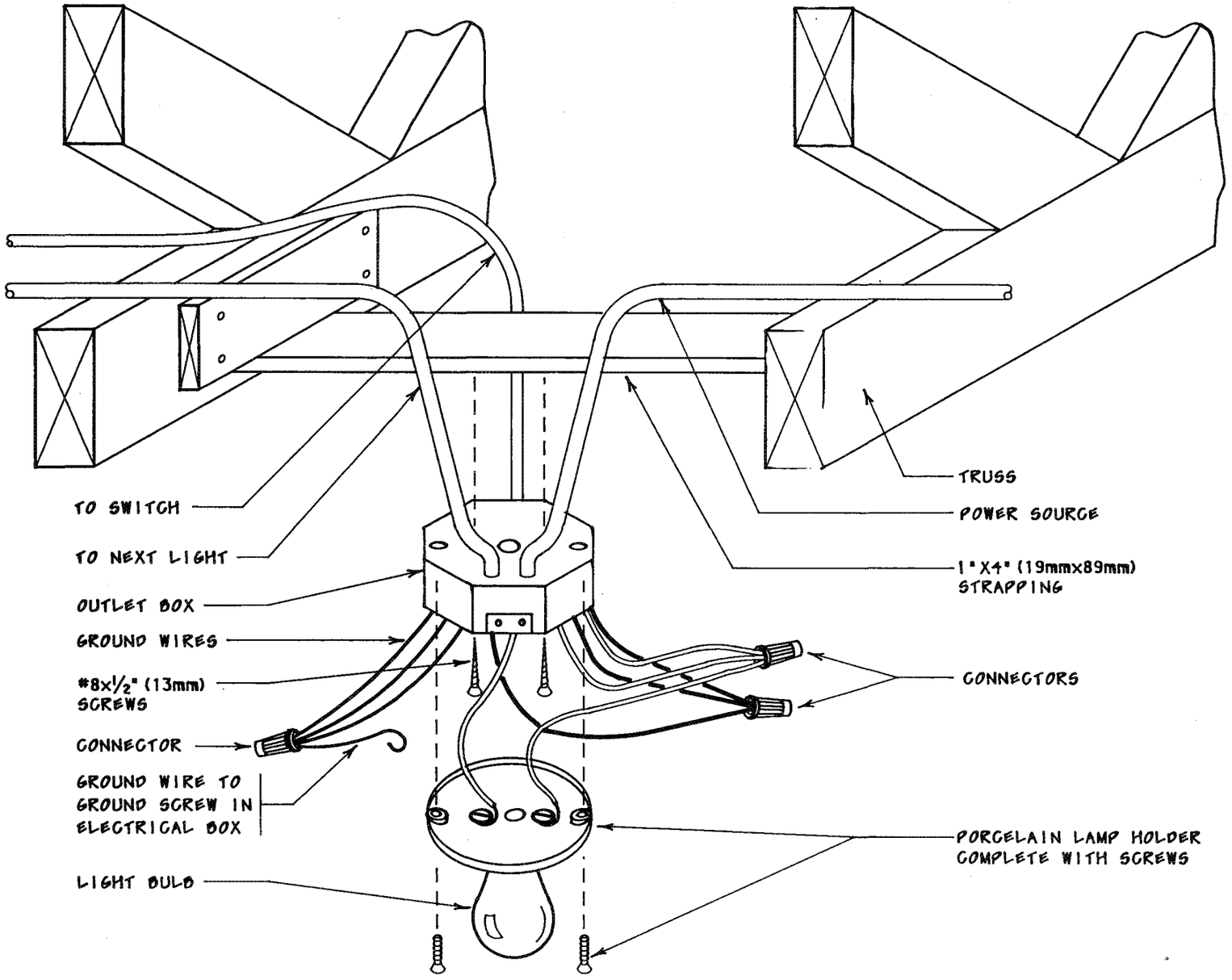
8-7



NOTES

1. *Mount outlet boxes to studs using two 3½" (90 mm) nails.*
2. *Strip back cable insulation approximately 8" (200 mm). Remove knockout on outlet box with screwdriver and run stripped cable into the box. Tighten cable clamp securely making sure that the cable is clamped over the insulation and not the wires.*
3. *Secure cables to studs, joists and trusses with electrical staples before walls are finished. Leave the installation of receptacles for your electrician.*
4. *Once walls are finished mount receptacle to the outlet box with the wires packed neatly. Attach cover plate to switch.*

WALL RECEPTACLE MOUNTING	8-8



NOTES

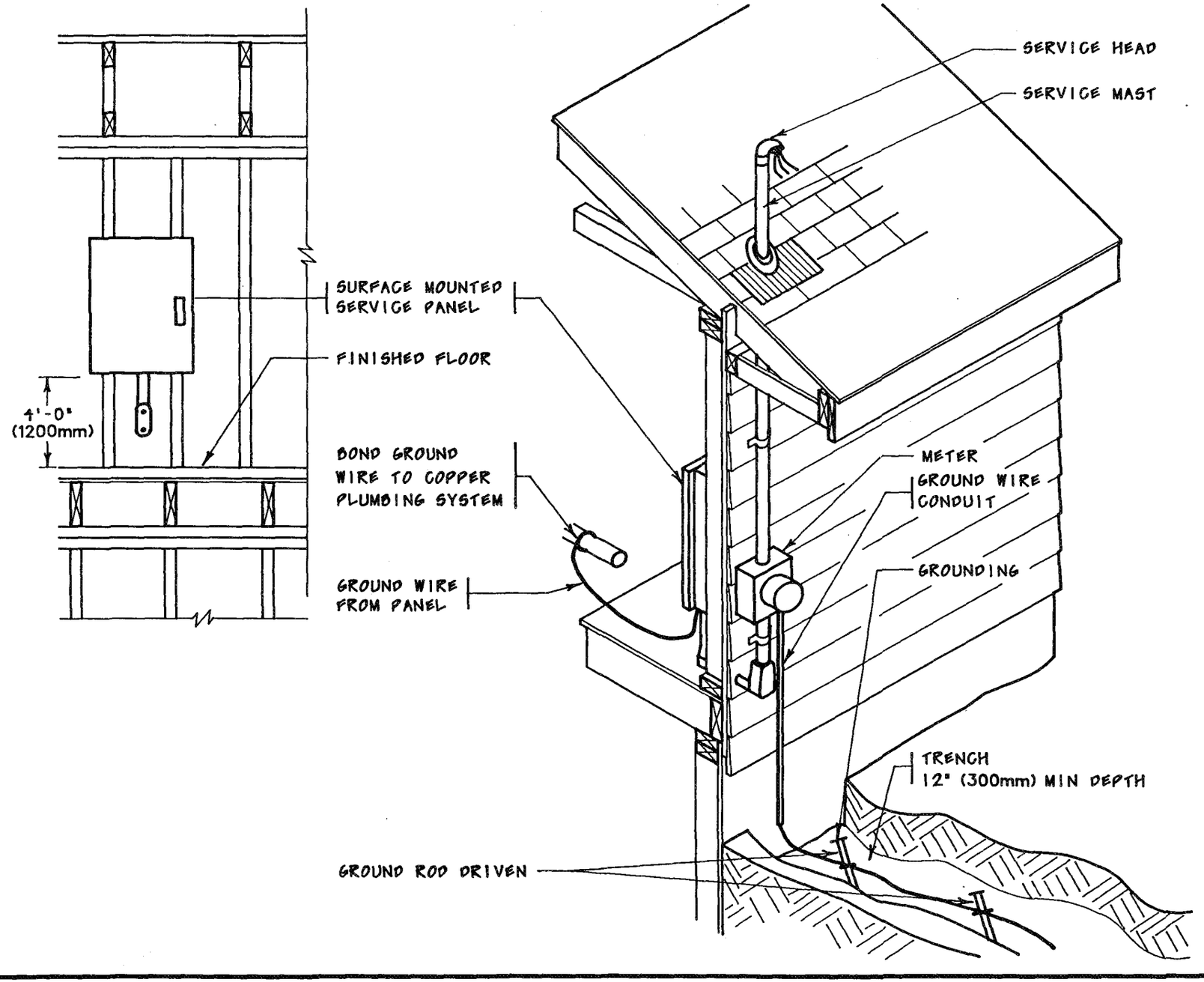
1. *Mount octagonal box to strapping located 1 1/4" (30 mm) above the bottom of truss with screws. Octagonal box to be flush with finished ceiling.*

2. *Strip back cable insulation approximately 8" (200 mm). Remove knockout on octagonal box with screwdriver and run stripped cable into the box. Tighten cable clamp securely making sure that the cable is clamped over the insulation and not the wires.*

3. *Secure cables to studs, joists and trusses with electrical staples before walls are finished. Leave the installation of light fixture for your electrician.*

4. *Once ceiling is finished, mount porcelain lamp holder to the octagonal box with screws.*

CEILING BOX MOUNTING	8-9



CONSTRUCTION SEQUENCE

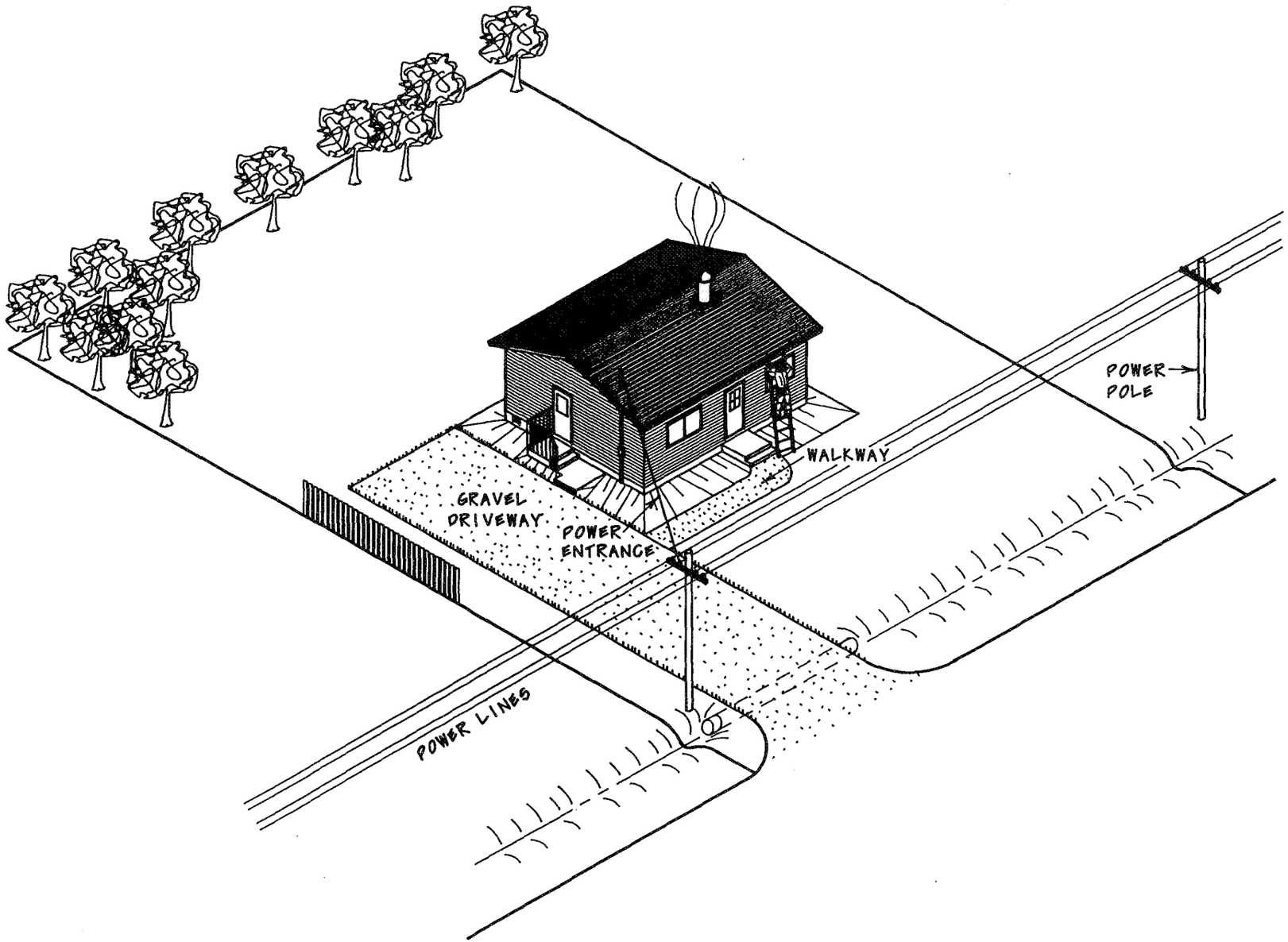
Mast and meter are mounted once siding is placed.

Panel to be mounted once interior wall finish is placed.

All work to be done by your electrician.

All work to be done per local codes and bylaws.

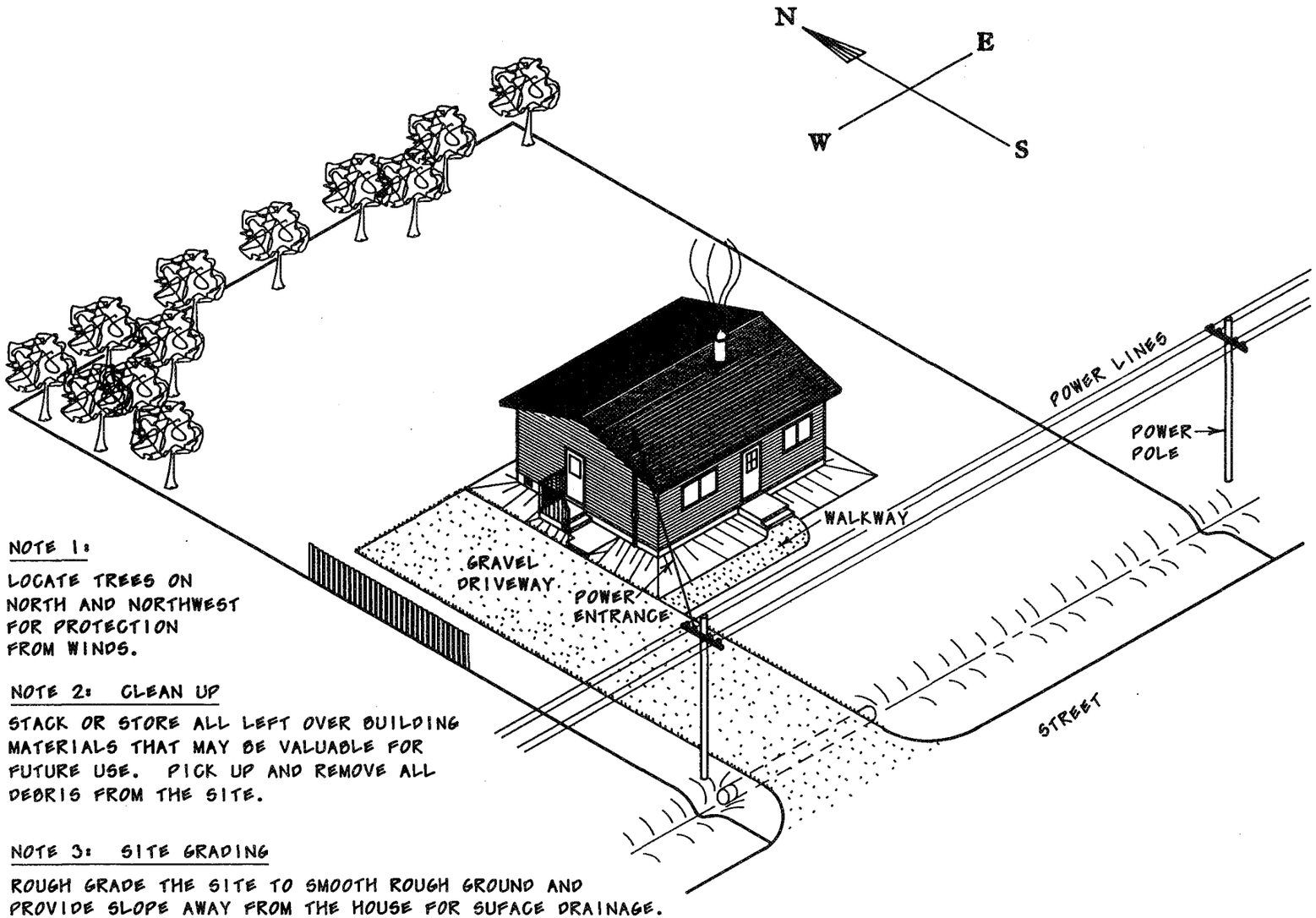
ELECTRICAL SERVICE ENTRANCE	8-10



Congratulations, you are now the owner of a new home. It has taken you many hours of hard work to build your new home. Now it is very important that you care for your home properly to maintain its appearance and quality.

CMHC has prepared a Home Care Manual under the Rural and Native Housing (RNH) Program. This manual contains useful information for maintenance and repair of your home.

SECTION 9
LANDSCAPING AND HOMECARE MAINTENANCE



NOTE 1:

LOCATE TREES ON NORTH AND NORTHWEST FOR PROTECTION FROM WINDS.

NOTE 2: CLEAN UP

STACK OR STORE ALL LEFT OVER BUILDING MATERIALS THAT MAY BE VALUABLE FOR FUTURE USE. PICK UP AND REMOVE ALL DEBRIS FROM THE SITE.

NOTE 3: SITE GRADING

ROUGH GRADE THE SITE TO SMOOTH ROUGH GROUND AND PROVIDE SLOPE AWAY FROM THE HOUSE FOR SUFACE DRAINAGE. FEATHER OUT TO MEET EXISTING GRADES.

CONSTRUCTION SEQUENCE

Landscaping will improve the appearance of your new house and property and add significantly to their value.

Steps you take to improve your property may include:

Topsoil the areas around the house and extend out to meet existing grades.

Spread the topsoil during dry weather. Rake the topsoil to eliminate rough or low areas and make sure topsoil is at least 3" (75 mm) thick.

Apply commercial grade fertilizer over area to be seeded. Mix thoroughly into upper 2" (50 mm) of topsoil.

Selection of seed will depend on whether the site is open or shady. Discuss the proper seed mixture for your site with your local merchant. Seed should be applied at the rate of 5 lbs. per 1000 sq. feet. (2.45 kg. per 100m^2). Lightly rake the seed into the soil to a minimum depth of 1/4" (6 mm). Roll the area immediately afterward with a light turf roller and water regularly in dry weather.

For your driveway and walkway one of the better materials would be clean crushed rock. Spread the gravel evenly to provide a minimum thickness of 6" (150 mm) on driveways and 4" (100 mm) on walkways.

To further enhance your property you may wish to plant flowers, trees and shrubs or erect a fence.

Suggested home maintenance schedule to keep the home in good condition and prevent costly repairs.

JANUARY	FEBRUARY	MARCH	APRIL
Clean or replace furnace and air exchanger filters. Remove snow and ice from roof. Inspect house for excessive moisture	Inspect plumbing for drips and leaks. Test smoke detector and fire extinguisher.	Inspect home for moisture damage Inspect home for interior maintenance.	Inspect basement for signs of water leakage. Check siding and outside of home for winter damage. Inspect landscaping for proper drainage. Inspect eavestroughs and downspouts and clear away obstacles.
MAY	**JUNE**	**JULY**	**AUGUST**
Inspect window and door screens for needed repairs. Inspect foundation walls for cracks and leaks. Clean and replace furnace and air exchanger filters.	Have septic tank cleaned Inspect condition of roof for loose or missing shingles. Do yard maintenance.	Clean drainage ditches of debris.	Shampoo carpets. Test smoke detectors and fire extinguishers.
SEPTEMBER	**OCTOBER**	**NOVEMBER**	**DECEMBER**
Clean chimney and have furnace inspected. Prepare for winter heating supply. Vacuum electric heaters to remove dust.	Test smoke detectors and fire extinguisher. Clean or replace furnace and air exchange filters. Inspect home for excessive moisture.	Check home for interior maintenance that is needed.	Check windows and doors for ice build up. Check all electric wires, outlets and plugs for deterioration.

Now that the construction is completed, you should be aware that many items around your home will require routine maintenance, repairs and eventually replacement. some of the major items are listed in the Home Maintenance Schedule of Page 9-2 or refer to your "Client Information Guide" or "Everyday Home Repairs" book.

In addition to these items, things such as cleaning the chimney, opening and closing the crawl space vents, cleaning the eavestroughing and washing the windows should be done each year. Items such as light bulbs, water taps, caulking and painting will need periodic repair or replacement. The method of repair and replacement for many of thee minor items can be found in the "Home Care Manual" available through CMHC.

Regular Maintenance Schedule:

Wood Siding and Trim	-	Paint every 3 to 4 years.
Septic Tank	-	Clean out every 2 to 3 years. *Replace after 10-15 years.*
Roof Shingles	-	Replace after 15-20 years.
Water Pump	-	Repair/service as required.
Hot Water Tank	-	Replace after 5-10 years.