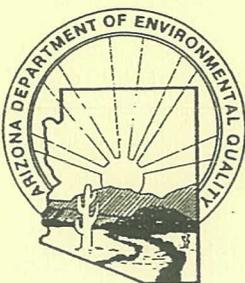


engineering bulletin no. 2

**the earth pit privy
and
other methods of
organic waste disposal**



ENGINEERING BULLETIN NO 2
THE EARTH PIT PRIVY
AND
OTHER METHODS OF
ORGANIC WASTE DISPOSAL
ENVIRONMENTAL HEALTH SERVICES

EARTH-PIT PRIVY

A-GENERAL - An earth-pit privy provides a safe and satisfactory method of excreta disposal at a minimum of cost. The design as outlined by figures 1 thru 6 and as specified below, will give good service under normal conditions provided the privy is properly installed and is maintained fly-tight.

B-DESIGN AND CONSTRUCTION

- a. **Location** - The privy shall be located at least 100 feet from any well or other source of water supply, or as otherwise specified by the local health department, and where possible upon ground sloping away from the water supply. No privy shall be located less than 10 feet from any street, road, alley, or adjacent property or less than 50 feet from any pond, lake, or stream. In areas underlaid by fissured rock formations or whenever ground water is encountered in the construction of the earth-pit, approval of the location based on special investigation of conditions must be obtained from the local health department.
- b. **Pit** - The pit shall have a minimum capacity of 50 cubic feet per seat and shall be not less than 4 feet deep measured from original ground level.
- c. **Pit Cribbing** - The cribbing shall extend 4 inches above the original ground line and to the full depth of the pit unless in rock formation or other non-caving material in which case the lower section of the cribbing may be omitted. The cribbing, when inserted, shall make a firm uniform contact with the earth walls on all sides. Cribbing shall not support the building or sills.
- d. **Sills** - In the case of concrete slab privies, concrete sills shall be placed around and outside the top of the pit cribbing on which to set the slab. These sills shall be at least 5 inches wide and extend down at least 4 inches to firm earth. For wood floor privies, when concrete sills are not used, there shall be provided a mud sill of durable wood of 4 x 6 inch pieces.
- e. **Pit Mounds** - Pit mounds shall be of well tamped earth installed in thin layers and shall extend outward on a level for a distance of not less than 18 inches in all directions from the sills and then continue outward to meet the original ground surface with a slope not greater than 1 vertical to 3 horizontal. The floor of the building shall be at least 6 inches above the surrounding natural ground level.
- f. **Floor and Riser** - The floor and seat riser shall be built of impervious material or tongue and grooved lumber, and in a manner to exclude insects. The bench or seat riser shall have an inside clearance of not less than 21 inches between the front and rear walls, and not less than 12 inches between the side walls. The top of the seat shall be not less than 12 inches or more than 16 inches from the floor. The seat riser shall be so constructed and bonded with the floor as to prevent seepage through the riser upon the floor.

- g. Seat Cover - The seat opening shall be covered with a lid, hinged so as to provide a clearance of not less than $3\frac{1}{2}$ inches horizontally between the back of the seat opening and lid when raised. The lid shall be so constructed and installed that when closed it will exclude flies and other insects.
- h. Vent Pipe - Unless adequate ventilation is provided by screened openings in the side of the privy structure, the pit shall be vented from the riser to a point outside the building by a flue or vent pipe having a cross-sectional area of not less than 12 square inches. All joints shall be tight and the opening or openings screened with 16 mesh copper wire screen.
- i. Superstructure - The building shall be rigidly constructed and shall provide privacy and protection from the elements. Except where climatic conditions prohibit, the building shall be ventilated by leaving a 4 inch opening at the top of the walls just beneath the roof. The building should preferably be covered with a single plane roof having a pitch of 1 in 4 with an overhang of not less than 5 inches front, 15 inches back, and 9 inches on each side, and a facing board not less than 6 inches wide extending around the entire margin of the roof.

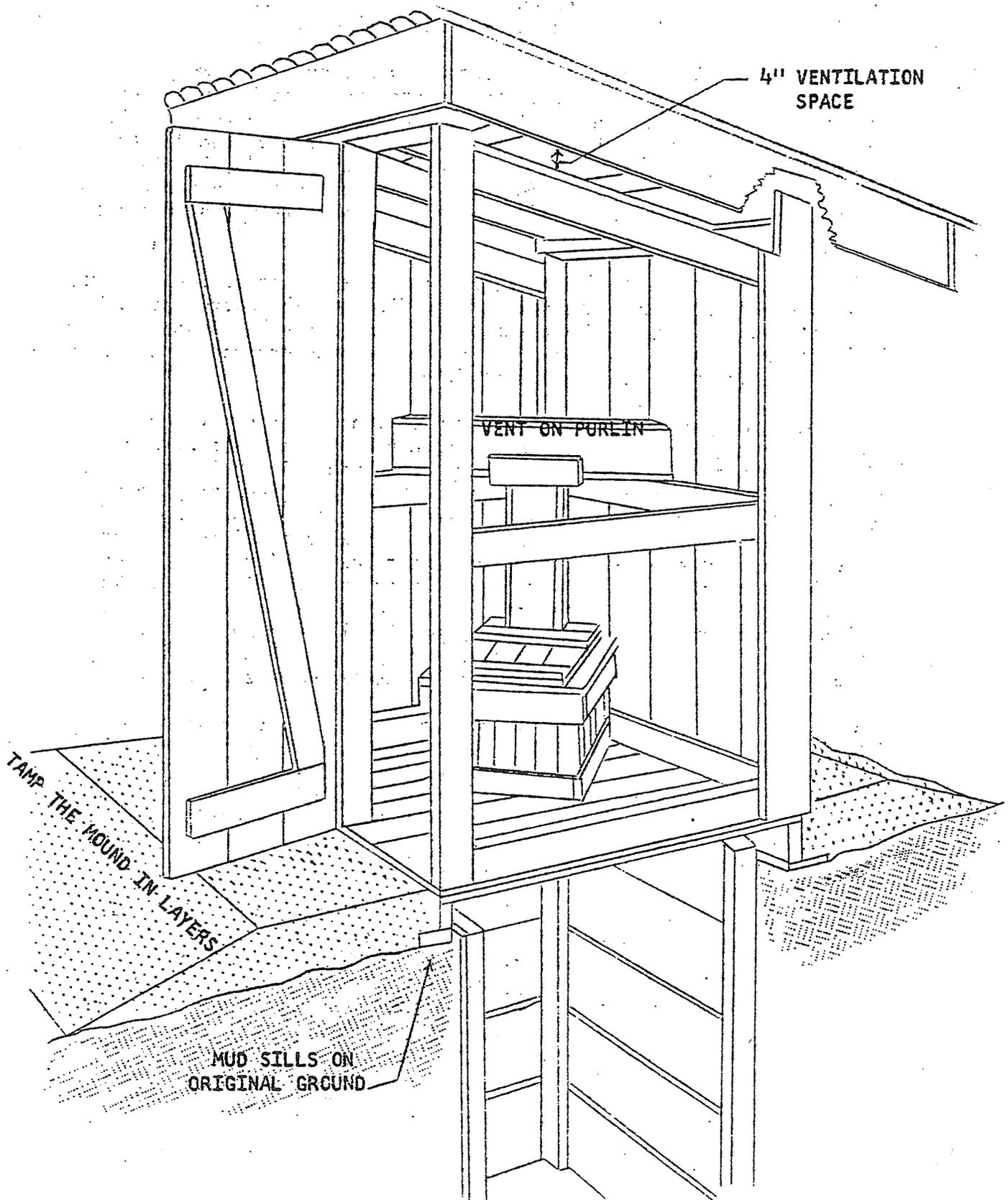
C-CONSTRUCTION SUGGESTIONS

- a. Location - Select a well drained site at least 100 feet from the water supply and downhill from it if possible. The privy should be placed near the house for convenience.
- b. The Pit - Construct a frame, the outside of which is the same size as the outside of the pit curbing ($3\frac{1}{2}$ feet by $3\frac{1}{2}$ feet). Use four curb siding pieces for this. Square and brace frame with wood strips across corners. Lay frame on ground at location selected. Dig pit to depth of about one foot to size corresponding to inside of frame. Use a spade to trim sides of pit so frame will slide evenly into it. Dig pit straight down and trim to a depth of $4\frac{1}{2}$ feet measured from the highest point on the original ground surface. When pit is completed, the frame should fit evenly on all sides from top to bottom.
- c. The Pit Curbing - Construct pit curbing as shown ($3\frac{1}{2}$ feet square outside dimensions). Wreck frame used for measuring pit and use material to finish siding of pit curbing. Lower curbing into pit. If curbing does not fit tightly, all cavities must be packed with dirt, using a thin board for ramming. The curbing should be installed immediately after the pit is completed, since if allowed to stand without curbing, it might cave in. The curb should extend 6 inches above the original ground surface.
- d. The Mound - Use the earth taken from the pit to construct a mound level with the top of the curbing. The earth should be spread in 2 inch layers and firmly tamped into place. A wooden block about 12 inches in diameter and 16 inches long, with 2 wood strips for handles, makes a suitable tamp. The top of the mound should extend at least 2 feet from the curbing on all sides before it begins to slope off. Construct this mound carefully, it is the foundation for the building.

- e. The Sills and Mud-Sill - Construct as shown in Figure 2. Mud sills should be nailed flush with the inside of the ground sills, and to the corners of ground sills as shown, to prevent spreading at the corners. All sill pieces must be sawed square to assure tight joints.
- f. The Riser - Select a straight 14 foot 2 x 4 and cut into two pieces of equal length. Lay these flat on the ground and space 13 inches outside to outside. Nail a temporary strip on each end to hold them at this distance. Lay smooth sides of the riser boards next to the 2 x 4's. Begin at squared ends of 2 x 4's and nail on side boards, leaving necessary clearances as shown in Figure 3. Lay the boards with tongues toward the other ends of 2 x 4's and remove tongue from last board in each section.

Saw off the sections at dotted lines and nail together to form the riser box. When nailing, keep the bottom band flush on the bottom so riser will not rock on floor. The riser box must be squared before the seat is installed. It is necessary to plug the exposed grooves on two corners of the riser to prevent entrance of flies.

- g. The Seat and Lid - Cover top of riser with tongue and groove material running across the top. Have smooth side up. Begin at front 2 x 4 band and work toward rear. Lay out seat and vent pipe holes as shown in Figure 3. The vent hole should be marked by setting the pipe on the seat at the proper location and marking around it. Sawing the holes will be simplified if one board crossing each is not nailed so that it can be slipped out to start the saw. After saw is started slip board back to position and nail. Construct lid as shown in Figure 3. The lid should be hinged on a line even with front of vent pipe. About $\frac{1}{2}$ inch clearance should be left between back of lid and hinge blocks. If hinges are stiff, free them by opening the joint with a chisel. Always oil hinges. The lid must fit flat on the seat and be self-closing.
- h. The Floor - The flooring consists of two layers, the sub-floor and the floor. The floor must be laid at right angles to the sub-floor. The floor should be 4-inch tongue and groove material laid such that the boards run from back to front to facilitate cleaning. One-half inch plywood may be substituted for the tongue and groove flooring, but the plywood must be free from holes as must be the flooring. The whole floor must be tight so as to prevent the entrance of flies into the pit.
- i. The Building - Construct as shown in Figures 1, 5, and 6. The building is not nailed to the floor slab, but is supported on a 2 x 4 sill, which rests on the floor and is toenailed to it. Note that siding boards extend about 1 inch below sub-floor. Siding should be put on as follows: Cover sides first; cut 14 foot piece in two, one piece to be used at each front corner. Run these pieces even with tops of rafters and nail. Finish one side, using a new piece of 12 foot flooring each time and lay unused piece aside for use on other side of building. The last piece on each side should be extended to top of rafter and nailed. Finish other side. Cover front and rear of building and build door. Front siding (6 feet 6 inches) and rear siding (5 feet 6 inches) will cut from 12 foot material. A 4 inch vent space is provided all around building. Rain and snow will be kept out by the 6 inch band around roof. Saw out sill in front of door and use piece for middle belt at side of door.



P E R S P E C T I V E O F P I T P R I V Y

Fig 1

SILL & STRINGER LAYOUT

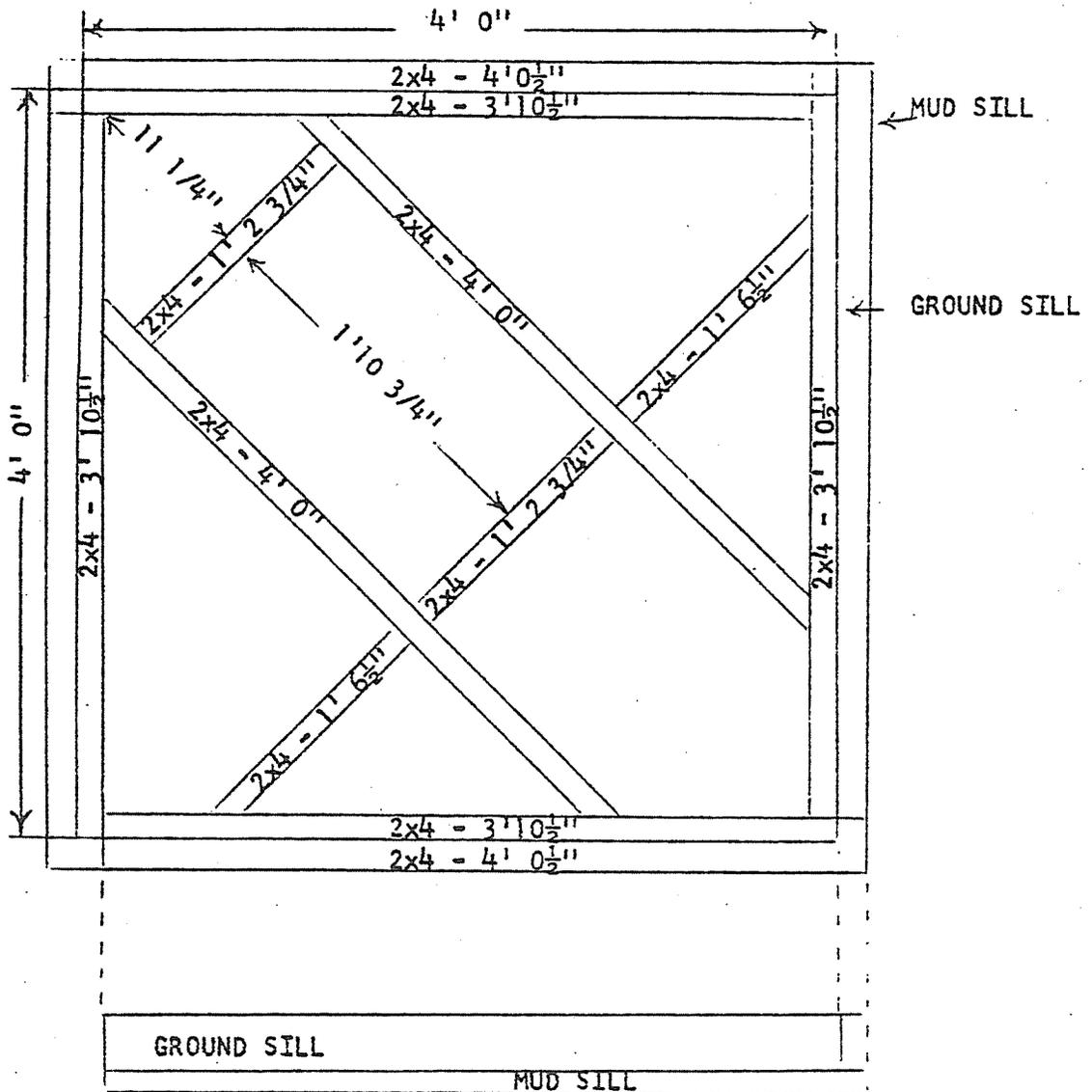
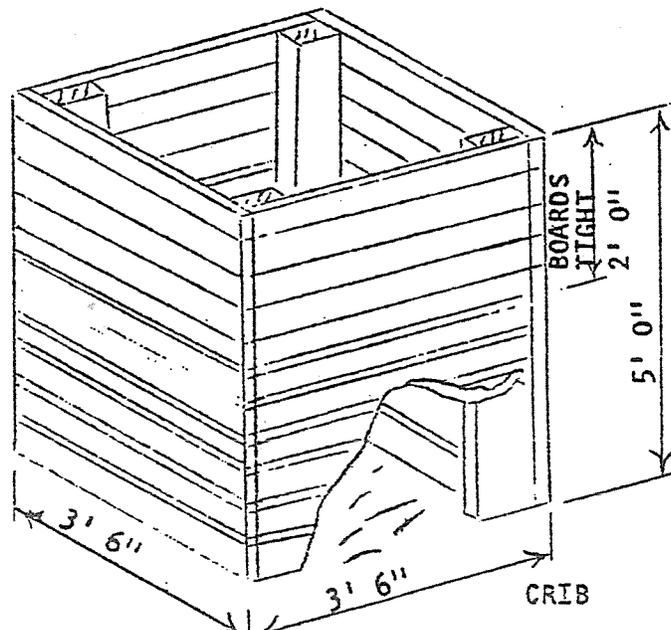
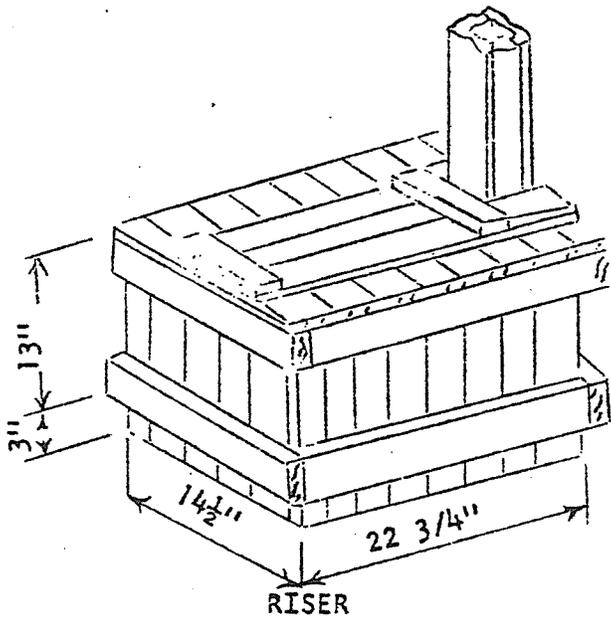
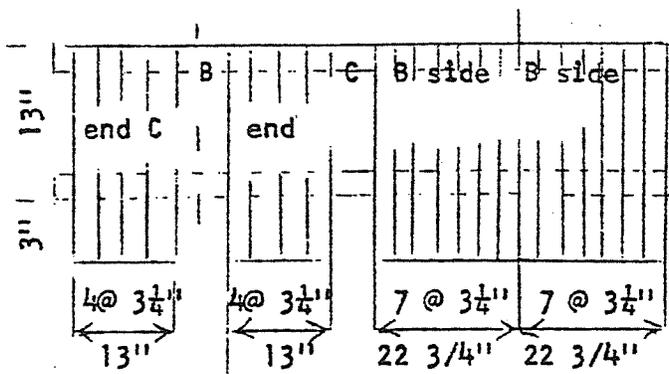
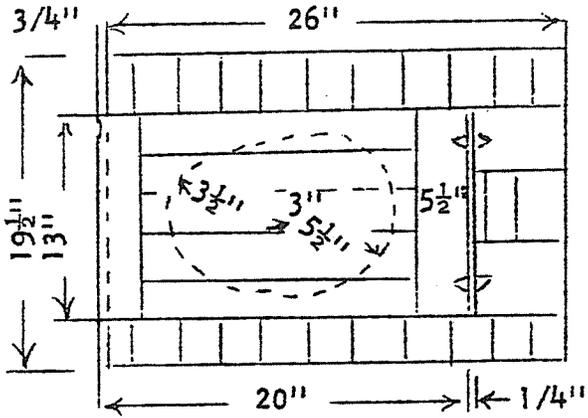


Fig 2

TOP OF RISER & LID

RISER SIDES & ENDS



USE 1" x 4" & 1" x 6" FLOORING
FOR SEAT LID AND VENT

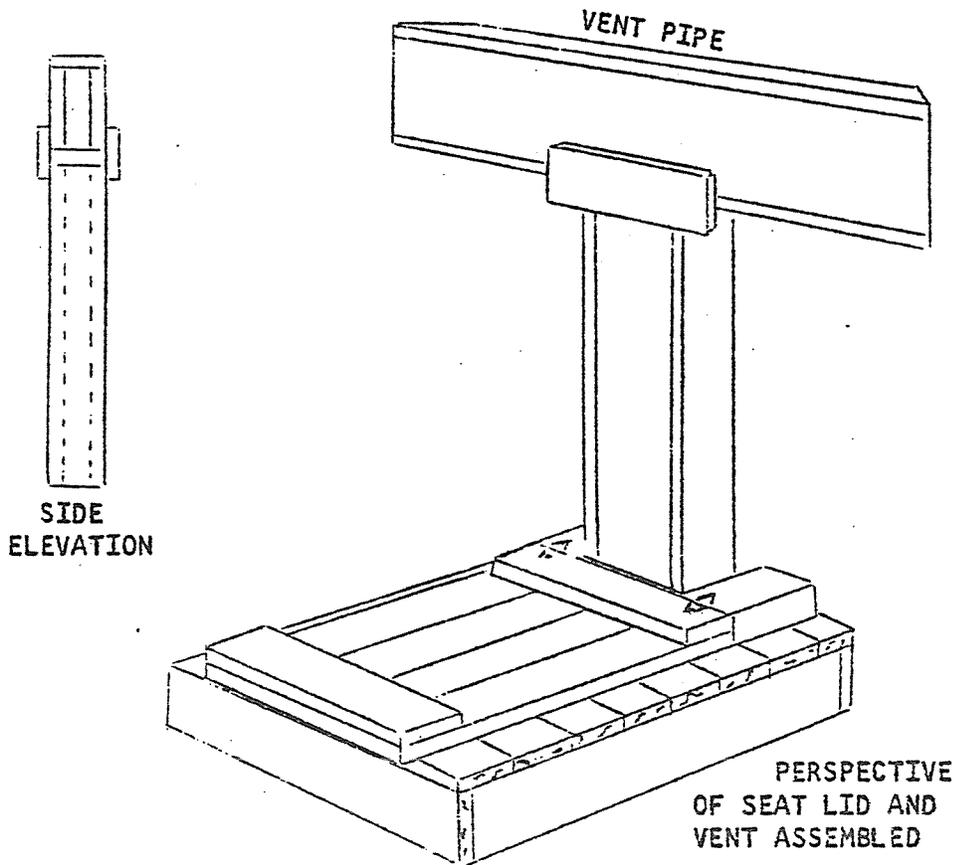
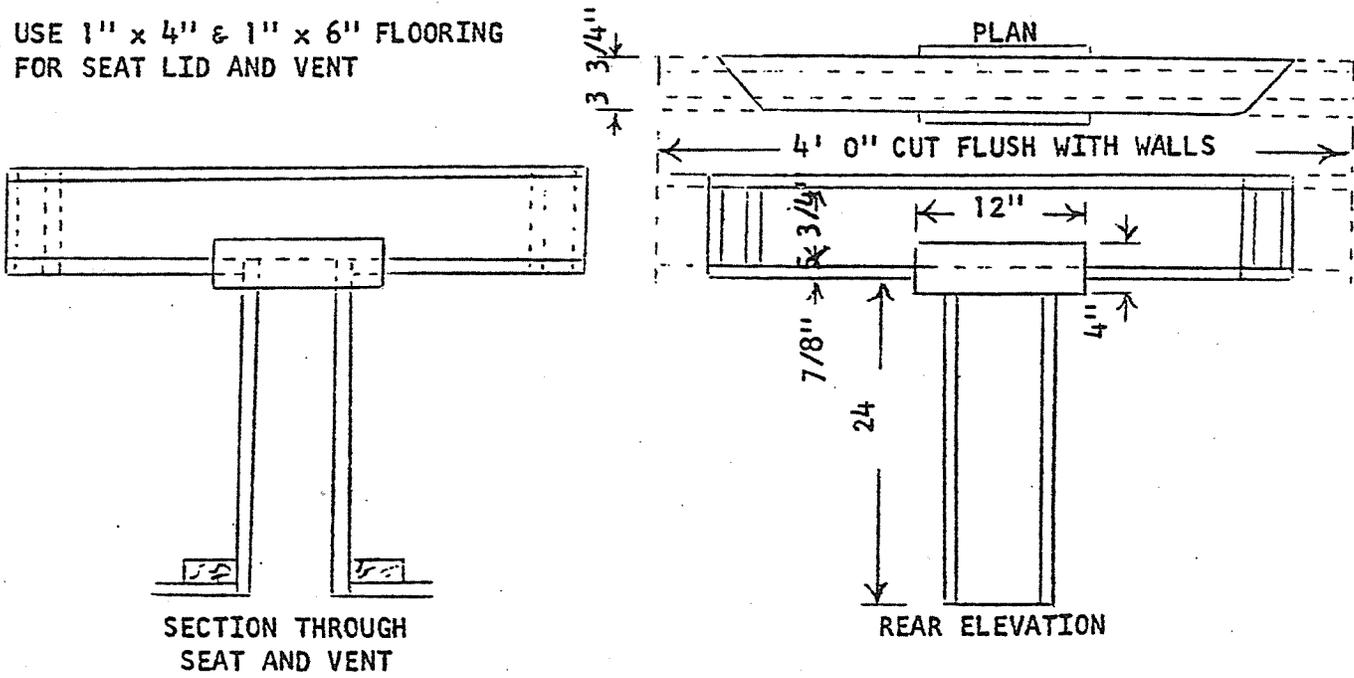
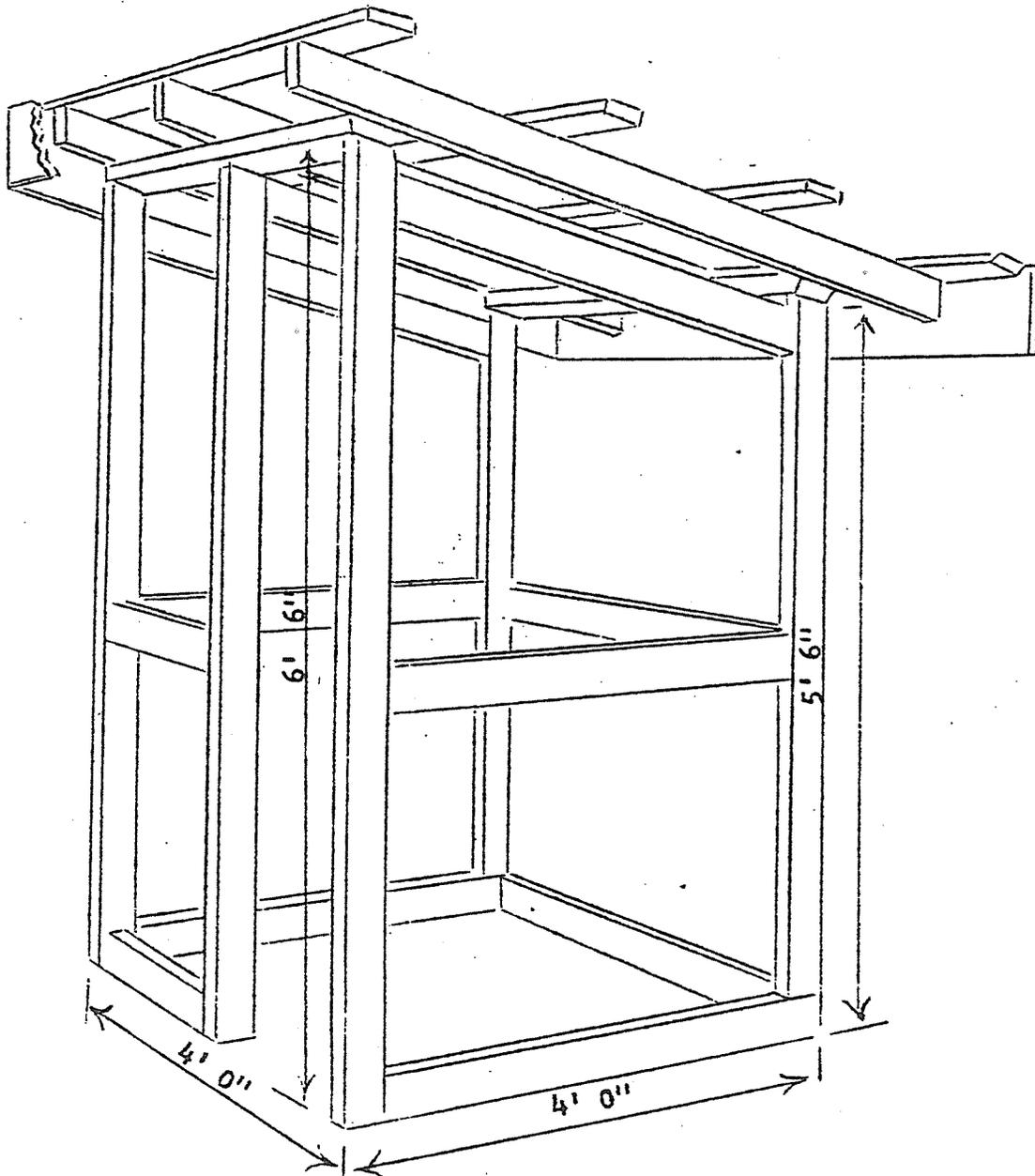
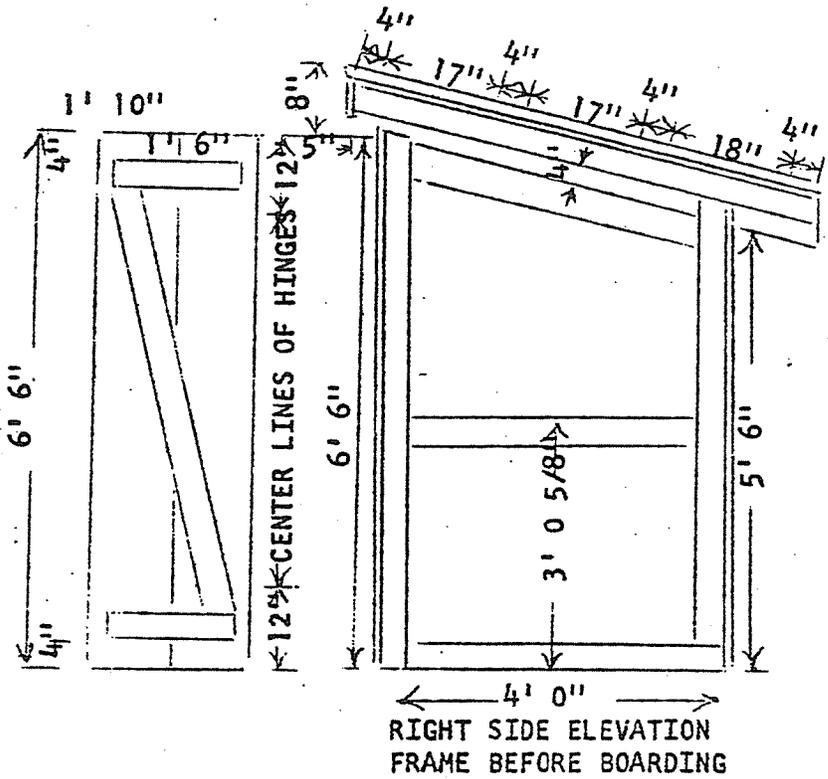
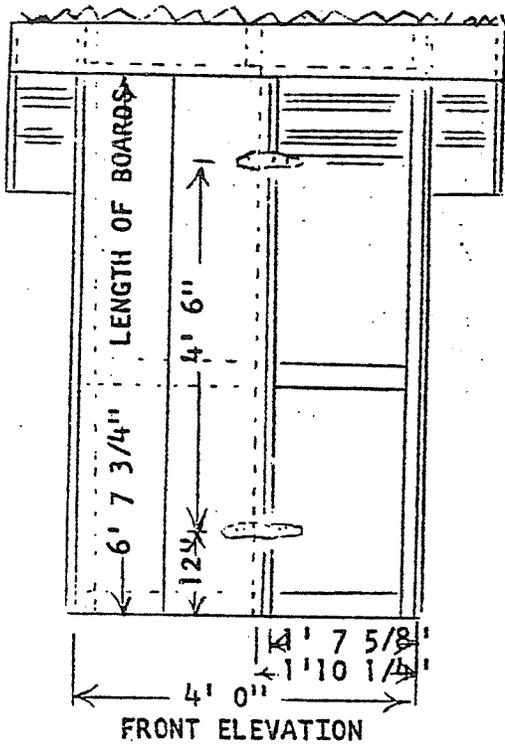


Fig 4

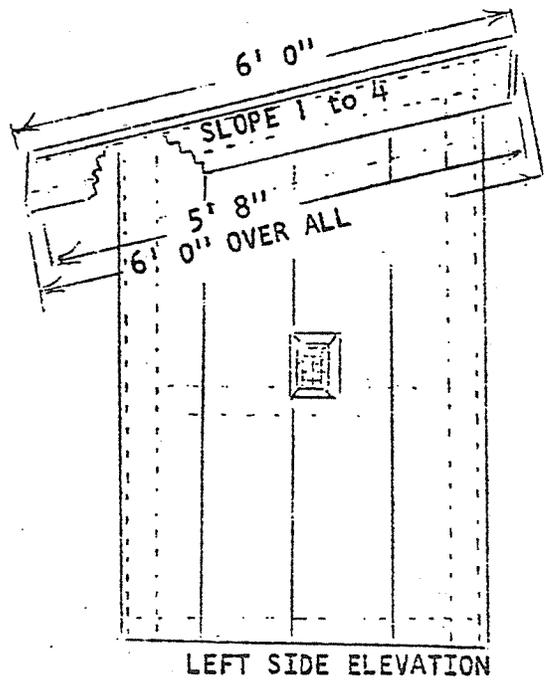
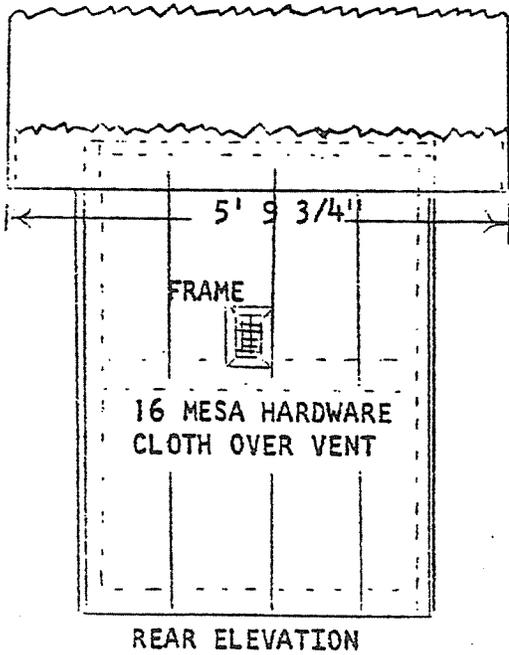


PERSPECTIVE OF COMPLETE HOUSE FRAME

Fig 5



- Use 1" Board for Walls
- 2" x 4" for framing
- 1" x 4" for lathing
- 1" x 8" for fascia



house elevations

MATERIAL LIST FOR WOOD BASE PRIVY

BASE

2 pc. 2x4x16' S4S #3 Common
1 pc. 2x4x18' S4S #3 Common

FLOOR

7 pc. 1x4x8' T & G Flooring #1

RISER

4 pc. 1x4x8' T & G Flooring #1
1 pc. Corner Stock 6'
1 pc. 2x2x8' S4S #3 Common
1 pc. 1x2x8' S4S #3 Common

SEAT & LID

1 pc. 1x4x12' T & G #1 N. P.
1 pc. 1x3x10' T & G #1 N. P.

VENT

1 pc. 1x6x12' S4S #3 Common
1 pc. 1x4x12' S4S #3 Common

FRAME

8 pc. 2x4x12' S4S #3 Common

SIDING

2 pc. 1x4x12' Common
3 pc. 1x8x12' Common
14 pc. 1x8x12' Shiplap
1 pc. 1x4x10' Common

CRIBBING

2 pc. 2x4x10' #5 Common) Rough may be used
4 pc. 1x12x16' #5 Common) if desired.

HARDWARE

3 sheets 2x6' cor. iron roofing
1 pair 6" strap hinges with screws
2 pair 3" strap hinges with screws
½ pair 3" "T" hinges with screws
1 pc. 6" x 18" 16 mesh copper screen wire
1 pc. 8" x 14 ½" mesh galv. Hardware cloth

HARDWARE (Con't.)

1 screen door pull with screw
1 3" hook and eye
1 lb. 16 d nails
4 lb. 0 d nails - cement coated
1 lb. 4 d nails - cement coated
2 lb. 8 d nails - cement coated

1 qt. Creosote
1 pt. Spar Varnish
1 pt. Clear Shellac
1 sheet #1 sandpaper

OTHER METHODS OF EXCRETA DISPOSAL

A-VAULT PRIVY - Essentially the same as an earth-pit privy except that the pit or vault is lined with impervious material, usually concrete, and is constructed so that the receptacle can be emptied and cleaned. They are used chiefly where limestone formations or fissured rock is encountered, where the water table is close to the ground surface, or where it is necessary to prevent contamination of nearby water courses, wells, or springs. The vault is constructed so that it will be water-tight to prevent the entrance of water into the pit or leakage of the contents from the pit. A readily accessible clean-out is required which is constructed so as to prevent entrance of flies, animals, and surface waters. A portion of the impervious vault cover makes up the floor of the privy. The same type of superstructure, seat, riser, and vent are used for vault privies as for earth-pit privies.

B-PAIL OR CAN TYPE PRIVIES - A type of privy employing the use of a water-tight container located directly beneath the seat and having provisions for the removal of the receptacle for emptying and cleaning. This type of privy provides a method for disposal of excreta for temporary camps, camp meetings and similar gatherings where adequate and approved service is available for regular maintenance. The door provided for servicing the receptacles must be readily accessible and constructed so as to be fly-tight. There are no pits in this type of privy; however, the floor, riser, seat, and superstructure are the same as for earth-pit privies.

C-CHEMICAL TOILETS - There are two general types: (1) Commode type where the pail containing the chemical solution is placed directly beneath the seat; (2) The tank type in which a container holding the chemical solution is placed in the ground directly beneath the seat. A pipe or conduit connects the riser with the tank. Facilities are provided for agitation of the chemical solution. Chemical toilets differ from privies in that they may be placed within a dwelling whereas privies are generally located apart from the dwelling. Because of fundamental differences in design, chemical toilets resemble other types of privies only in seat construction and method of venting and in most instances are manufactured commercially.

Sodium hydroxide is the chemical commonly used in chemical toilets, although other suitable chemicals may be employed. The purpose of the caustic solution is to emulsify the fecal matter and paper and to liquify the contents. To accomplish this, the solution must be maintained at proper strength and the mixture thoroughly agitated after each use. Odors are due mainly to the liberation of ammonia and will be produced if the caustic solution is weak, or if mixing by agitation is not properly carried out. Should the odor persist after thorough agitation of the contents, the toilet should be recharged with chemical in accordance with recommendations of the manufacturer.

D-INCINERATOR TOILETS OR PRIVY - Essentially a privy or toilet designed to permit disposal of excreta by incineration using LP gas, natural gas, or other source of heat to effect destruction of the wastes. Some types are manufactured commercially and are designed specifically for use within the dwelling. The Forest Service and others have developed an incinerator or cremating privy for use where water under pressure is not available and rock formations are encountered. This type of privy is expensive to build and requires that fuel be readily available and inexpensive. The pit is fundamentally different for the incinerator privy from that used for the earth-pit privy in that provision

is made for adding fuel and for removing ashes. Vents also differ from those used in other types of privies because of the need for increase draft. Although the same type of superstructure may be used for an incinerator privy as for the earth-pit privy, the floor must be constructed of fireproof material and the riser and lid should be of metal or other fire resistant material to prevent damage or destruction during incineration of the wastes.

OPERATION AND MAINTENANCE OF EXCRETA DISPOSAL FACILITIES

- A-PIT PRIVY** - For an earth-pit privy, the receptacle shall not be allowed to fill to a point higher than 24 inches below the undersurface of the floor of the privy building. When the receptacle is filled, a new pit shall be provided at a location approved by the local health department, the building and floor moved to the new location and installed as specified under Earth-pit Privies. The mound around the old pit shall be leveled and the pit contents buried with at least a 12 inch earth covering.
- B-OTHER PRIVIES** - For other types of privies, receptacles shall be emptied at sufficient intervals to prevent overflowing, creation of insanitary conditions, a health hazard or a nuisance. Receptacles shall be maintained in good repair so as to prevent leakage of the contents to the surrounding ground or onto the floor or other portions of the privy structure.
- C-CHEMICAL TOILETS** - The concentration of caustic or other chemical used in chemical toilets shall be maintained at the proper level so as to prevent septic action taking place.
- D-VENTS** - A vent where provided, shall be maintained in good repair and free from obstructions.
- E-SEAT COVERS** - Seat covers shall be kept closed when the privy is not in use and shall be maintained fly-tight.
- F-WASTES PROHIBITED** - Bottles, broken glass, tin cans, brick bats, garbage, ashes, dirt, and other similar types of wastes or liquids shall not be thrown or disposed of into the receptacles of any privy or chemical toilet.
- G-CLEANLINESS** - The seat, floor, and the ground surrounding a privy shall be kept clean at all times.
- H-INSECT CONTROL** - All privies or other methods or systems for the storage or disposal of human excreta shall be maintained free of vermin. Suitable measures shall be taken to effectively control "black widow" spiders.