

**A COPY OF THIS MANUAL MUST REMAIN  
WITH THE HOME FOR REFERENCE BY  
THE OCCUPANT.**

3191

**MANUFACTURED HOME INSTALLATION  
TECHNICAL MANUAL  
FOR  
MULTIPLE-SECTION HOMES**

Keep this booklet with your manufactured home. Title VI of the Housing and Community Development Act of 1974 provides you with protection against certain construction and safety hazards in your manufactured home. To help assure your protection, the manufacturer of your manufactured home needs the information which these cards, when completed and mailed, will supply. If you bought your home from a dealer, please be sure that your dealer has completed and mailed a card for you. If you acquired your home from someone who is not a dealer, you should promptly fill out and send a card to the manufacturer. It is important that you keep this booklet and give it to any person who buys the manufactured home from you.

**NOTE:** Consumer information cards are located inside this manual. Tear off, send in as required.

Technical Document Number  
72-07-0001-K



# FOREWORD

This Technical Installation manual contains instructions that are required for the proper installation of your home. We urge you to read this manual carefully and to fully understand all of the procedures and recommendations provided.

In this manual statements of special signification are written in a BOLD TEXT and/or are preceded by the following words:

- WARNING — means that there is the possibility of personal injury to yourself and others.
- CAUTION — means that there is the possibility of physical damage to the home or its components.
- NOTE — indicates topics of particular interest.

We recommend that you take particular notice of these items when you are reading this manual.

Many of the words or terms used within the text of this manual are those commonly used in the industry to describe the condition of the home or its components when they are properly assembled and the home is ready for occupancy. Such words or terms include but are not limited to "Level", "Plumb", "Flush", "Align", "Straight" and "Slope" are used in the text for simplicity, but the use of such terms should not be taken to indicate that reasonable trade tolerances are unacceptable.

The testing of the various utility systems and the connection of these systems to the energy supply sources must be accomplished by an experienced installer. The laws of some jurisdictions may require that the installer possess a license. This manual is provided with additional owner's information so that as the owner and/or installer you can be assured that the procedures appropriate to your home are carefully followed.

This home has been designed to meet the construction and safety standards in effect at the time the home was manufactured. To maintain an effective warranty, it is important that installation be accomplished in accordance with the instructions in this manual.

Before attempting to install the home, these instructions must be carefully read, understood and then followed.

Your home is designed to be moved by a specially equipped truck/tractor. In the event it is moved, supported or lifted with equipment other than that specifically designed for this purpose, damage may result and your warranty rights may be affected.

Always check with regulatory agencies in your area for codes or regulations which may affect certain procedures in this manual.

The drawings and data contained in these instructions are intended to be representative of the product. Designs and specifications are subject to change without prior notice.

Should you have questions or desire further clarification, please contact your dealer. If he is unable to provide the necessary information, contact the factory.

## WARNING

**THIS HOME'S STRUCTURE WEIGHS SEVERAL TONS! ADEQUATE SUPPORT BLOCKING SHOULD BE USED TO SAFEGUARD WORKERS AND THE STRUCTURE DURING ALL INSTALLATION PROCEDURES. PERSONNEL SHOULD NOT BE PERMITTED TO WORK UNDER THE HOME WHERE THEY MIGHT BECOME INJURED SHOULD THE HOME ACCIDENTALLY SLIP DURING THE INSTALLATION PROCESS.**

## WARNING

**THIS MANUAL GIVES INSTRUCTIONS TO ASSIST IN THE SAFE INSTALLATION OF THIS MANUFACTURED HOME. HOWEVER, UNIQUE CONDITIONS AT A SPECIFIC INSTALLATION SITE CAN CAUSE SPECIAL PROBLEMS AND REQUIRE PARTICULAR SAFETY PRECAUTIONS. THE INDIVIDUAL RESPONSIBLE FOR SUPERVISING THE INSTALLATION MUST BE EXPERIENCED IN HOME INSTALLATION PROCEDURES IN ORDER TO EVALUATE THE SAFETY IMPLICATIONS OF SUCH MATTERS AS: SOILS, SLOPES, MOISTURE CONDITIONS, INSTALLATION EQUIPMENT, SIZE AND WEIGHT OF THE HOME, ETC. THIS IS ESSENTIAL SO THAT THE INSTALLATION CREW WILL BE PROPERLY INSTRUCTED TO PERFORM THE INSTALLATION CORRECTLY AND TO MAINTAIN SAFE WORKING CONDITIONS.**

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# SECTION 1

## FOUNDATION SYSTEM

### 1.1 GENERAL

This manual depicts the most widely used method of supporting mobile homes. Other methods, which provide equal support to the home at the same locations shown, may be acceptable provided they do not stress the structure in a different manner or cause greater distortion to the structure during setup. Also, other products and/or materials equal to or better than those shown, may be used.

Homes manufactured by subsidiaries of Fleetwood Enterprises, Inc. are designed to be supported by individual supports or piers and anchored with a number of tiedowns appropriate for local conditions. These are collectively referred to as the Support and Anchoring Systems.

The foundation system must resist vertical loads from the weight of the home, plus temporary extra roof loading and it must resist side loads imposed on the home by wind blowing against the walls. Design data describing the roof and wind loads, which your home has been designed to resist, may be found posted in the home. Load zone maps of the United States showing roof load, wind load, and thermal zones are also included in Exhibit 1.

Individual codes governing home installation in your area may have specific wind and roof load design requirements which vary from the indications on the load zone maps.

### 1.2 PIERS

The piers used must be strong enough to transmit the vertical load, which includes the weight of the home, its furnishings, and temporary roof loading, to the foundation surface below. Recommended types of piers and footing sizes are described in Appendix A and Exhibit 2.

Check with local building authorities for any requirements for setup of your home due to ground conditions. In areas where the ground is subject to freezing, the pier pads and footers must extend below the frost line established by local jurisdiction.

### 1.3 PIER LOADS

The vertical loads imposed on the piers at the various locations under the home are shown on the "Piering Plan" drawing for this home on a loose insert sheet with this manual.

### 1.4 FRAME TIEDOWN

The foundation system must also resist the lifting, sliding and overturning force resulting from side winds. A method frequently used is to install ground anchors and tiedown straps in addition to the piers.

Your home has been designed with provision for tiedown straps to resist side and uplift forces.

Each tiedown strap (not furnished by the home manufacturer) must have a working load capacity of at least 3,150 pounds and a total load capacity of at least 4,725 pounds. Install the straps per recommendations in Appendix B.

Ground anchors (not supplied by the home manufacturer) are used with most types of tiedown straps. Commercial designs are available through your dealer or installation contractor. Acceptable anchors can be fabricated from concrete, steel rod or cable or other similar material. Installed ground anchors must each have a working load capacity of at least 3,150 pounds (ultimate load of 4725 lbs. min.) and be installed per anchor manufacturer's instructions.

Because of local sheltered conditions authorities may permit installation of the home without tiedowns. However, tiedowns as described are the minimum necessary if the home is to withstand its design wind load without dislocation.

This home is designed for a foundation system which supports the main frame rails. These are the two main beams which run the length of each section of the home. Consult the home manufacturer before using a support system which does not directly support the main rails as this may result in damage to the home.

**CAUTION**  
**BEFORE INSTALLING A SUPPORT SYSTEM WITHOUT TIEDOWNS, BE SURE THAT SUCH A METHOD IS ADEQUATE FOR YOUR AREA AND IS PERMITTED BY THE APPLICABLE LOCAL CODE.**

A recommended frame tiedown procedure is described in Appendix B.

### 1.5 WATER UNDER THE HOME

**CAUTION**  
**EXCESSIVE WATER IN OR ON THE SOIL UNDER THE HOME WILL CAUSE UNNECESSARY DETERIORATION TO THE HOME AND AFFECT THE COMFORT LEVEL IN THE HOME.**

It is necessary to control the flow of rain and irrigation water keeping it from running under the home. When the home is set in a pit it is also necessary to provide for water drainage when the underground water level is near the surface of the soil. Controlling the water under the home also improves the stability of the piers that support the home.

### 1.6 VENTILATION AND WATER VAPOR RETARDER

The under-floor area must be ventilated to minimize the accumulation of moisture beneath

the home. The ventilation shall be provided by openings with a net area of at least one square foot for each 150 square feet of under-floor area. The required area of openings should be approximately equally distributed along the length of at least two opposite sides with openings located close to corners to provide cross ventilation. It is recommended that a layer of 6 mil black polyethylene plastic or similar material be used to fully cover the ground under the home to form a water vapor retarder

unless it can be demonstrated that the soil will remain dry. See Appendix K.

When skirting is attached to the lower sidewall or trim of the home's perimeter, it is important to make the installation so that moist air from under the home is not forced up into the wall cavities.

When the exterior siding is hardboard the skirt trim must be sealed to the trim to keep water from getting between the skirt trim and the hardboard.

## SECTION 2 POSITIONING AND SETUP

### 2.1 PIER POSITIONS

Determine the appropriate foundation system for local site and wind exposure conditions, as described in Section 1.

Establish the location of each pier and tiedown for the length of home and locale in which the home is being installed, using the loose insert sheet provided with this manual entitled "Piering Plan".

Start with the first section (Figure 1) of the home and install any installation components that might be difficult to place after the section of the home is in position. An example would be ground anchors if they are to be installed at an angle. If the recommended moisture retarder is placed on the ground under the home, placement of the material may be started at this time. For convenience, the material can be left rolled up with sections unfolded, as needed, during setup to facilitate placement of jacks and equipment.

### 2.2 SETTING

Move the first section of the home into its desired final position.

#### WARNING

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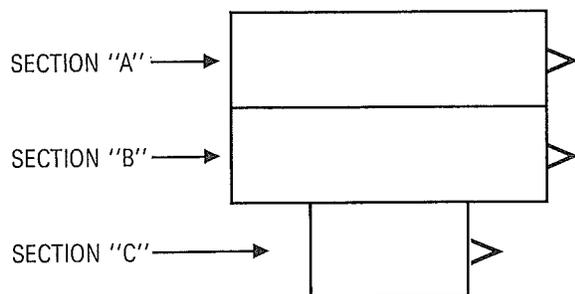


FIGURE 1  
MULTIPLE SECTION DESIGNATION

### 2.3 LEVELING

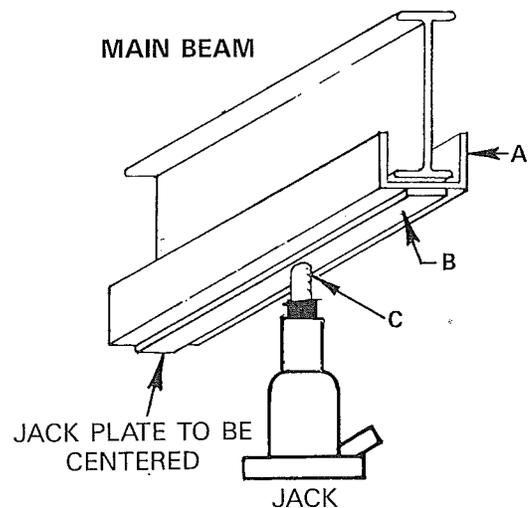
During leveling, care must be taken to avoid distorting the home. Excessive and/or nonuniform jacking during the leveling will cause the home to be racked and twisted. This may result in damage to the home.

#### CAUTION

**USE JACKING REINFORCING PLATES WHEN JACKING THE FRAME MAIN BEAM (SEE FIG. 2) TO AVOID DAMAGE TO THE BEAM AND VOIDING OF THE WARRANTY. OTHER EQUIVALENT MEANS MAY BE USED TO ADEQUATELY DISTRIBUTE THE CONCENTRATED LOAD OF THE JACK HEAD TO THE FRAME MEMBERS**

After completion of the leveling and setup procedures on the first section per Paragraph 2.3, the floor must be level and the walls must be plumb. All doors and windows must operate freely without binding.

Proceed as follows for positioning and leveling the next sections of the home (Ref. Figure 1).



- A) 3/16" x 4" x 18" Long C-Channel
- B) 1/4" x 1-1/2" x 18" Long Steel Strap Jack Plate
- C) Collar for Jack Head Made of Pipe Coupler or Equal 1" Approx. Depth with 1/8" Clearance for Jack Head

FIGURE 2  
MAIN BEAM JACKING PLATES

- 2.3.1 Remove the waterproof plastic and all shipping braces from the open sides of the first two sections.

**NOTE**

BEFORE MOVING THE SECOND SECTION INTO POSITION, IT MAY BE HELPFUL TO LEVEL THE GROUND WHERE THE INSIDE WHEELS (NEXT TO THE MARRIAGE LINE) WILL REST TO HELP IN SLIDING THE STRUCTURES TOGETHER.

- 2.3.2 Determine the general location of piers and tie-downs for the length of the next section of the home, using the "Piering Plan". Appendix A shows various types of piers. Exhibit 2 shows pad sizes for pier load capacities.
- 2.3.3 Install strips of carpet padding or fiberglass (provided) around the ceiling, end walls and floor marriage line of the first section. Do not place material where it could obstruct air ducts in the heating system supply or return air duct system. If the home has heating air supply or return ducts passing through the ridge beam or floor structure, be sure that the duct connection seals are in place.

**CAUTION**

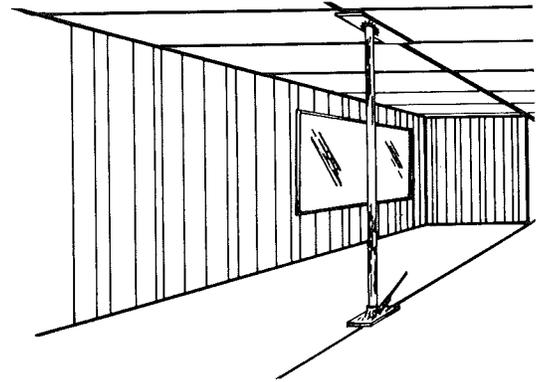
**SPECIAL CARE MUST BE TAKEN TO ENSURE THAT THIS MARRIAGE LINE JOINT IS TIGHT TO RESIST AIR INFILTRATION AND MINIMIZE CONDENSATION.**

- 2.3.4 Move the section into position alongside the first.
- 2.3.5 Bring the two floors together in alignment. Then align the endwalls. A recommended alignment procedure is given in Appendix D.
- 2.3.6 When the two sections are in place, aligned and leveled, complete the fastening of the ridge beams together by one of the methods shown in Figure 3. Sheetmetal roof joinery is depicted in Figure 3 detail "B" and shingle roof joinery in detail "A". Gaps between ridge beams, 1-1/2" wide maximum, which do not extend the full length of the home may be closed up by filling with lumber and plywood shim strips. The lag screws in the shimmed portion shall be increased in length to ensure that they engage both top chords of the ridge beams.

**NOTE**

IT IS IMPORTANT TO HAVE THE CEILING BELOW EACH ROOF SECTION FLUSH AT THE SEAM BEFORE THE ROOF IS TOTALLY FASTENED. ONE MAN SHOULD WORK INSIDE TO RAISE THE LOW SIDE, AS REQUIRED, BY JACKING UNDER A WOOD POST OR SECTION OF STEEL PIPE WITH A WOOD OR METAL PAD AT THE TOP (FIGURE 5.) PLACE THE BASE OF THE JACK

ACROSS THE FLOOR SEAM TO DISTRIBUTE THE LOAD TO BOTH SECTIONS. JACK AGAINST THE CEILING ONLY IN AREAS TO BE COVERED LATER WITH TRIM MOLDING.



**FIGURE 5  
ALIGNING THE CEILING WITH JACK AND POST**

- 2.3.7 Additional piers must be placed under each ridge beam column along the marriage line in accordance with the following steps. This includes field-installed columns as well as factory-installed columns.

Ridge beam column locations and configurations are shown on the floor plan loose insert sheet with this manual. The locations are shown on the floor plan by a square with a number in it, i.e., [2].

Some post configurations require field connection of one or more members. These posts shall be installed at setup per details in Figure 6.

**NOTE**

IT IS IMPORTANT TO HAVE THE RIDGE BEAMS PROPERLY ALIGNED AND SECURELY FASTENED TOGETHER BEFORE ATTEMPTING TO SET COLUMNS.

Fasten the frames or floors together. (See Figure 4).

Fasten the endwalls together with No. 8 x 4-inch wood screws installed at an angle at 12 inch on center and staggered.

**2.4. TIEDOWN**

If applicable, connect tiedown straps to ground anchors in accordance with the ground anchor manufacturer's instructions. A recommended frame tiedown procedure is included in Appendix B.

Observe proper tensioning procedures to avoid disturbing the level of the home or damaging the home or foundation. Tiedown straps must be tensioned alternately on opposite sides to avoid disturbing the setup of the home.

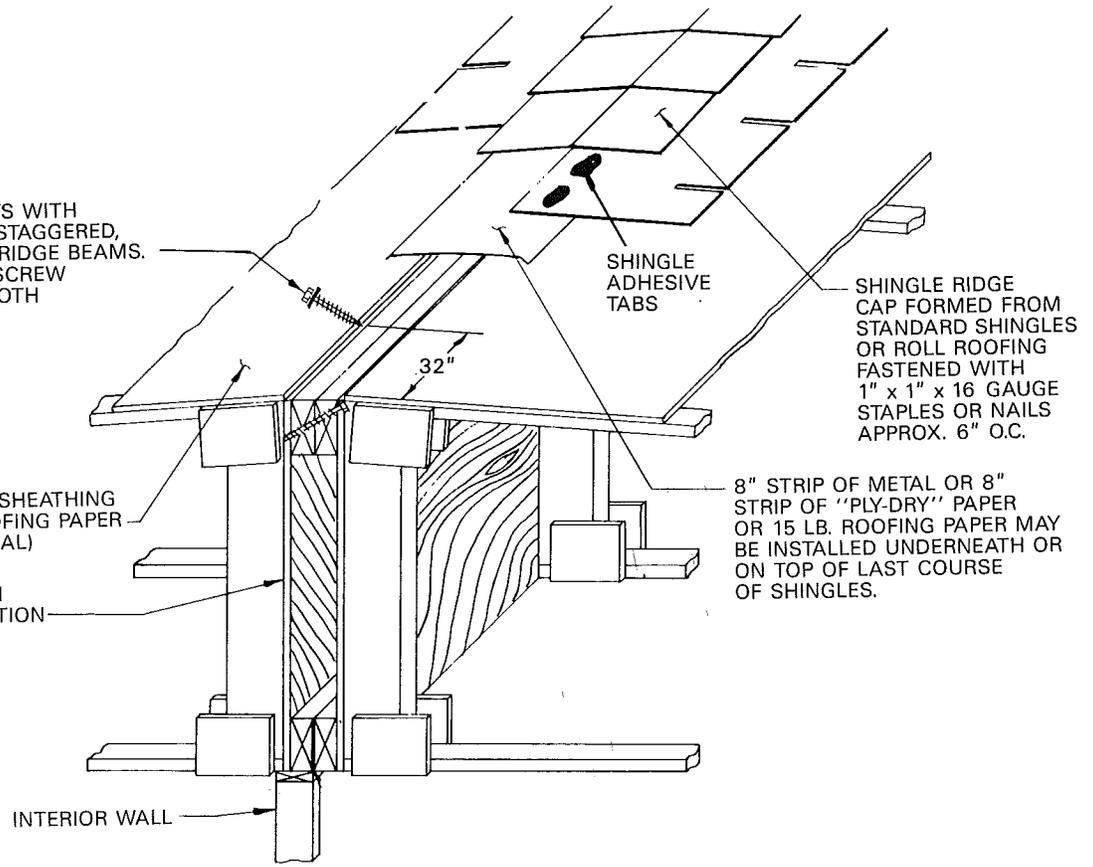
Over-the-roof tiedown straps are not required on this home to maintain its stability. The roof, sidewall, floor and frame are all fastened together internally to provide resistance to wind loads. Concealed metal straps on the exterior walls tie the roof to the walls and the walls to the floor. In turn, the floor is bolted to the frame members. These concealed fasteners provide the same unifying function as the over-the-roof straps. By providing tiedown of the frame members and any identified tiedown straps projecting below the floor by the method recommended in Appendix B or by an equivalent method, the anchoring of the home is completed. These diagonal frame ties resist the sideways movement due to wind forces and the same diagonal ties plus the concealed fasteners

resist the overturning of the home due to the wind forces.

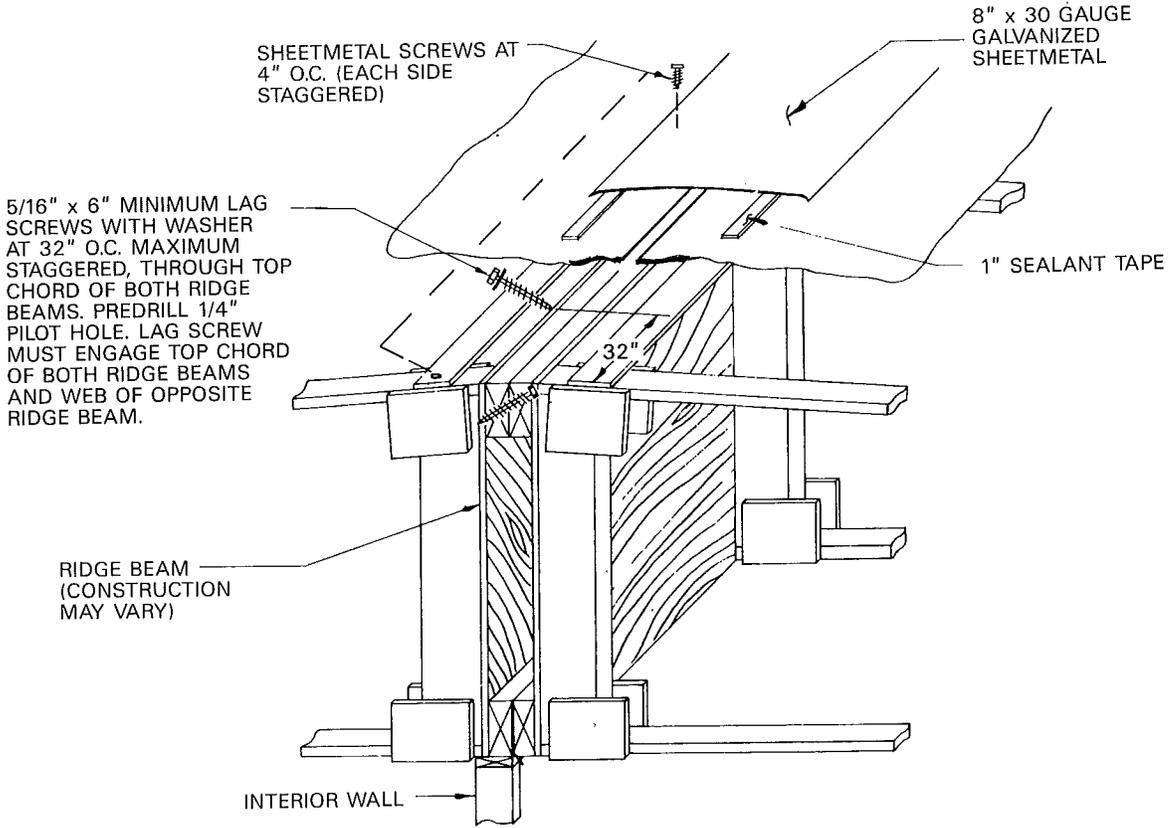
## 2.5. COMPLETING SETUP

Remove all shipping blocks and clips from appliances, windows, and doors. Install fixtures, shelves or other loose items packaged or attached for shipping. Special details for completing the home, if applicable, are shown on insert sheets attached to the tab inside the front cover. All wall paneling omitted in plant and shipped loose to facilitate final setup shall be installed with a 1/4" bead of PVA (white) glue on all framing members and stapled with 1/4" x 1" x 0.030" wire staples at 6" o.c. along all panel edges and at 12" o.c. on intermediate support members.

5/16" x 6" MINIMUM LAG SCREWS WITH WASHER AT 32" O.C. MAXIMUM STAGGERED, THROUGH TOP CHORD OF BOTH RIDGE BEAMS. PREDRILL 1/4" PILOT HOLE. LAG SCREW MUST ENGAGE TOP CHORD OF BOTH RIDGE BEAMS AND WEB OF OPPOSITE RIDGE BEAM.

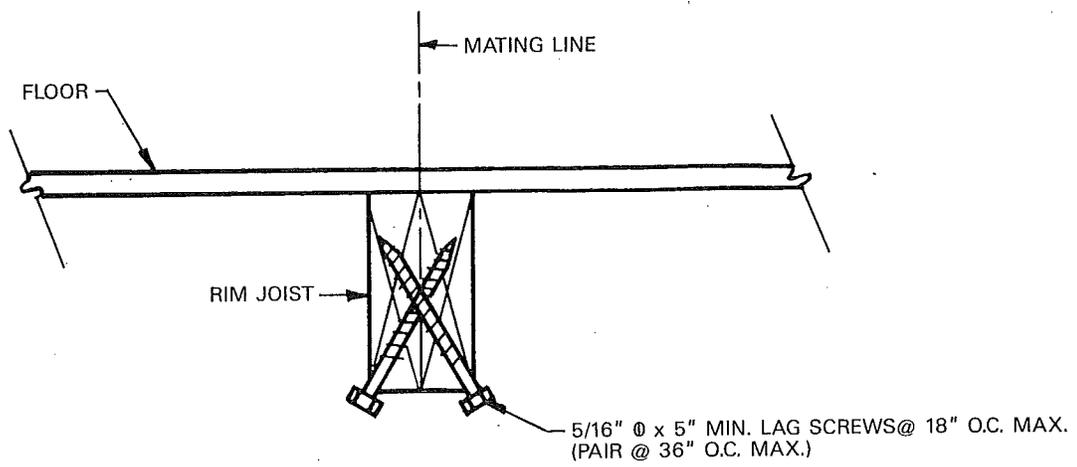


**A. SHINGLE ROOF CONNECTION**



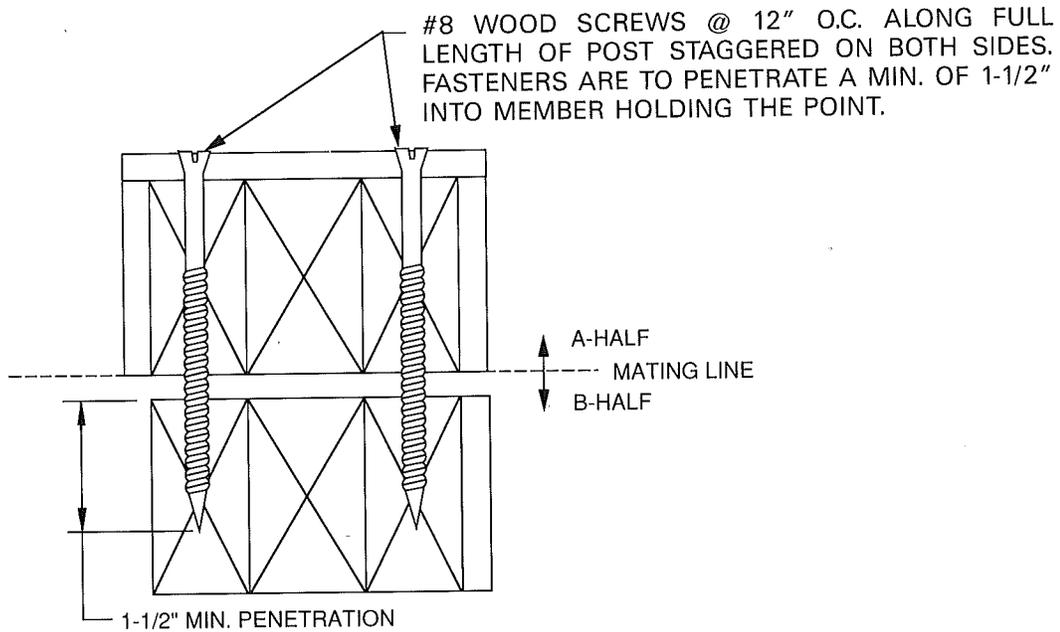
**B. SHEETMETAL ROOF CONNECTION**

**FIGURE 3  
TYPICAL ROOF CONNECTION DETAILS**

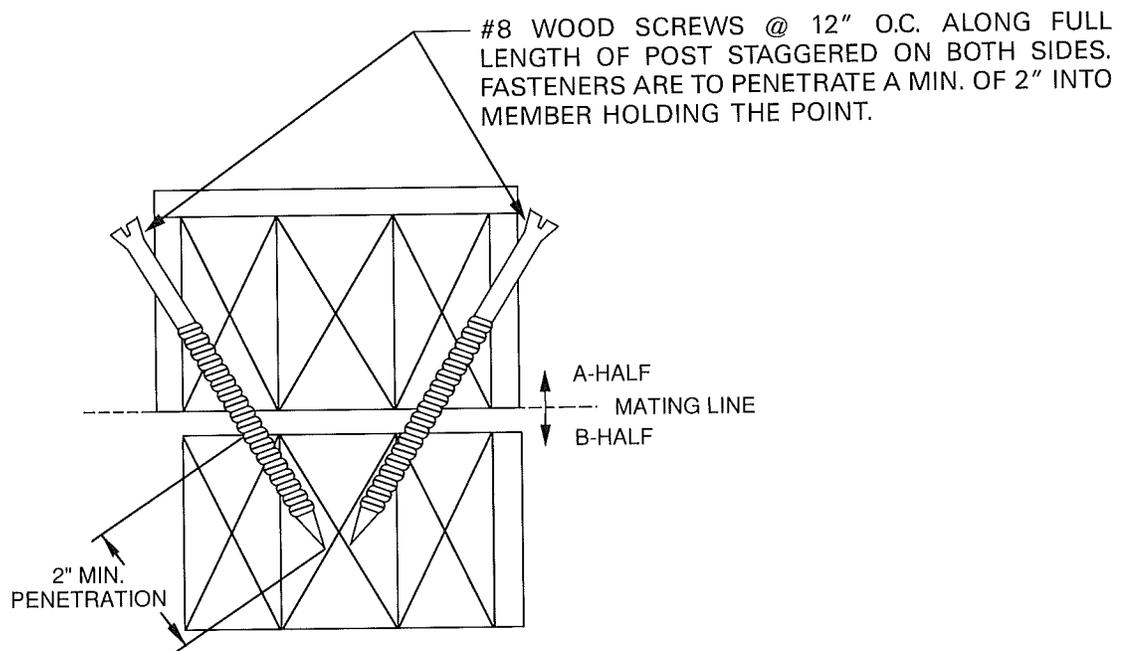


**FIGURE 4**  
**MULTIPLE SECTION FLOOR CONNECTIONS**

1. POSTS IDENTIFIED WITH LABEL "THIS POST IS TO BE FIELD CONNECTED" ARE TO BE FASTENED PER THESE DETAILS DURING SET-UP.
2. THE METHODS MAY BE COMBINED IN ONE POST CONFIGURATION (CONDITIONS PERMITTING) AS LONG AS MINIMUM PENETRATION REQUIREMENTS ARE MET FOR THE PARTICULAR METHOD.

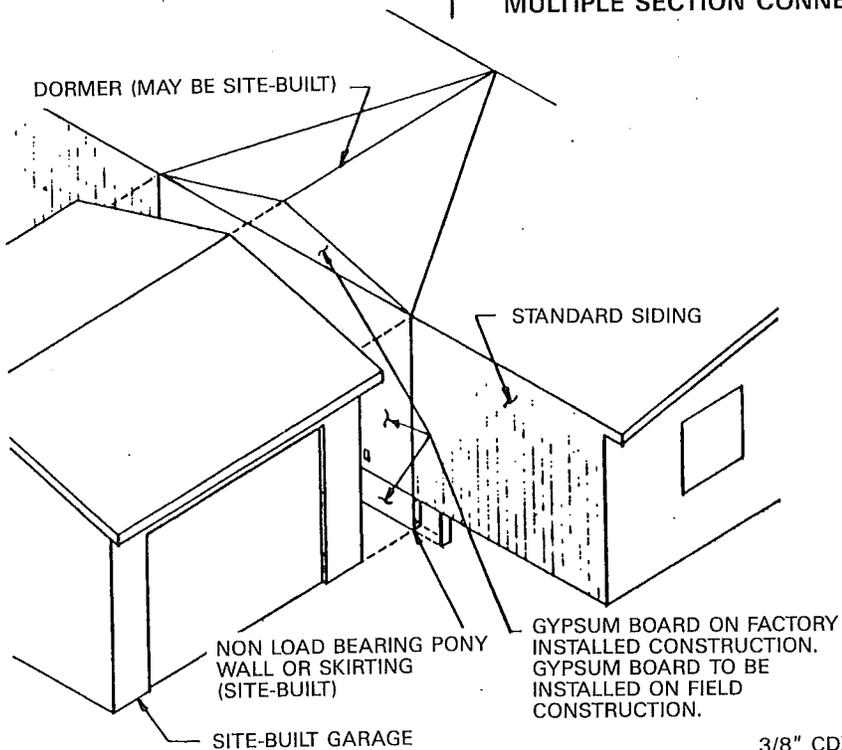
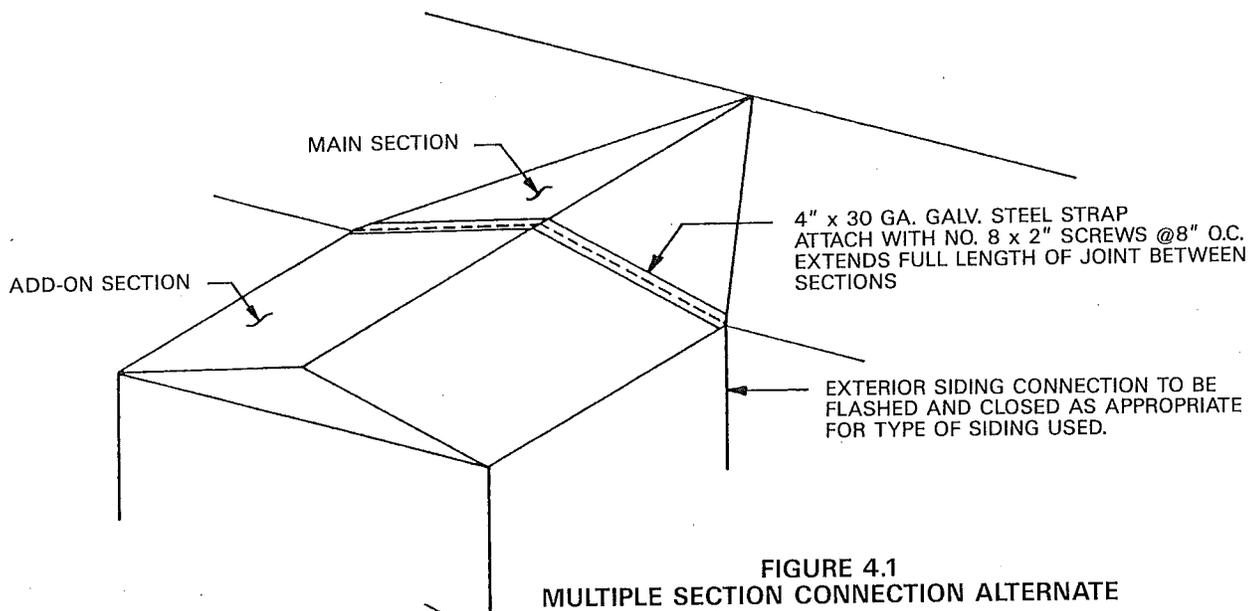


**METHOD 1**



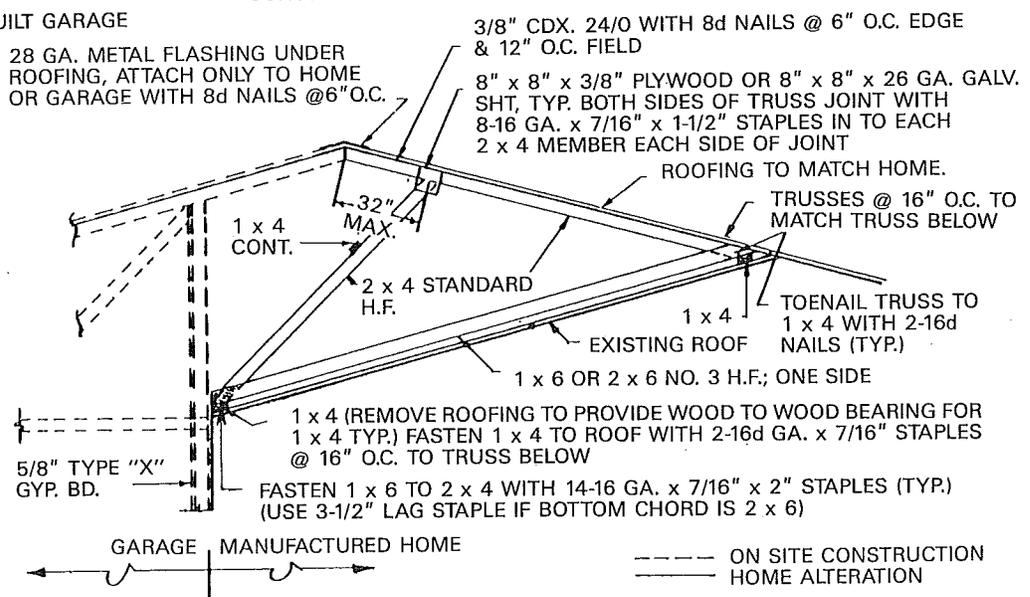
**METHOD 2**

**FIGURE 6  
CENTER BEAM POST FIELD CONNECTED**



NOTES:

1. GARAGE STRUCTURE SHALL BE DESIGNED SUCH THAT NO GARAGE LOADS ARE TRANSMITTED INTO THE HOME'S SIDEWALL.
2. GARAGE AND DORMER SHALL BE DESIGNED AND BUILT PER LOCAL REQUIREMENTS.
3. PONY WALL OR SKIRTING TO SEPARATE GARAGE AND UNDER-HOME AREA MAY BE PART OF GARAGE WALL IF PROPERLY SEALED TO HOMEWALL.



# SECTION 3 UTILITIES

## 3.1 SYSTEMS TEST

All utility systems are given a quality assurance test at the home manufacturing facility. To ensure that no damage occurred in transit and that the final connections are proper, specific field tests of the utility service connections must be made during installation of the home.

All utility connections must be made by qualified service personnel who are familiar with local regulations.

See the Owner's Manual for other important information concerning utility connections.

## 3.2 GAS SYSTEM AND HEATING DUCT

3.2.1 The gas piping supply system has been designed for a maximum pressure of 14 inches water column (1/2 psi). For the safe and effective operation of this system, the gas supply pressure should be between 14 and 7 inches water column.

3.2.2 Check to determine if the home has a gas line crossover between home sections. The gas crossover is located below the floor structure on the marriage line between sections. It is equipped with a flexible metal connector and a quick-disconnect device.

Remove the plastic covers from the quick-disconnect device and snap the two halves together to complete the connection.

3.2.3 The gas system must be tested to ensure that it is free from leaks. A recommended gas system test procedure is included in Appendix E. Do not pressurize the gas line in excess of 8 ounces maximum to avoid possible damage to the gas valves and regulators.

3.2.4 After completion of tests, connect home gas inlet to gas supply line using a listed gas connector of the capacity indicated on the label by the gas inlet.

### CAUTION

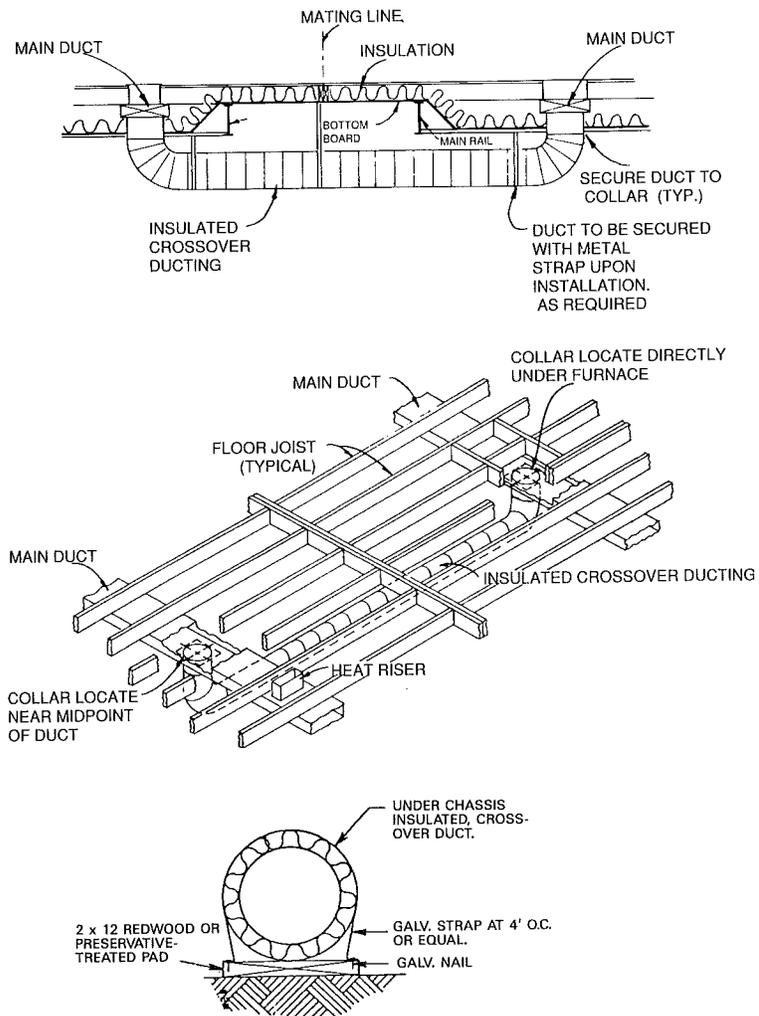
**THE APPLIANCES IN THIS HOME ARE EQUIPPED FOR NATURAL GAS. IF THE GAS SUPPLY IS LIQUIFIED PETROLEUM GAS (LPG), IT IS NECESSARY THAT THE APPLIANCES BE CONVERTED TO LPG IN ACCORDANCE WITH INSTRUCTIONS PROVIDED BY THE MANUFACTURER OF EACH APPLIANCE.**

### WARNING

**DO NOT LIGHT APPLIANCE PILOT LIGHT UNTIL EACH APPLIANCE HAS BEEN CHECKED TO MAKE SURE THAT ITS ROOF JACK (VENT) HAS BEEN INSTALLED, AND ALL HOME UTILITY CONNECTIONS HAVE BEEN MADE AND TESTED.**

3.2.5 Connect the provided flexible heat duct crossover between the two duct connectors that extend below the floor bottom closure. Arrange duct as straight and smooth as possible, do not compress or kink.

Support the duct with metal straps or plumbers' tape secured to floor joist as shown in Figure 7. Do not permit the duct to rest upon the ground.



ALTERNATE CROSSOVER DUCT SUPPORT

FIGURE 7  
HEAT DUCT CROSSOVER

### 3.3 ELECTRICAL SYSTEM

3.3.1 This home is designed to be connected to a service nominally rated 120/240 volts, 3-wire AC, with grounded neutral.

#### NOTE

THE CONNECTION TO THE HOME IS A FEEDER, NOT A SERVICE. WHEN WIRING THE FEEDER, GROUNDING (GREEN) CONDUCTOR MUST BE INSTALLED, AND THE NEUTRAL (WHITE) CONDUCTOR MUST NOT BE GROUNDED IN THE HOME DISTRIBUTION PANEL.

3.3.2 Electrical crossovers between home sections are located along the marriage line between sections. Each crossover location is covered by two access covers below the bottom closure material.

Remove the covers. Uncoil cables on B section of home and run to junction boxes in accordance with the diagrams in Exhibit 5. Secure cables entering boxes within 12 inches of boxes. Close junction box covers, adjust or replace any damaged fiberglass insulation, and replace access covers.

#### NOTE

ON DOUBLE CROSSOVERS WHERE ONE CIRCUIT IS 20 AMPS AND THE OTHER IS 15 AMPS, THE 20 AMP CIRCUIT CONNECTS TO THE RED CONDUCTOR COMING FROM THE DISTRIBUTION PANEL (REF. EXHIBIT 5).

3.3.3 The electric system must be tested to ensure grounding continuity, polarity, and operation. A recommended electrical system test procedure is included in Appendix F. Complete the grounding continuity tests before connecting the home to electrical power.

#### CAUTION

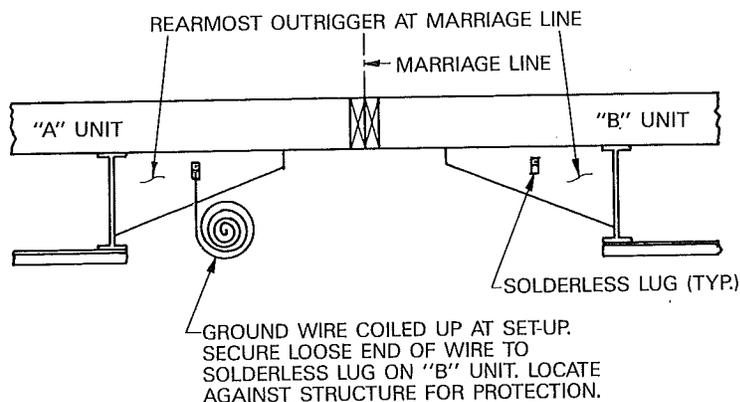
**VERIFY THAT ALL CROSSOVER CIRCUITS PROTECTED BY A GFCI DEVICE ARE CONNECTED TO THE PROPER CIRCUIT CONTINUATION.**

3.3.4 Home with Permanent Feeder Cord. A permanently connected 50 AMP feeder cord is stored in a compartment under the floor. The cord is ready to be plugged into the 50 AMP service receptacle after recommended tests have been completed (Ref. Paragraph 3.3.3).

3.3.5 Home with Under-Chassis Feeder. A raceway is provided from the distribution panel to the underside of the home. A suitable conduit fitting or a junction box must be installed on the exposed end of the raceway as shown in Figure 8. See Exhibit 4 for minimum junction box size and for feeder conductor sizes required. Make final connections after completion of recommended tests (Ref. Paragraph 3.3.3).

3.3.6 Home with Overhead Feeder. An overhead entrance with feeder conductors installed has been provided. See Exhibit 4 for feeder conductor sizes required. Make connections after completion of recommended tests (Ref. Paragraph 3.3.3).

### 3.3.7 CONTINUOUS ELECTRICAL GROUND



#### NOTES:

Ground wire connection between chassis is required only when the outriggers of adjoining units are not bolted together on houses which have shingle roof and non-metallic siding. Continuity is provided on other types of units by the metallic roof or metallic siding or by bolting outriggers together.

### 3.4 WATER SYSTEM

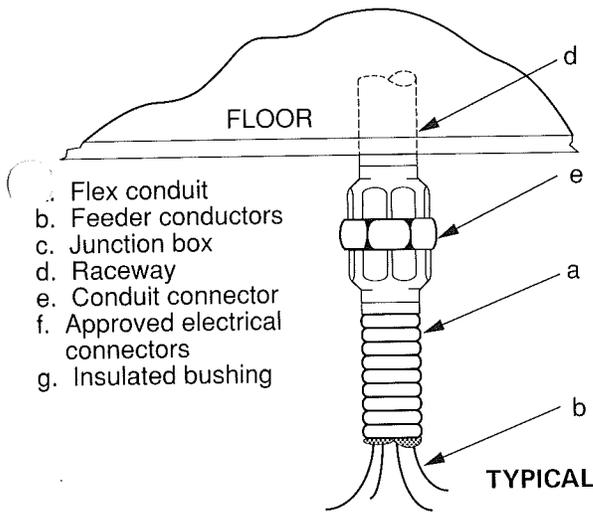
3.4.1 The hot and cold water system is designed for a maximum inlet water pressure of 80 psi. If the local water supply pressure to which the home is being connected exceeds 80 psi, a pressure reducing valve must be installed to limit the supply pressure.

3.4.2 Water crossovers between home sections are located along the marriage line between sections and covered by two access covers. Remove the covers and push insulation aside from below the crossover location. Connect both hot and cold crossovers using the connectors provided. Run the connectors through the hole or holes in rim joist, similar to Figure 9. Reposition insulation and replace the covers.

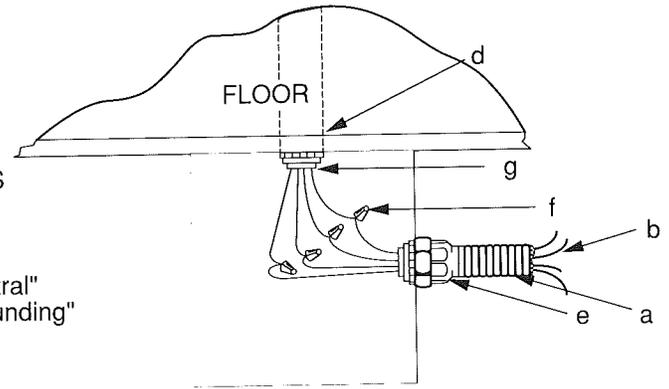
3.4.3 A recommended water system test procedure is included in Appendix G. The water system shall be pressurized to 100 psi and shall maintain that pressure for 15 minutes without loss.

#### WARNING

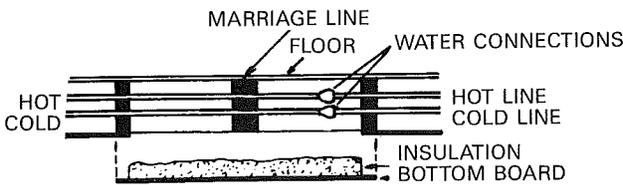
**DISCONNECT OR FILL WATER HEATER TANK WITH WATER BEFORE TESTING WITH AIR.**



CONDUCTORS  
 B - Black "hot"  
 R - Red "hot"  
 W - White "neutral"  
 G - Green "grounding"



**FIGURE 8**  
**TYPICAL UNDERCHASSIS FEED CONNECTIONS**



**FIGURE 9**  
**TYPICAL HOT AND COLD WATER**  
**CROSSOVER CONNECTION IN THE FLOOR**

loose parts in accordance with the special instructions in Appendix L. Connect the home drain system to the site sewer inlet using a 3-inch plastic or metal pipe. The pipe must slope at least 1/4-inch per foot toward the site connection unless noted otherwise on the DWV schematic. Use approved 3-inch flexible connectors at both ends of the 3-inch drain line to connect to the home outlet and the site inlet. Support the pipe at a maximum of 4 ft. intervals. Fill the fixtures with water and drain them through the drain system. Check the system for visible leaks.

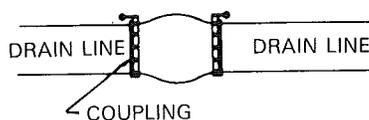
3.4.4 A shut off valve must be installed on the water supply line adjacent to the home at the time it is connected to the local supply. Use a full-flow type valve.

3.4.5 When a home is set in an area which is subject to freezing temperatures, the exposed water supply connection pipe must be protected. An electrical receptacle is located nearby for the use of electrical heat tape. Any heat tape used must be listed specifically for use on a home and must be used strictly in accordance with the heat tape manufacturer's instructions. See Appendix K and the Owner's Manual for additional data on cold climate areas.

### 3.5 DRAINAGE SYSTEM

3.5.1 Connect the drain lines wherever they cross the marriage line using the couplers or pipe provided, similar to Figure 10.

Install any portions of the drain system below the home which were shipped as



**FIGURE 10**  
**TYPICAL DRAIN LINE CROSSOVER CONNECTION**

### 3.6 CLOTHES DRYER VENT INSTALLATION (option)

Homes equipped with a clothes dryer receptacle, or a stubbed-in clothes dryer gas supply, have dryer vent openings roughed-in through the floor or sidewall.

Complete the installation if requested by owner by removing the closure material over the roughed-in openings and installing the exhaust duct in accordance with the diagram in Appendix I and the dryer manufacturer's instructions.

#### CAUTION

**UNDERFLOOR DRYER DUCT MUST TERMINATE OUTSIDE THE PERIMETER OF THE HOME, OUTSIDE OF ANY SKIRTING INSTALLED AROUND THE HOME.**

### 3.7 EVAPORATIVE COOLER CONNECTIONS TO 5-WAY SWITCH. (option)

Connect the evaporative cooler to the 14-gauge conductors in the weather proof junction box on the roof adjacent to the roof opening. Use approved wiring methods and materials and connect in accordance with the cooler manufacturer's installation instructions (Ref. Appendix J).

### 3.8 INSTALLATION OF AIR CONDITIONING

Air conditioning may be installed on homes that are designated "suitable for air conditioning" on their home data plates. Information to assist in calculating the size air conditioner needed is included on each data plate.

The air conditioning evaporator may be installed either inside the furnace cabinet on homes with furnaces listed for this modification, or exterior to the home and ducted into the home air supply duct system. In either case, a heating/cooling thermostat must be installed to control both heating and cooling with a single device.

When the air conditioning evaporator is installed exterior to the home, return air grille(s) must be installed in the floor in a central area of the home that receives the return air from the separate rooms and ducted back to the evaporator.

### CAUTION

**DO NOT CUT ANY FLOOR FRAMING WHEN INSTALLING RETURN AIR GRILLES.**

Supply air duct connections from the exterior evaporator to the home air supply duct system must be made at a central location on each duct in each section of the home. Federal Regulations require that automatic damper(s) be installed to prevent the discharge air from the exterior air conditioning evaporator from passing back through the furnace, and that automatic damper(s) be installed to prevent the discharge air from the furnace from passing backwards through the exterior air conditioning evaporator duct(s).

Install required electrical connections in accordance with the air conditioner manufacturer's instructions and local codes.

## SECTION 4 FINAL CHECK

### 4.1 RECAULKING

After the home installation has been completed, carefully inspect the sealants on exterior walls, roof vents or seams, window and door frames.

Check all areas and reseal any area showing evidence of damage or cracked sealant. Do not overlook voids or cracks in hidden areas, such as eaves or openings which may be subject to wind-blown rain.

### 4.2 MOLDINGS

Tighten and reseal any loose molding strips, rails, frames, seams or closures with special attention to those along the edge of the metal roof.

### 4.3 SCREWS

Replace or tighten loose screws as required.

### 4.4 CLEARANCE

Prune low-hanging trees or bushes near the home to remove branches which could scrape the walls or roof. Consider future growth as well as possible movement during projected wind conditions or under snow or ice load.

### 4.5 ROOF COATING

If roof coating is to be applied, choose a product that will not run or cause streaks on the side of the home. Follow the roof coating manufacturer's instructions on application, including preparation of the surface. Special solvents may be required to clean certain types of metals or finishes, or for roofs

which are badly oxidized. Refer to the manufacturer's instructions on the container of the roof coating.

### CAUTION

**IF IT IS NECESSARY TO WALK ON A METAL ROOF, WALKBOARDS SHOULD BE USED TO DISTRIBUTE YOUR WEIGHT. IF REQUIRED TO STEP DIRECTLY ON THE ROOF STRUCTURE, WATCH YOUR STEP AND AVOID WALKING DIRECTLY ON METAL ROOF BETWEEN THE RAFTERS OR ON SEALED AREAS.**

### 4.6 DOORS AND WINDOWS

Check all doors and windows for proper operation after the home installation has been completed. One window in each bedroom is designated as a secondary means of egress in case of emergency. The egress window has a label or decal which states that the window is an egress window and gives operating instructions. Check the operation of these windows to the window manufacturer's instructions.

### 4.7 SMOKE DETECTOR(S)

Smoke detectors have been installed in this home on a wall near each bedroom area. To ensure that no damage or dislocation of the detectors occurred in transit and that the detectors are in working condition, each smoke detector shall be field tested in accordance with the smoke detector manufacturer's instructions.

## **SECTION 5**

# **REPAIRING THE BOTTOM CLOSURE MATERIAL**

Fastened to the underside of the floor joists of your home is a special covering designed to protect against rodents and moisture as well as to isolate the floor cavity from unconditioned outside air. This covering was inspected before the home left the manufacturing

facility. It is important that any areas damaged during transportation or installation be resealed. A recommended procedure for repairing this bottom closure material is included in Appendix H.

## **SECTION 6**

# **ACCESSORIES INSTALLATION**

- 6.1 If accessories, such as awnings, skirting or carport, are to be installed and attached to your home, observe the following practices.
  - 6.1.1 Use the proper awning support railing provided with the awning or available through your awning supplier. If possible, choose an awning which is free-standing design, having columns to support the additional weight.
  - 6.1.2 Follow the recommendations of the awning manufacturer and applicable building codes in installing the accessories.
  - 6.1.3 Always use fasteners of the proper size to attach mating parts snugly, but without straining the home or damaging the home structure. Only make necessary attachments to the upper wall or roof. Be sure there is a solid material behind metal siding for a positive connection before making penetrations.
  - 6.1.4 Use a sealant on all seams or openings resulting from exterior siding modifications. The best way is to place weather sealing tape or sealing compound under railing joints or fasteners, during assembly, and then seal the completed seam.

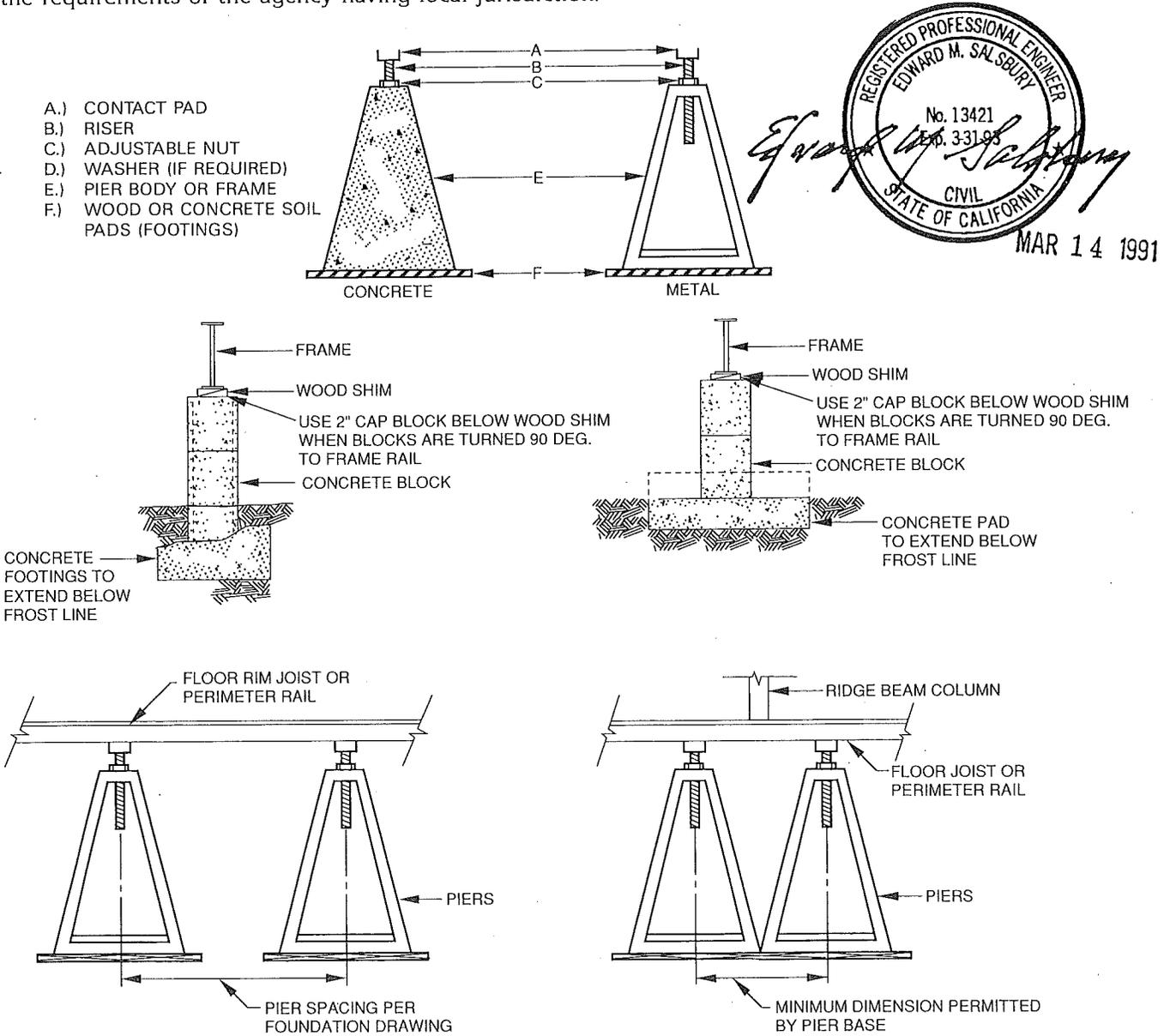
### **CAUTION**

**REMEMBER THAT MODIFICATIONS WHICH ARE IMPROPERLY DONE MAY DAMAGE YOUR NEW HOME OR MAR ITS APPEARANCE AND COULD AFFECT YOUR WARRANTY RIGHTS.**

- 6.2 If accessory windows or components are furnished with your home, they must be installed with the installation materials supplied and in accordance with the manufacturer's installation instructions provided with each window assembly or component.
  - 6.2.1 Storm window components should be secured in place with the mechanisms furnished on the window frame.
- 6.3 If an accessory fireplace assembly approved for manufactured home installation has been furnished or has been partially installed at the factory, the assembly and installation must be completed in accordance with the manufacturer's installation instructions provided with the fireplace. The installation shall be located so that no roof truss or floor joist is cut.

# APPENDIX A

The pier can be concrete blocks shimmed with wedges or an adjustable metal or concrete assembly similar to those shown in Figure A-1. The adjustable piers shown are typical of commercial designs available in various heights and base widths. The base of the pier must be relatively wide with respect to the height when supporting the home. For example, if a pier is 24 inches high, the base should be at least 10 inches wide. The pier should be high enough so that the riser (Figure A-1, Item B) will be extended only 2 to 3 inches when in place. Blocking may be used under the base (Figure A-1, Item F) to adjust height. If the pier is directly on soil or gravel, a pad (redwood, treated lumber, cedar or concrete) should be placed under the pier base to minimize settling or tipping. These pads shall be at least 3 square feet and larger if the soil is particularly soft or unstable. In unusually soft soil, paved runners or pads can be constructed under the foundation for better footing. Minimum pad or footing sizes are shown on the Pier Load Capacities and Footing Sizes Table, in Exhibit 2. The type and size of the footing selected must take into consideration actual ground conditions. Final selection of pier type and footing size shall be in accordance with the requirements of the agency having local jurisdiction.



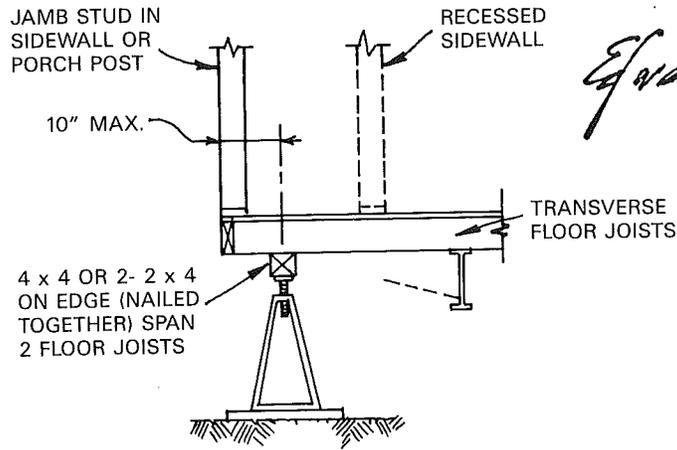
REGISTERED PROFESSIONAL ENGINEER  
 EDWARD M. SALSBURY  
 No. 13421  
 Exp. 3-31-98  
 CIVIL  
 STATE OF CALIFORNIA  
 MAR 14 1991

NOTE  
 IF THE SOIL BEARING VALUES ARE NOT AVAILABLE, USE THE 1000 PSF COLUMN  
 FOR MINIMUM FOOTING SIZES

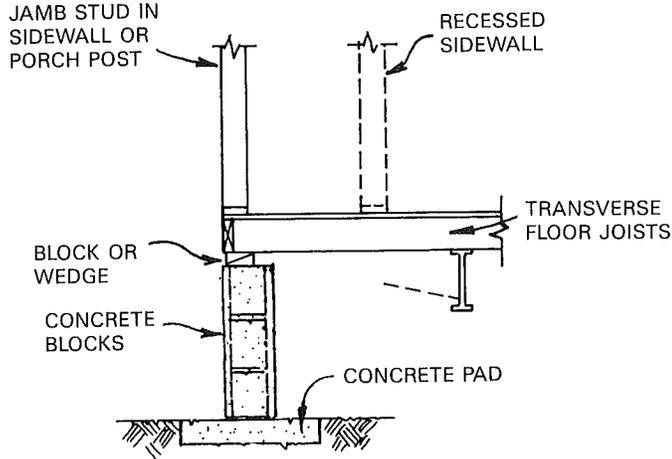
FIGURE A-1  
 RECOMMENDED PIERS

# APPENDIX A . . . Continued

## RECOMMENDED PERIMETER PIER INSTALLATION METHODS WHEN PIERING IS REQUIRED BY BASEMENT FRAME/PIERING PLAN



DETAIL "A"



DETAIL "B"

NOTES:

1. PIERING METHODS SHOWN ARE APPLICABLE TO ALL REQUIREMENTS FOR PERIMETER PIERING, NOT JUST JAMB STUDS OR PORCH POST CONDITIONS.
2. FOR MINIMUM PIER CAPACITY, SEE THE "PIERING PLAN" DRAWING. SEE EXHIBIT 2 FOR PAD SIZES.

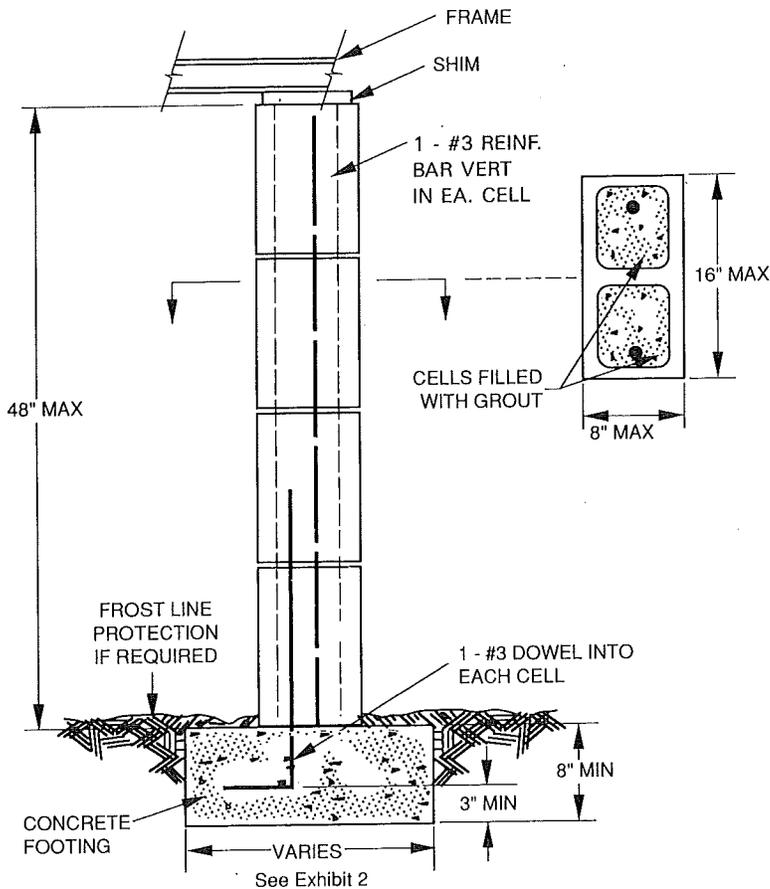


# APPENDIX A...Continued

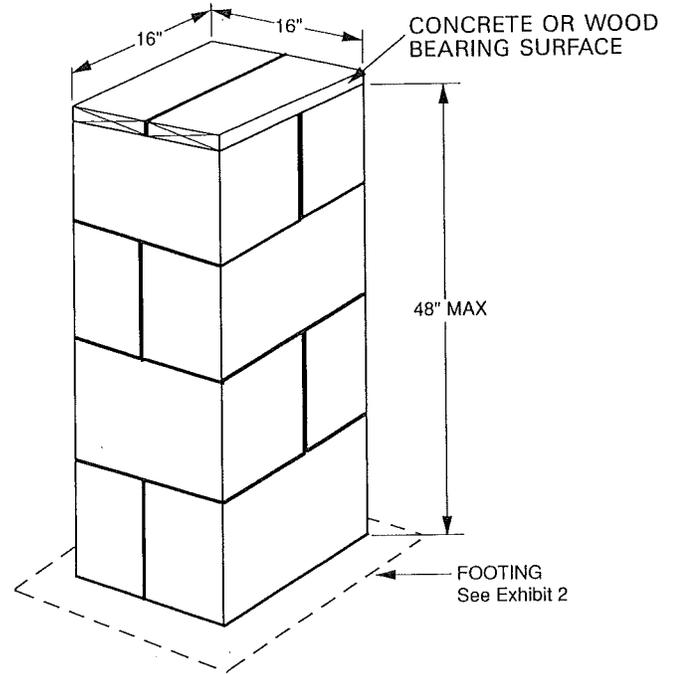


*Edward M. Salsbury*

MAR 14 1991



**ALTERNATE 1**



**ALTERNATE 2**

No grout or reinforcing steel required

Hollow Load Bearing Concrete Masonry Units may be used as supports for manufactured homes when installed according to the following specifications:

Manufacturer - Blocks shall be manufactured in conformance with ASTM Designation C90-70, Grade N units.

Cross-Sectional Dimensions - 8" nominal width and 16" nominal length.

Cap Block - a 1" nominal thickness wooden cap block, or 4" concrete cap block should be used as the top bearing surface to distribute the loads of the frame rail to the blocks.

Wedges - when wooden wedges are used for height adjustment the wedges shall be extended over the full width of the block.

Maximum Load - 8,000 lbs. (not considering foundation).

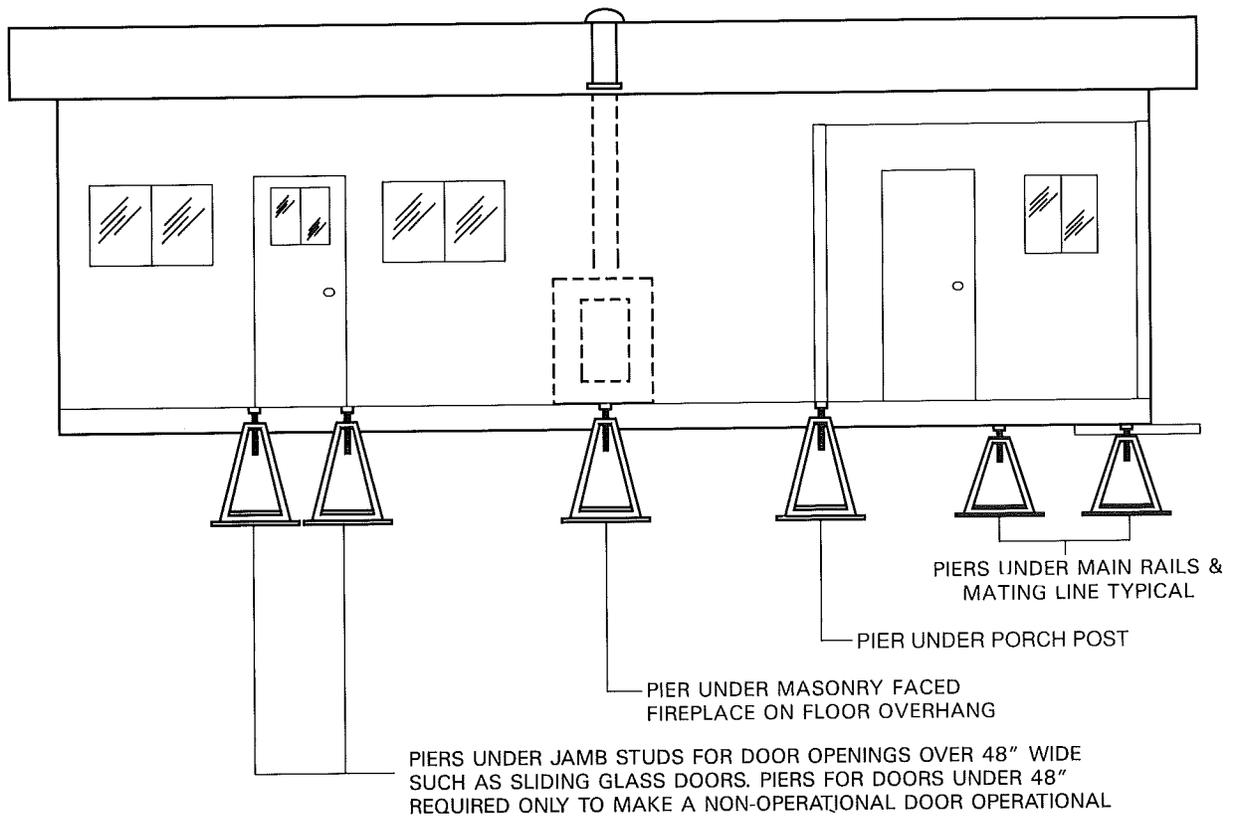
Foundation - an approved foundation (footing) shall be used to distribute the loads to the soil so that the soil bearing pressure will not exceed 1,000 pounds per square foot unless data are available to substantiate higher allowable bearing pressure.

Installations proposing different installation specifications; block sizes, or loads shall be justified by engineering data. Plans, calculations, and/or test data shall be submitted to the enforcement agency for approval.

## CONCRETE BLOCK SUPPORTS

# APPENDIX A...Continued

## TYPICAL REQUIRED PIER LOCATIONS



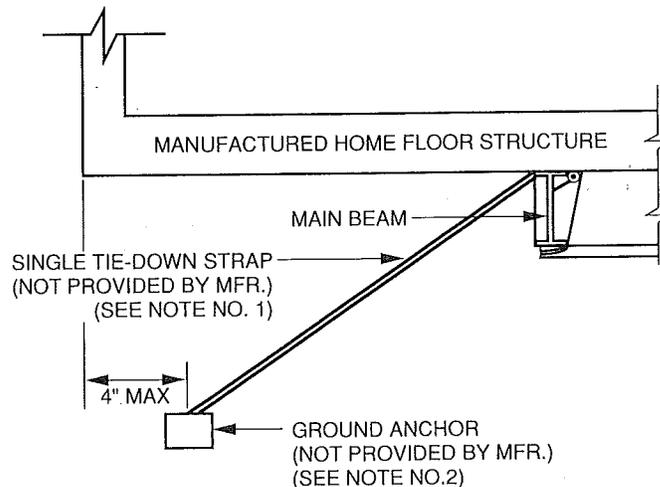
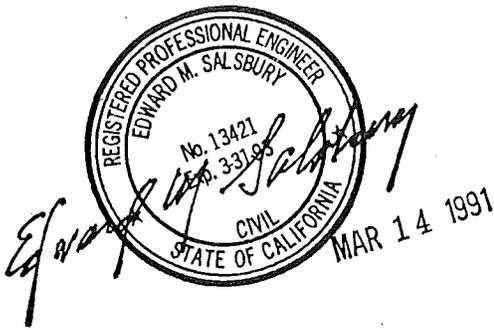
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STATE OF CALIFORNIA

MAR 14 1991

# APPENDIX B

## TIE DOWN INSTALLATION

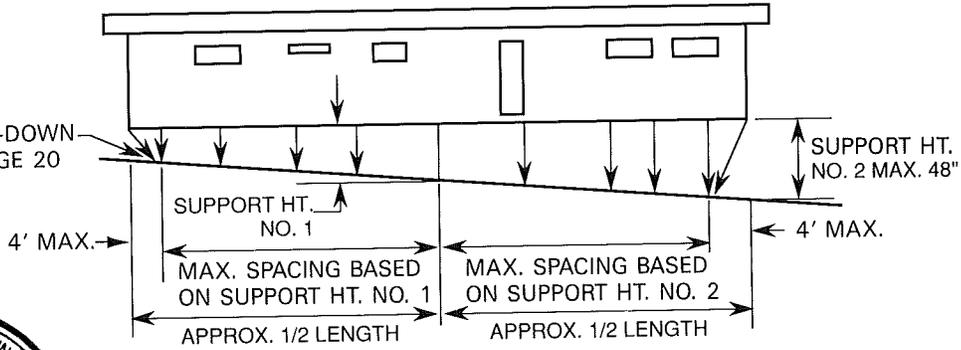


1. TIEDOWN STRAPS: All tiedown straps shall be 1-1/4" x .035" galvanized (.30 oz. per sq. ft.) steel strap conforming to Federal Spec. QQ-S-781-H, Type 1, Finish B, Grade 1 (or equivalent with ultimate load capacity of 4725 lbs. and design load capacity of 3150 lbs.)
2. GROUND ANCHORS: Ground anchors shall be capable of resisting an ultimate load of 4725 lbs. (3150 lbs. design) minimum per strap when the strap is installed as shown above. Install in accordance with ground anchor manufacturer's instructions.
3. Install frame tiedown straps on the main beams of the home in accordance with the spacing shown in the following tables and as follows:
  - a. Install the tiedown straps around the main rail beam and connect to ground anchor in accordance with manufacturer's instructions.
  - b. Tighten all tension bolts until tiedown strap slack is taken up.
  - c. Strap spacing for pier heights over 48" require special designs.

**CAUTION: Do NOT pretension tiedown straps on one side of the home only. If step b is not performed alternately on opposite sides, the home may be pulled off the supports.**

# APPENDIX B . . . Continued

FOR LONGITUDINAL TIE-DOWN REQUIREMENTS SEE PAGE 20



## TIE-DOWN STRAP SPACING

### 20' HOME TIEDOWN SPACING

I-BEAM CENTERS >>>		FOR 18" MAX. HIGH COMMERCIAL STANDS*		FOR 48" MAX. HIGH COMMERCIAL STANDS*	
		15 PSF WIND	25 PSF WIND	15 PSF WIND	25 PSF WIND
EAVE (IN.)	SUPPORT HT.* (IN.)	95.5" OR 99"	95.5" OR 99"	95.5" OR 99"	95.5" OR 99"
0	18	19'-0"	17'-6"	10'-0"	9'-0"
	36	12'-0"	5'-6"	6'-6"	3'-6"
	48	11'-0"	5'-0"	4'-6"	2'-6"
12	18	13'-6"	6'-6"	N/A	N/A
	36	11'-0"	5'-6"	6'-0"	3'-0"
	48	10'-0"	5'-0"	4'-6"	2'-6"

### 24' AND 26' HOME TIEDOWN SPACING

I-BEAM CENTERS >>>		FOR 18" MAX. HIGH COMMERCIAL STANDS*		FOR 48" MAX. HIGH COMMERCIAL STANDS*	
		15 PSF WIND	25 PSF WIND	15 PSF WIND	25 PSF WIND
EAVE (IN.)	SUPPORT HT.* (IN.)	95.5" OR 99"	95.5" OR 99"	95.5" OR 99"	95.5" OR 99"
0	18	20'-0"	9'-0"	N/A	N/A
	36	16'-0"	7'-0"	10'-0"	5'-0"
	48	14'-0"	6'-6"	7'-6"	4'-0"
18	18	19'-0"	8'-6"	N/A	N/A
	36	15'-0"	7'-0"	10'-0"	5'-0"
	48	13'-6"	6'-0"	7'-0"	4'-0"

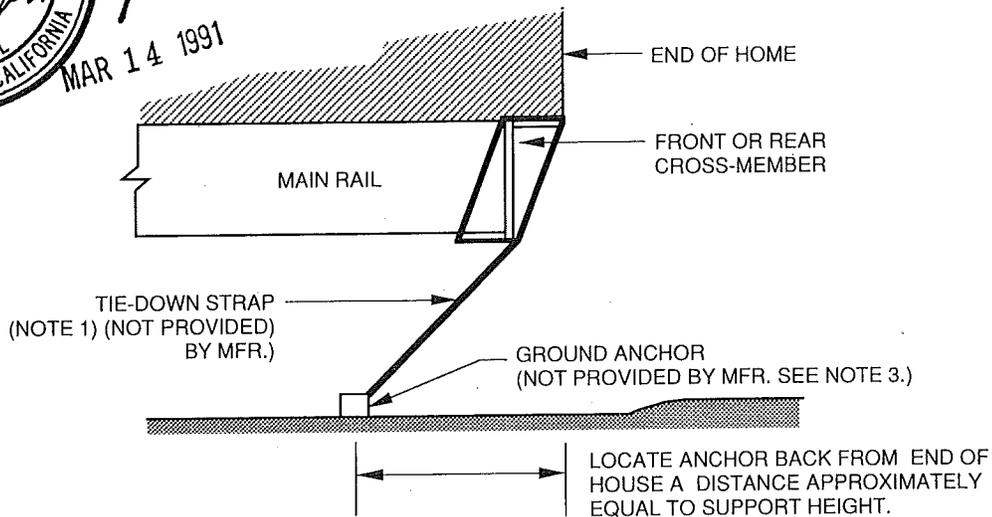
### 28' HOME TIEDOWN SPACING

I-BEAM CENTERS >>>		FOR 18" MAX. HIGH COMMERCIAL STANDS*		FOR 48" MAX. HIGH COMMERCIAL STANDS*	
		15 PSF WIND	25 PSF WIND	15 PSF WIND	25 PSF WIND
EAVE (IN.)	SUPPORT HT.* (IN.)	95.5" OR 99"	95.5" OR 99"	95.5" OR 99"	95.5" OR 99"
0	18	23'-0"	9'-6"	N/A	N/A
	36	19'-0"	8'-0"	12'-6"	6'-6"
	48	17'-0"	7'-6"	9'-6"	5'-0"
18	18	21'-6"	9'-0"	N/A	N/A
	36	17'-6"	7'-6"	12'-6"	6'-6"
	48	15'-6"	7'-0"	9'-0"	5'-0"

\* See page 21 for support and stand height definitions.



## APPENDIX B . . . Continued



### LONGITUDINAL TIEDOWNS

Number of tiedowns based on length of house.

### DOUBLE WIDE UNITS - 20' through 28'

#### REQUIREMENTS FOR LONGITUDINAL (FORE & AFT) TIEDOWNS:

For 15 PSF wind zone — Houses less than 22' long, 2 tiedowns in front, 2 tiedowns in rear;  
Houses 22' or longer, no tiedowns required.

For 25 PSF wind zone — Houses less than 37' long, 2 tiedowns in front, 2 tiedowns in rear;  
Houses 37' or longer, no tiedowns required.

### TAG SECTION (3rd Section)

#### REQUIREMENTS FOR TAG SECTION (IN ADDITION TO THOSE ON MAIN UNIT):

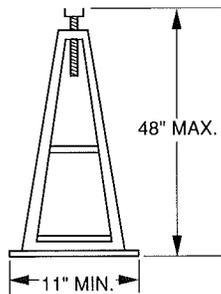
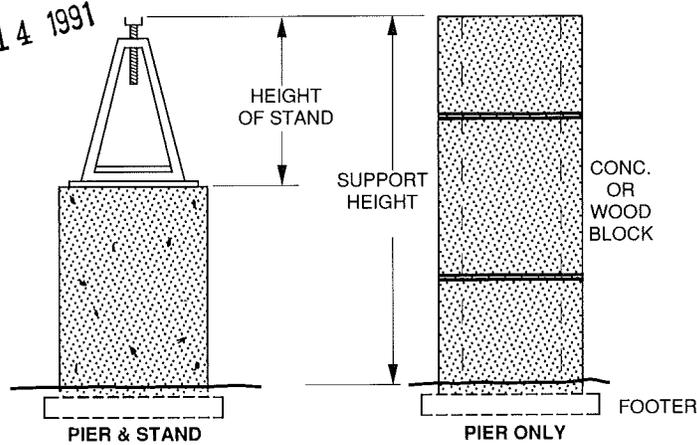
For 15 PSF wind zone — Section less than 22' long, 2 tiedowns in front, 2 tiedowns in rear;  
Section 22' or longer, no tiedowns required.

For 25 PSF wind zone — Section less than 37' long, 2 tiedowns in front, 2 tiedowns in rear;  
Section 37' or longer, no tiedowns required.

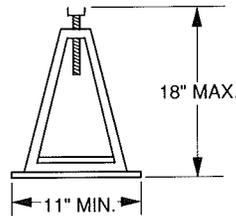
#### NOTES:

1. Longitudinal tiedown straps shall be installed around the cross member close to the main rail. All tiedown straps shall be 1-1/4" x .035" galvanized (.30 oz. per sq. ft.) steel strap conforming to Federal Spec. QQ-S-781-H, Type 1, Finish B, Grade 1 (or equivalent with ultimate load capacity of 4725 lbs., 3150 lbs. design)
2. Longitudinal tiedown straps, when required, are in addition to diagonal tiedowns along the main rails.
3. Ground anchors shall be capable of resisting an ultimate load of 4725 lbs. (3150 lbs. design) minimum per strap when the strap is installed as shown above. Install in accordance with ground anchor manufacturer's instructions.

# APPENDIX B . . . Continued



48" COMMERCIAL STAND



18" COMMERCIAL STAND

## HEIGHT DEFINITIONS

### NOTES:

1. Commercial stands higher than 18" must use charts for 48" commercial stands.
2. 18" charts may be used for 18" commercial stands at pier heights greater than 18" only if footer or pads are used under the stands.
3. All other types of piers and stands, regardless of construction or height may use the 18" commercial stand charts.

### EXAMPLE:

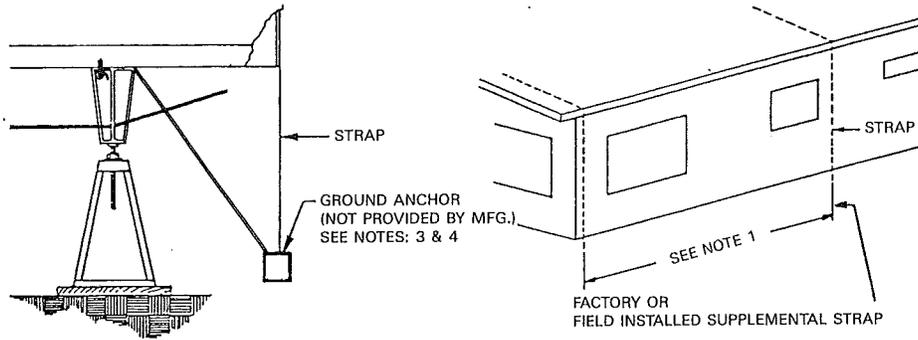
24' wide home, 12" eaves, 99" I-beam centers, 36" pier height required, 15 PSF wind zone.

If 36" commercial stands are used, anchor spacing = 10'-0" (48" commercial stand table).

If 18" commercial stands are used on 18" high concrete pads, anchor spacing = 15'-0".

If 36" high concrete block is used, anchor spacing = 15'-0".

# APPENDIX B...Continued

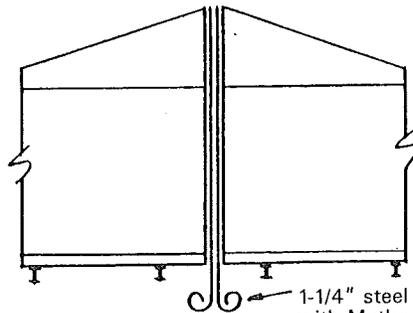


## SUPPLEMENTAL TIEDOWNS

### NOTES:

1. Supplemental ties shall not be used in lieu of frame diagonal ties to secure the home. Frame ties to ground anchors shall also be provided. The supplemental straps may have been built into the house or may be field installed according to the strap manufacturer's instructions. Field installed straps must be located over rafter locations. If the floor of the home overhangs the steel frame in the front or rear, a strap shall not be installed in the overhang area.
2. Tiedown strap material shall be 1-1/4" wide x 0.035" thick galvanized with 0.30 oz. per sq. ft., steel conforming to Federal Spec. QQ-S-781-H, Type 1, Finish B, Grade 1, or equivalent. All hardware shall be used in accordance with the manufacturer's instructions.
3. Ground anchors shall be capable of resisting an ultimate load of 4725 lbs. (3150 lbs. design) and shall be installed in accordance with the anchor manufacturer's instructions.
4. Both the diagonal tie and the supplemental tie may be connected to the same ground anchor using appropriate hardware except for a G-2 strap. If a strap extends below the sidewall and is marked with a label designating it a G-2 strap, it must be connected to a ground anchor by itself, not combined with a diagonal frame tie.

### TIE-DOWN OF CENTERLINE STRAPS WHEN PROVIDED ON HOME

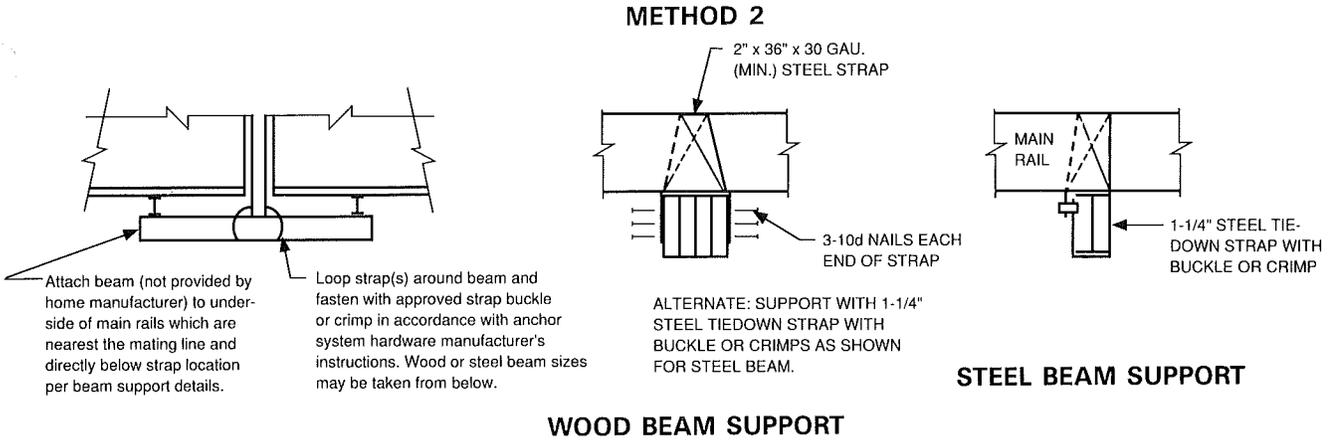


1-1/4" steel straps to be anchored in accordance with Method 1 or 2. Straps are marked with a label designating them as a G-1 strap or G-2 strap.

### METHOD 1

Install approved ground anchor(s) with working load capacity - 3150 lbs. (ultimate load capacity - 4725 lbs.) directly below strap location under the mating line. Attach strap to tension head on anchor per hardware manufacturer's instructions and tighten until strap is taut. Two G-1 straps may be attached to a single ground anchor. Maximum one G-2 strap shall be attached to one ground anchor. (Ground anchor and connecting hardware not provided by home manufacturer).

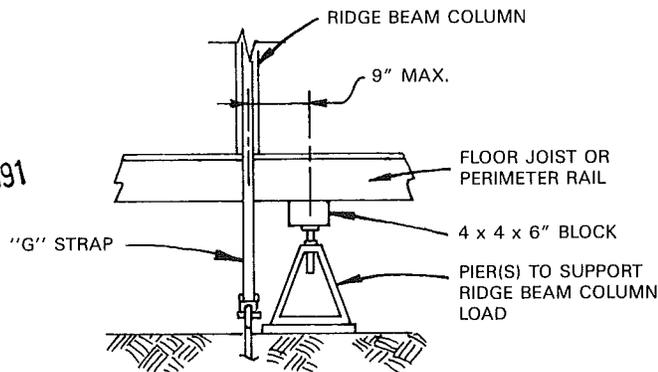
# APPENDIX B...Continued



## RECOMMENDED BEAMS

		95-1/2" / 99" MAIN RAIL SPACING	
		20' and 24' WIDE	26' and 28' WIDE
BEAMS FOR 2-G1 OR 1-G2 STRAP(S)	WOOD (1)	3 - 2 x 8 SPF No. 2	4 - 2 x 8 SPF No. 2
		3 - 2 x 8 S.O.P No. 3	3 - 2 x 10 S.O.P No. 3 or 4 - 2 x 8 S.O.P No. 3
		3 - 2 x 8 HF No. 2 or 4 - 2 x 6 HF No. 2	3 - 2 x 8 HF No. 2
	STEEL	PACO C10 x 6.48	10 x 7.5 WELD I-BEAM
M8 x 6.5		S3 x 7.5	
C4 x 5.4		C5 x 6.7	
FOR 2-G2 STRAPS	STEEL	10 x 8.4 WELD I-BEAM	M12 x 10.8
		S3 x 7.5	S4 x 7.7
		C6 x 8.2	C7 x 9.8

(1) Nail wood beam w/20d nails @ 32" at top and bottom and staggered, 2 - 20d nails at each end.



**ALTERNATE PIER(S) LOCATION AT RIDGE BEAM COLUMN WITH G-1 OR G-2 STRAP**

# APPENDIX D

## MULTIPLE-SECTION ALIGNMENT PROCEDURE

1. Position and level the first section of the home per instructions. Excessive and/or non-uniform jacking during the leveling will cause the home to be racked and twisted. This may result in damage to the home. Care must be used during leveling to not distort the home.
2. Move the second section into position alongside the first section.
3. Draw the two floors together using winches (come-alongs) and rollers or skid boards.
4. With the two sections together, but with no fasteners installed, check the alignment of the end walls, interior walls, roof and floor. Determine if the walls and/or the roof of either section must move backward or forward with respect to the floor. Any correction required can be accomplished during the leveling of the second section.

### NOTE

IF JOINTS ARE IN THE CEILING, THEY ARE ONE GOOD INDICATION OF ROOF POSITION: THE JOINTS SHOULD RUN STRAIGHT FROM ONE SECTION TO THE OTHER WHEN THE SECTIONS ARE CORRECTLY POSITIONED. IF THE WALLS REQUIRE ONLY A SMALL CORRECTION, PROCEDURE STEP 5 IS SUGGESTED. IN MORE DIFFICULT CASES, USE PROCEDURE STEP 6.

### 5. ALIGNMENT PROCEDURE

- a. Position the second section to bring the floor seams flush, keeping the roof slightly apart and the end walls aligned at the floor. At this time, place piers only under the inside frame beam. Secure the floors together with lag screws at rim joists.
- b. Close the gap in the ceiling by raising the outside frame beam using three hydraulic jacks placed ahead of, behind the wheels and one about half way between wheels and hitch.
- c. IF THE TOP MUST BE MOVED FORWARD. . . with the frame support beams evenly supported, carefully raise the outside rear corner of the second section (and lower the outside front corner) with the hydraulic jacks. The roof should shift forward until the end walls come even at the top. When the walls and ceiling joints are even, raise the outside support frame beam evenly to close the gap.
- d. IF THE TOP MUST BE MOVED BACK. . . with the frame support beams evenly supported, carefully raise the outside front corner of the second section (and lower the outside rear corner) with the hydraulic jacks. The roof should shift back until the end walls come even at the top. When the walls and ceiling joints are even, raise the outside frame support beam evenly at the front and rear to close the gap.
- e. Fasten the top of the ridge beam together, as described in Step 2.3.6. When the top and end walls are aligned and fastened, proceed with leveling of the second section.

### 6. ALTERNATE ALIGNMENT PROCEDURE

- a. Position the second section so that the floors are together with the ceiling seam flush and the end walls, interior walls and ceiling joints even at the top. Close the gap between the roofs by raising the outside frame support beam.
  - b. With the ceiling positioned and the ridge beam halves snug, fasten the top of the ridge beam together, as described in Step 2.3.6.
  - c. With the roof securely fastened, attach a winch (come-along) between spring shackles of each section. Shift the floor into alignment by tightening the winch.
  - d. When the floors and walls are even, install lag screws. (Ref. Figure 4). With the top, walls, and floor aligned and fastened at the marriage line, proceed with piercing and leveling of the second section.
7. If the home is comprised of more than two sections, start with step 2 of this procedure (Appendix D) for each section.

# APPENDIX E

## GAS SYSTEM TEST PROCEDURE

1. Using an ounce gauge, check the gas system for leaks. First close all appliance controls and all appliance pilot light valves (see appliance instructions included in the home or posted on the appliance).
2. Open the gas shutoff valve on the supply line to each appliance.
3. Attach the ounce gauge on the main gas inlet to the home.
4. Carefully pressurize the system to between 5 and 8 ounces of pressure.

### CAUTION

**DO NOT PRESSURIZE THE LINE IN EXCESS OF 8 OUNCES MAXIMUM TO AVOID POSSIBLE DAMAGE TO GAS VALVES AND REGULATORS.**

5. Apply an ammonia-free soapy water bubble solution to the joints at both ends of the appliance connector. If bubbles are formed, tighten connector until bubbles cease to be formed.

### CAUTION

**DO NOT BUBBLE CHECK COPPER OR BRASS FITTINGS WITH SOLUTIONS CONTAINING AMMONIA.**

# APPENDIX F

## ELECTRICAL SYSTEM TEST PROCEDURE

1. Perform the following tests after all structural assembly, metal and trim installations, and electrical crossover connections are complete.

The grounding continuity test is to be performed before connecting the home and the polarity and operation tests are to be performed after the electrical installation is complete.

2. Perform the following procedure checks for grounding continuity, polarity, and operation of the electrical system.

a. Before home is connected to 120/240 VAC service, proceed as follows:

- (1) Connect one clip of a flashlight continuity tester to a convenient ground (metal skin, window frame on metal skinned units, floor duct riser, etc.) and touch the other clip to each fixture canopy. The continuity light should light if each fixture is properly grounded.
- (2) Using the continuity tester, check every direct-connected appliance or fan. The tester must be hooked to a convenient ground and to the metal frame of the appliance.
- (3) Using the continuity tester, check the continuity between the following:
  - (a) Between one riser of furnace duct and convenient ground.
  - (b) Between metal roof and steel frame.
  - (c) Between metal skin and steel frame.
  - (d) Between metal gas piping and steel frame.
  - (e) Between metal water piping and steel frame.(NOTE: Continuity to ground is not required on metal inlet of plastic piped water system)
- (f) Between metal raceway below distribution panel and steel frame.

### NOTE

When plumbing fixtures such as metallic sinks, tubs, faucets and shower risers are connected only to plastic water piping and plastic drain piping, continuity to ground is not required.

- (4) Any loss of grounding continuity found in (1), (2), or (3) above will require investigation and correction.
- b. After the home is connected to the electrical service, proceed as follows:

- (1) Plug an AC receptacle wiring tester into each receptacle in the home to check for reversed polarity, open grounds and shorts.
- (2) Any reverse polarity, open grounds or shorts found will require investigation and repair.
- (3) Install light bulbs and fluorescent tubes where not already installed. Make sure each light fixture is operable by turning the appropriate switch to "ON" position.
- (4) Shut off all light switches in the house and perform test on smoke detector(s).
- (5) Repair or replace any defective items.

# APPENDIX G

## WATER SYSTEM TEST PROCEDURE

The water system test is made after any water crossovers are connected by attaching an air pump, valve, and gauge to the home water inlet and pressurizing the system to 100 psi. Verify that the pressure remains for a period of 15 minutes without loss.

### WARNING

**IT IS NOT SAFE TO FILL THE WATER HEATER TANK WITH HIGH PRESSURE AIR ONLY. DISCONNECT WATER HEATER FROM WATER SYSTEM BY CONNECTING THE HOT AND COLD WATER LINES TOGETHER, OR FILL WATER HEATER TANK WITH WATER BEFORE PRESSURIZING SYSTEM WITH AIR.**

# APPENDIX H

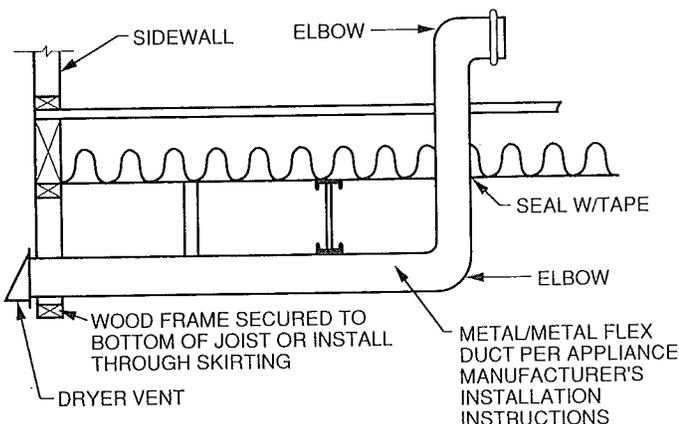
## REPAIRING BOTTOM CLOSURE MATERIAL

1. If the closure material is asphalt base or composition material, it should be repaired by applying a patch of the same or similar material over the damaged area.
  - a. Place beads of adhesive or sealant under all contact edges to ensure an airtight seal.
  - b. Press the patch firmly into place with your hand or other object and use fasteners and tape to hold it in place until the adhesive sets.
  - c. Be sure no gaps exist that could permit air or water to enter.
  - d. It is recommended that fasteners be a type designed to spread and hold in soft material. If these fasteners are not available, a patch may be cut large enough to span the floor joist. Add blocking between the joists so that the fasteners used to secure the patch will penetrate wood on all edges.
2. If the covering is a vinyl coated material, use vinyl patching tape especially designed to repair tears or holes. Pull torn edges together then cover, as necessary, with tape or apply a patch of the same material taped all four sides.

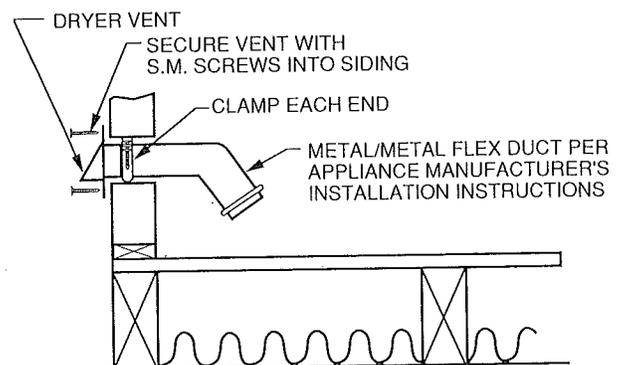
# APPENDIX I

## CLOTHES DRYER VENT INSTALLATION

1. **UNDER-CHASSIS VENT.** Terminate vent through skirting or install wood vent frame to outer floor joist or to wood nailer under perimeter frame as shown. Install vent and run flexible duct up through holes in bottom closure and floor. Pull duct up through hole until slack is removed from under the floor; secure above floor with metal clamp as shown. Using plumbers' tape or metal straps, support flexible duct to floor joist, as required, to keep duct off of ground and provide support against excessive sagging. Seal around duct with durable tape where it enters the bottom closure material. (Ref. Bottom Closure Repair Procedure, Appendix H).
2. **THROUGH-WALL VENT.** Install vent as shown below using sheetmetal screws and sealant tape between vent flange and siding.



**FIGURE I-1**  
**DRYER VENT INSTALLATION**  
**BELOW FLOOR**



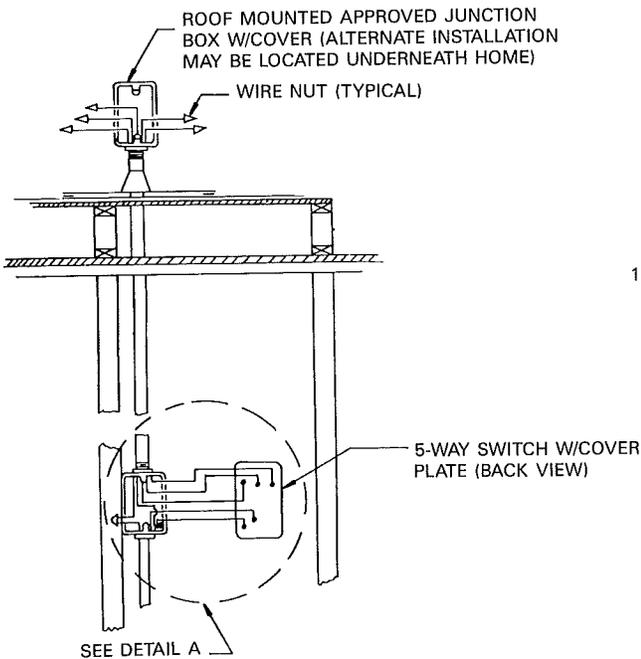
**FIGURE I-2**  
**DRYER VENT INSTALLATION**  
**W/VENT THROUGH SIDEWALL**

# APPENDIX J

## EVAPORATIVE COOLER CONNECTIONS TO 5-WAY SWITCH

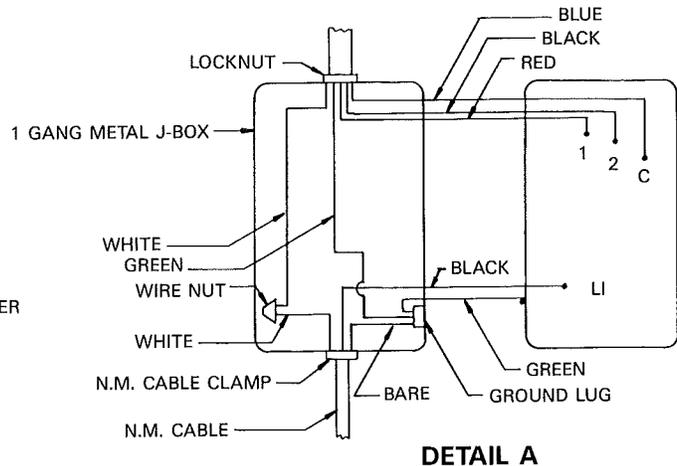
The conductors in the junction box are color coded as follows:

- Blue — Connect to "high speed" terminal of blower motor.
- Red — Connect to "low speed" terminal of blower motor.
- Black — Connect to "hot wire" of pump motor.
- White — Connect neutral conductor to neutral terminals of blower and pump motors.
- Green — Connect to ground terminal or frame of evaporative cooler.  
or Green w/Yellow Stripe or Bare Conductor



NOTE:

1. Single conductors are 14 gauge cu. types TW. or THW. colored as shown.



**FIGURE J-1**  
**EVAPORATIVE COOLER CONNECTIONS TO 5-WAY SWITCH**

See evaporative cooler manufacturer's installation instructions for equipment installation details.

# APPENDIX K

## COLD CLIMATE AREA RECOMMENDATIONS AND WATER SYSTEM DRAINAGE

Fleetwood Enterprises, Inc., through its various subsidiary companies, manufactures and warrants its homes to be in compliance with the applicable standards in effect at the time of production. They are guaranteed to their purchasers for one year from the date of first retail delivery to be free from manufacturing defects in materials and workmanship. Your home is capable of providing satisfactory and comfortable service as a residence in the specific climatic zone for which it was designed, when properly setup and prepared for the weather conditions likely to prevail at the site.

Complete information related to the design zones for which your home was constructed will be found on its Data Plate which is posted in the home. Also printed on the Data Plate is the comfort heating certificate for your home. It is the responsibility of the owner to make sure that the climatic conditions where this home is introduced are compatible with the design capabilities specified on the Data Plate.

## APPENDIX K...Continued

The manufacturer is responsible for the compliance of your home with applicable standards, and its construction to certified designs and specifications. The manufacturer is not responsible for the home failing to withstand climatic conditions more rigorous than those for which it was designed, nor damage caused to the home through failure to prepare it adequately for extreme temperatures or other climatic conditions that may be encountered.

For occupancy in areas where below freezing temperatures occur, the manufacturer and your dealer make the following specific recommendations for installing your home and the addition of certain accessories. (For additional information, refer to the Owner's Manual supplied with your home.)

**SKIRTING:** Skirting is a highly recommended accessory that will assist your home in withstanding below freezing temperatures. Its installation helps to prevent cold air infiltrating below the home where the heat ducts and the majority of the plumbing is located. Its addition should be considered necessary to prevent plumbing freeze-ups if your home is likely to be exposed to temperatures below 25°F (-5°C) for any prolonged period, or to temperatures below approximately 10°F (-12°C) even briefly. The addition of a wind chill factor to the above figures make skirting even more vital. For your planning purposes, you may consider that each increase of 10 mph in wind velocity may be equivalent to a drop in air temperature of approximately 20°F (10°C), or 2°F (1°C) for each mph of wind increase. (The information on your home's Data Plate is calculated assuming a 15 mph wind factor.)

The use of so-called insulated skirting is probably not required under most conditions. The greatest value of any skirting is as a barrier to air movement, and standard skirting accomplishes this purpose as well as the insulated type. Insulated skirting may be considered if prolonged temperatures in the -20° to -30°F (-30° to -35°C) range is to be withstood, and then in conjunction with the introduction of auxiliary heating under the home. Consult with your dealer for further information on the desirability of installing these accessories and whether such installations are compatible with your own local codes.

Care should always be taken to ensure that adequate ventilation is provided when skirting or perimeter foundations are installed. Failure to provide adequate ventilation may allow moisture to build up under a home, and transfer that moisture via diffusion or air movement into the home itself. This moisture can result in high humidity in the home, and also in the formation of condensation, frost or ice on cold surfaces.

Entry of outside air into the home's floor cavity is one of the most frequent causes of water pipe freeze-up. Before the skirting is installed, the bottom covering of a home should be closely inspected to determine that there has not been any loosening of its attachment or tears which have occurred as a result of highway movement or road hazards. Openings around the perimeter of the floor covering, around pipes or pipe hangers, splits or tears should be sealed with weather resistant tape. Check also to ensure that plumbing P-traps are well insulated and covered. It is important that this inspection be made and any necessary repairs completed whether skirting is to be installed or not. This inspection and service should be accomplished by your dealer when your home is installed.

**GROUND BARRIER:** The addition of a ground moisture-vapor retarder under a home laid on the soil surface is recommended to assist in controlling humidity in the home. There is a strong tendency for ground moisture to be drawn into the home greatly complicating your efforts to control humidity and condensation. Polyethylene or vinyl are widely used as ground vapor retarder materials.

**HEAT TAPE:** Heat tape is a linear electric heating element readily available from many dealers, home supply outlets, and hardware stores, which is designed to be wrapped around water pipes to protect them from freezing. Its use is usually necessary on exposed fresh water inlet pipes in order to withstand prolonged exposure to below-freezing temperatures. Heat tape should completely wrap the pipe being protected, and should extend from below the frost line at the supply end and terminate under the insulation of the home at the point where the supply line enters the living space of the home. Heat tape must always be installed in strict accordance with the tape manufacturer's instructions in order to achieve the highest possible safe heating efficiency. A receptacle outlet is provided under the floor by the supply inlet for heat tape connection.

**HEAT DISTRIBUTION:** The circulation of heat within your home is accomplished through the movement of warm air. Closing off portions of your home may cause localized areas to become cold along with outside low temperature unless measures are taken to ensure that the warm air circulates properly. Be sure that all registers and grilles are open and unblocked by furniture, etc., and that your furnace is operating properly. If it is equipped with a filter, the filter should be cleaned or changed frequently. The blower motor must also be performing properly.

## APPENDIX K...Continued

If particularly low temperatures are forecast, you should open closet doors and the doors on the cabinets under the sinks and pullmans where your pipes are located to allow circulating heat to reach them. Areas of still air, such as storage closets, may allow frost or even ice to build up on exterior or outside walls. This may be controlled by ensuring air movement to such areas and making an effort to keep humidity low as outside temperatures fall.

**LEAVING YOUR HOME UNATTENDED:** If you plan to leave your home unattended, or if it is to be without heat for any period, measures must be taken to prevent piping damage from water expansion during freezing. Your water supply pipes may be emptied by performing the following steps in sequence:

### WATER SYSTEM DRAINAGE

1. Turn off the gas or electricity supply to the hot water heater.
2. Shut off the home water inlet valve and uncouple the home fresh water connection.
3. Attach a hose to the water heater tank drain valve and open the drain valve.

### CAUTION

**BE SURE GAS OR ELECTRICAL SERVICE TO WATER HEATER IS TURNED OFF.**

4. Open all the faucets and water control valves in the water system.
5. When gravity drainage of water is complete, close all faucet outlets, leave the water heater drain open and the home inlet supply connector uncoupled.
6. Open the cold water faucet farthest from the water inlet and connect a source of pressurized air to blow any remaining water from the cold water line.
7. Open the hot water faucet closest to the hot water tank. Using pressurized air, blow the remaining water in the line out into the water heater tank where it will drain. Close the faucet before proceeding to the next farthest faucet.
8. Repeat the operations in step 7 above for each hot water faucet moving progressively farther from the hot water tank, until the remaining water is blown from the hot water system.

### NOTE

**BE SURE THE WATER HEATER IS REFILLED COMPLETELY BEFORE PUTTING IT BACK INTO SERVICE. IF THE WATER HEATER OPERATES WHILE EMPTY, SERIOUS DAMAGE IS LIKELY TO RESULT.**

To prepare your sewer system to resist freezing temperatures while you are away, you should empty the commode water chests by flushing the toilets with the water supply turned off. Then pour approved drain system antifreeze into all drains to prevent freezing of the P-traps. Check with your dealer for his advice as to brands of antifreeze compatible with your home's type of sewer pipe.

If suitable antifreeze is not available, the toilet bowls and plumbing fixture drain P-traps must be drained to a point at which the water level is below the P-trap seal to prevent damage. It will first be necessary to disconnect the sewer line hook-up where it attaches to the home drain outlet. The sewer line on the site should then be capped to prevent the escape of sewer gases. The home drain outlet must be left open to permit drainage from the traps.

Use a rubber toilet plunger to force the water out of the toilet bowl and fixture traps until only an inch or two remains in the bottom. Next, using the same rubber toilet plunger (or pressurized air, if available), force the water out of all lavatory, sink, washing machine, tub, and shower drain water P-traps. (Note that it will be necessary to temporarily restrict one of the drain openings of double fixtures in order to force the water out of the P-traps from the other drain.)

### WARNING

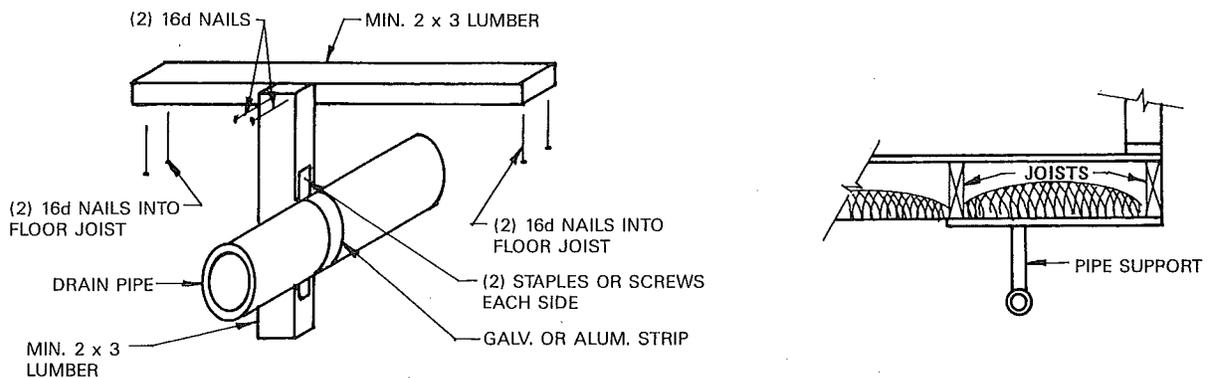
**SEWER HOOK-UP MUST BE DISCONNECTED BEFORE EMPTYING DRAIN TRAPS, OR TOXIC AND EXPLOSIVE SEWER GASES MAY BE PERMITTED TO ENTER THE HOME.**

# APPENDIX L

## INSTALLATION INSTRUCTIONS FOR FIELD INSTALLED DWV SYSTEMS

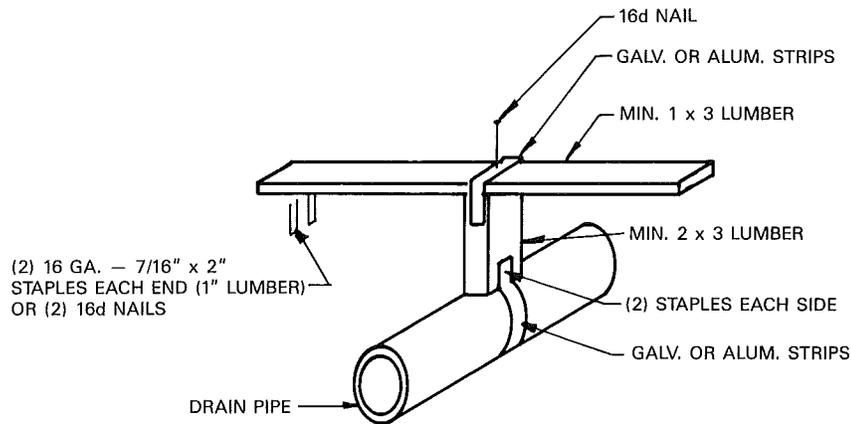
Portions of the DWV system of a home which are below the floor may not have been installed by the manufacturer, due to the possibility of road damage to the plumbing system during transit. All materials required to complete the system have been furnished by the manufacturer and are shipped as loose items in the home. The following instructions are provided for use in completing the installation of the DWV system in the correct manner. Please read through this entire instruction sheet before starting work to familiarize yourself with the proper sequence of installation.

1. Locate the DWV plumbing schematic which is a drawing page attached to the tab in the back of the Installation Manual supplied with this home and review the layout. All drain lines and fittings marked with an asterisk(\*) on the schematic drawing are to be field installed.
2. Inventory all loose plumbing parts supplied by the manufacturer by laying them out on the ground under the home in their correct relationship according to the DWV schematic. All pipe and fittings should be used where indicated on the schematic to insure the correct flow and grade in the drain line.
3. Remove shipping covers from all fittings and pipe stub-outs and ensure that all piping is clean and free of burrs.
4. All solvent welded connections should be made in accordance with the instructions furnished by the cement manufacturer and included with the loose shipped parts.
5. Assemble the field installed portion of the DWV system by starting at the most remote end and working toward the outlet, supporting the piping as you go with temporary blocking to achieve the proper grade. The grade of the drain must be at least 1/4" fall per foot of run unless noted otherwise on the DWV schematic drawing. When the entire system is completed the permanent drain line supports should be installed at 4' o.c. See drawings in this supplement for suggested methods of installation of supports.
6. The completed DWV system shall be subjected to a flood level test per the requirements of Section 3280.612 (b) (3) of the Federal Manufactured Home Standards as follows: "The home shall be in a level position, all fixtures shall be connected, and the entire system shall be filled with water to the rim of the toilet bowl. (Tubs and shower drains shall be plugged.) After all trapped air has been released, the test shall be sustained for not less than 15 minutes without evidence of leaks. Then the system shall be unplugged and emptied. The waste piping above the level of the toilet bowl shall then be tested and show no indication of leakage when the high fixtures are filled with water and emptied simultaneously to obtain the maximum possible flow in the drain piping."



### DRAIN PIPE SUPPORT METHOD

## APPENDIX L...Continued



ALTERNATE PIPE SUPPORT METHOD

## APPENDIX M

### INSTALLATION OF RANGE AND/OR COOK TOP AND OVEN

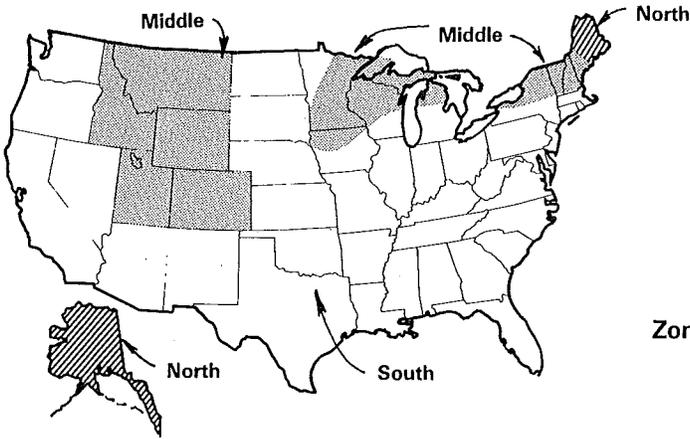
If a range and/or cook top and oven, that was not supplied by the home's manufacturer at the time of purchase, is to be installed, the following should be observed:

- Install the appliance to provide the required clearances per Federal Standards which may be more restrictive than appliance manufacturer's normal installation instructions.
- Do not install an appliance which requires a heavier connected energy capacity than the home's system provides (see capacity label on appliance).
- Follow appliance manufacturer's installation instructions except as outlined in a. above.

# EXHIBIT 1

## ZONE MAPS OF THE UNITED STATES

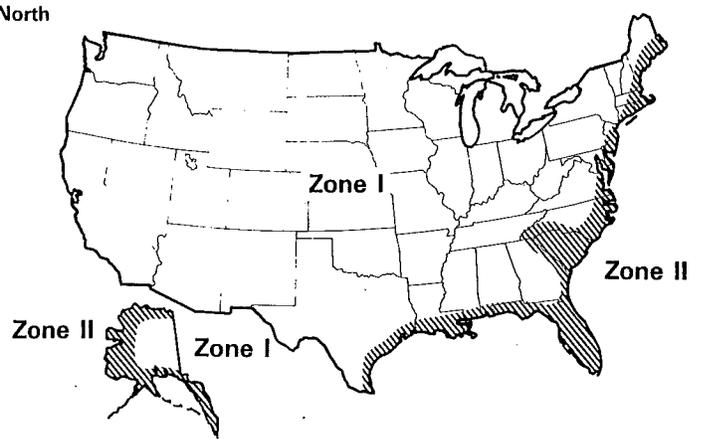
### STRUCTURAL DESIGN



Note: Hawaii, Canal Zone, Puerto Rico and Virgin Islands are South Zone

#### DESIGN ROOF LOAD ZONE MAP

South	20 PSF
Middle	30 PSF
North	40 PSF

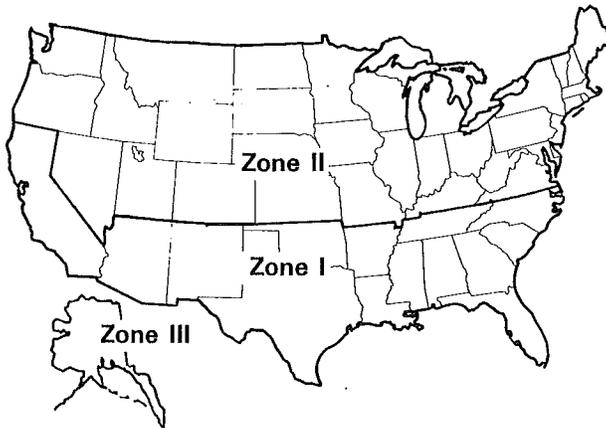


Note: Hawaii and Canal Zone = Zone 1  
Puerto Rico and Virgin Island = Zone 2

#### DESIGN WIND ZONE MAP

Standard Wind	Zone I	15 PSF Horizontal	9 PSF Uplift
Hurricane Resistive	Zone II	25 PSF Horizontal	15 PSF Uplift
Other			

### HEATING AND COOLING DESIGN



# EXHIBIT 2

## PIER LOAD CAPACITIES AND FOOTING SIZES

Required Pier Load Capacity Pounds	Minimum Footing Sizes (1) (or equal area)			
	Allowable Soil Bearing Value			
	1000 PSF	1500 PSF	2000 PSF	3000 PSF
1040	12" x 12"	12" x 12"	12" x 12"	12" x 12"
1200	12" x 16"	12" x 12"	12" x 12"	12" x 12"
1400	12" x 18"	12" x 12"	12" x 12"	12" x 12"
1900	12" x 24"	12" x 16"	12" x 12"	12" x 12"
2200	24" x 14"	12" x 16"	12" x 14"	12" x 12"
2600	24" x 16"	12" x 22"	12" x 16"	12" x 12"
2800	24" x 18"	24" x 12"	12" x 18"	12" x 12"
3000	24" x 18"	24" x 12"	12" x 18"	12" x 12"
3200	24" x 20"	24" x 14"	12" x 20"	12" x 14"
3400	24" x 22"	24" x 14"	12" x 22"	12" x 14"
4000	24" x 24"	24" x 16"	24" x 12"	12" x 16"
4300	24" x 26"	24" x 18"	24" x 14"	12" x 18"
4600	24" x 28"	24" x 20"	24" x 14"	12" x 20"
5500	24" x 34"	24" x 22"	24" x 18"	12" x 22"
6000	36" x 24"	24" x 24"	24" x 18"	24" x 12"
6400	36" x 26"	24" x 26"	24" x 20"	24" x 14"
6500	36" x 26"	24" x 26"	24" x 20"	24" x 14"
6800	36" x 28"	24" x 28"	24" x 22"	24" x 14"
7000	36" x 28"	24" x 28"	24" x 22"	24" x 14"
7500	36" x 30"	24" x 30"	24" x 24"	24" x 16"
8000	36" x 32"	24" x 32"	24" x 24"	24" x 16"
8600	36" x 36"	24" x 34"	24" x 26"	24" x 18"
9200	36" x 38"	24" x 36"	24" x 28"	24" x 20"
11000	36" x 44"	36" x 30"	24" x 34"	24" x 22"
12000	36" x 48"	36" x 32"	24" x 36"	24" x 24"
13000	48" x 40"	36" x 36"	36" x 26"	24" x 26"
14000	48" x 42"	36" x 38"	36" x 28"	24" x 28"
15000	48" x 46"	36" x 40"	36" x 30"	24" x 30"
16000	48" x 48"	26" x 44"	36" x 32"	24" x 32"
1600	12" x 20"	12" x 14"	12" x 12"	12" x 12"
1800	12" x 22"	12" x 16"	12" x 12"	12" x 12"
2300	24" x 14"	12" x 20"	12" x 14"	12" x 12"
2500	24" x 16"	12" x 20"	12" x 16"	12" x 12"
2700	24" x 18"	24" x 12"	12" x 18"	12" x 12"

Minimum footing size required for other pier loads may be determined as follows:

$$\frac{\text{Pier Load in Lbs.}}{\text{Allowable Soil Bearing Value in PSF}} = \text{Required Footing Area in Sq. Ft.}$$

- (1) Treated lumber footing dimensions are "nominal width x actual length". Example 24" x 26" above, when made from treated lumber, means 2 pieces of 1-1/2" x 11-1/4" x 26" side by side.
- (2) If a pier of sufficient capacity is not available, use 2 piers, each with sufficient capacity to carry at least half of the required load. Install as shown in Appendix A.

# EXHIBIT 3

EXHIBIT 3 LEFT BLANK INTENTIONALLY

# EXHIBIT 4

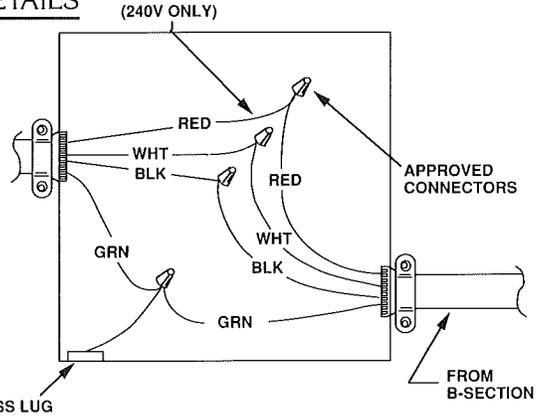
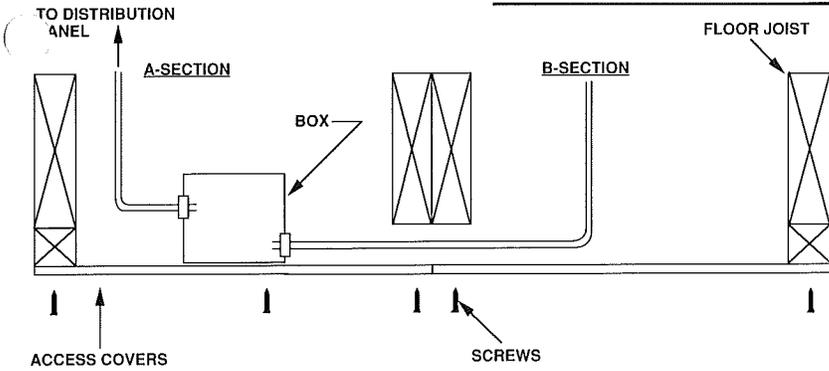
ELECTRICAL FEEDER AND EQUIPMENT SIZES

Feeder Size (See main breaker and label on distribution panel (AMPS))	Minimum Sizes			Feeder Conductor Sizes						Max. Calculated Neutral Feeder Load (AMPS)
	Junction Box (in.)	Flex Conduit (in.)		Copper Conductors (note 1)			Aluminum Conductors			
		Copper Conductors	Aluminum Conductors	Red & Black (Power)	White (Neutral)	Green (Grounding)	Red & Black (Power)	White (Neutral)	Green (Grounding)	
50	10x10x4	1	1	No. 6 THW	No. 6 THW	No. 8 THW	No. 6 THW	No. 6 THW	No. 8 THW	50
100	10x10x4	1¼	1½	No. 3 THW	No. 3 THW	No. 8 THW	No. 1 THW	No. 1 THW	No. 6 THW	100
125	12x12x6	1½	2	No. 1 THW	No. 2 THW	No. 6 THW	No. 2/0 THW	No. 1/0 THW	No. 4 THW	115
150	12x12x6	1½	2	No. 1/0 THW	No. 2 THW	No. 6 THW	No. 3/0 THW	No. 1/0 THW	No. 4 THW	115
200	12x12x6	2	2	No. 3/0 THW	No. 2 THW	No. 6 THW	250 MCM	No. 1/0 THW	No. 4 THW	115

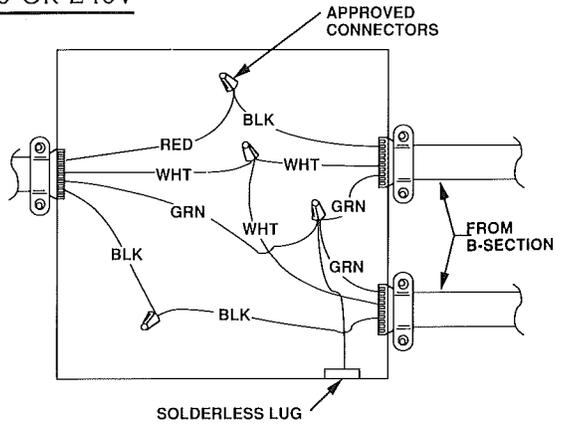
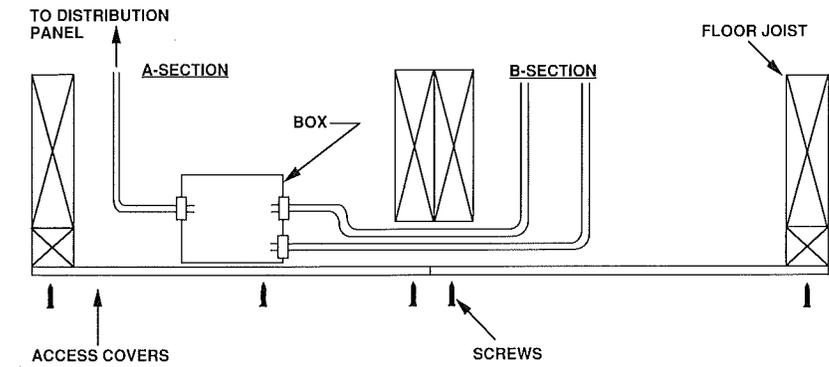
Note 1. Copper feeder conductor sizes No. 3 may be replaced by No. 2, No. 1 may be replaced by No. 1/0 & No. 1/0 may be replaced by No. 2/0.  
 Note 2. Support of vertical rigid nonmetallic conduit for feeder conductors, when used, is based on feeder conductors rated 60°C and below.

# EXHIBIT 5

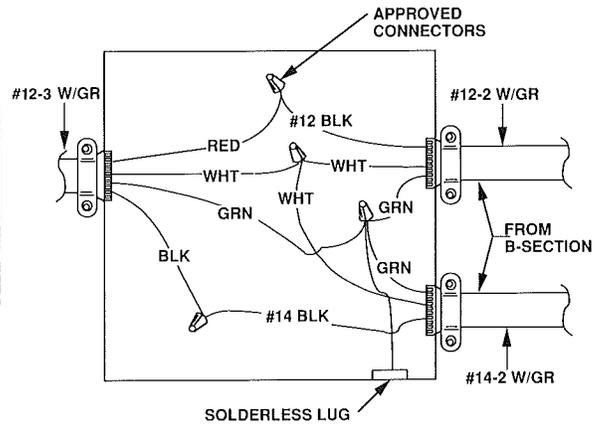
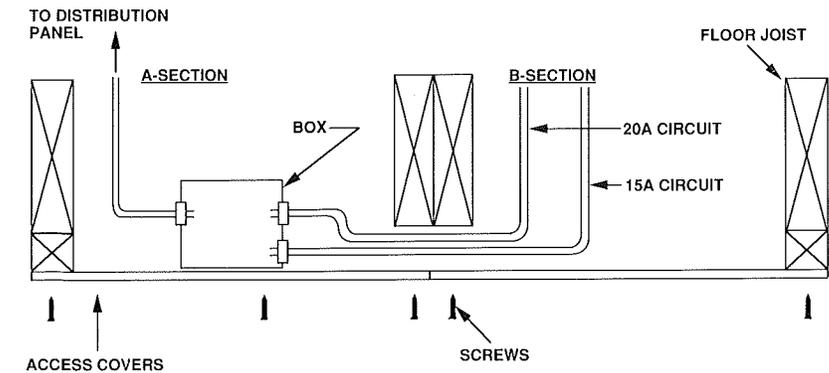
## ELECTRICAL CROSSOVER DETAILS



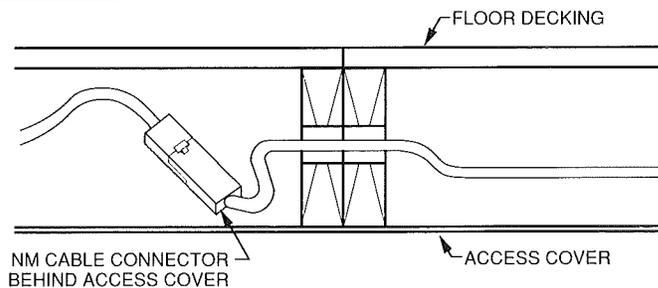
### SINGLE CIRCUIT CROSSOVER, 120 OR 240V



### DOUBLE 20A CIRCUIT CROSSOVER OR DOUBLE 15A CIRCUIT CROSSOVER



### 20A CIRCUIT AND 15A CIRCUIT DOUBLE CROSSOVER



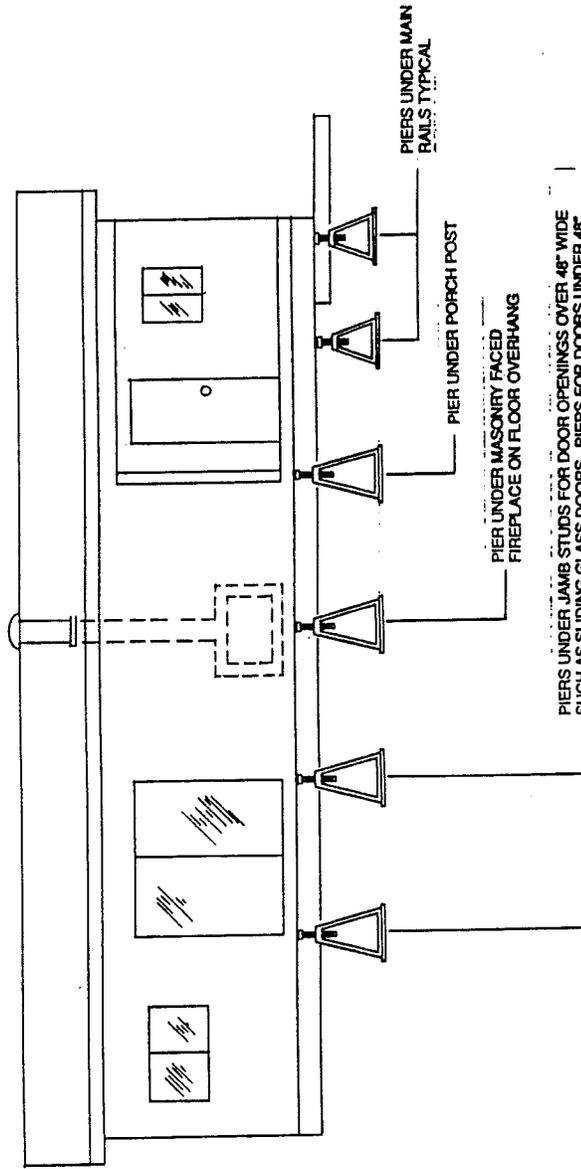
### SINGLE CIRCUIT CROSSOVER 120V



# APPENDIX A...Continued

## TYPICAL REQUIRED PIER LOCATIONS

(THIS APPROVAL REPLACES INFORMATION IN INSTALLATION MANUAL)



PIERS UNDER JAMB STUDS FOR DOOR OPENINGS OVER 48" WIDE SUCH AS SLIDING GLASS DOORS. PIERS FOR DOORS UNDER 48" REQUIRED ONLY TO MAKE A NON-OPERATIONAL DOOR OPERATIONAL

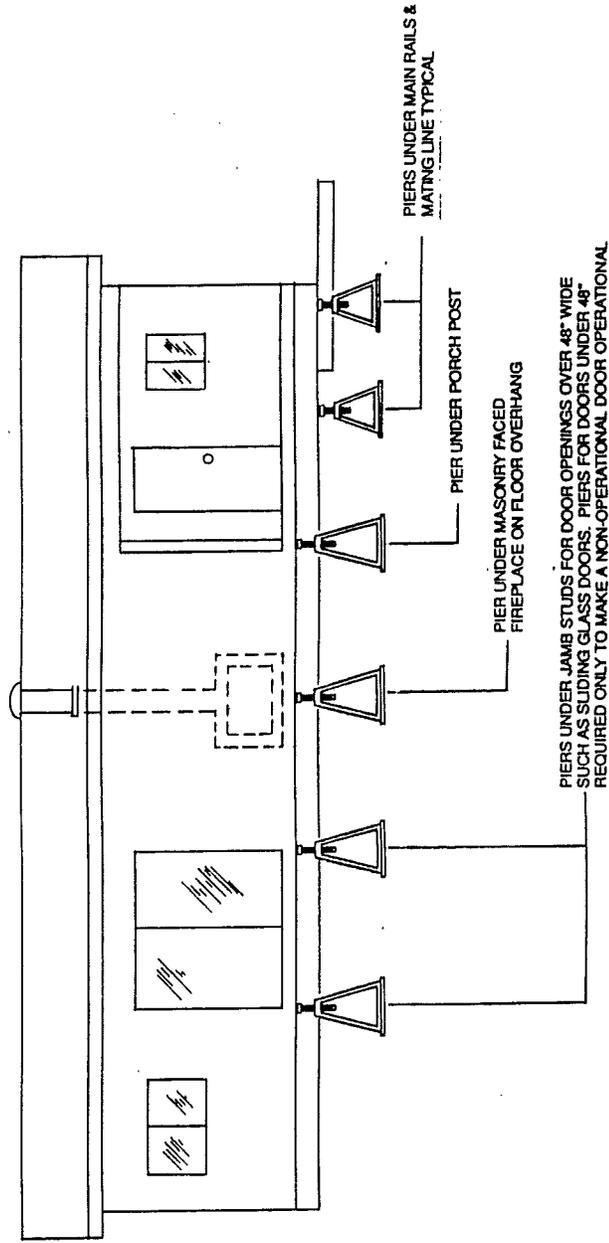
APPROVED  
 HOUSING CONSTRUCTOR  
 & SAFETY STANDARDS  
 MAY 09 1991  
 8

PROPRIETARY AND CONFIDENTIAL <small>This drawing and its contents are the property of Fleetwood Enterprises, Inc. and are not to be distributed, copied, or used in any way without the written consent of Fleetwood Enterprises, Inc. This drawing is intended for use only in conjunction with the Fleetwood product described herein. It is not to be used for any other purpose.</small>		TITLE TYPICAL REQUIRED PIER LOCATIONS - SINGLE SECTION	SHT. OF REV.
FLEETWOOD ENTERPRISES, INC.	CALC.	DRAWN BY DATE 5-7-91	NO. 72-18-0117
CALC.	CALC.	DATE 5-7-91	REV.

# APPENDIX A...Continued

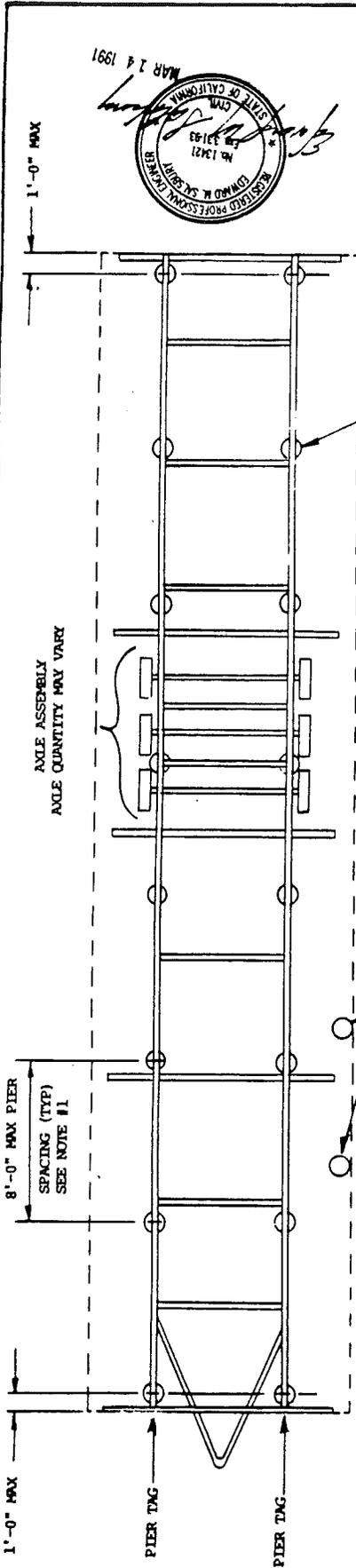
## TYPICAL REQUIRED PIER LOCATIONS

(THIS APPROVAL REPLACES INFORMATION IN INSTALLATION MANUAL)



PIERS UNDER JAMB STUDS FOR DOOR OPENINGS OVER 48" WIDE SUCH AS SLIDING GLASS DOORS. PIERS FOR DOORS UNDER 48" REQUIRED ONLY TO MAKE A NON-OPERATIONAL DOOR OPERATIONAL

SHOWN CONSTRUCTION & SAFETY STANDARDS APPROVAL RADC MAY 09 1991 8		PROPRIETARY AND CONFIDENTIAL These drawings, specifications, and other data are the property of Fleetwood Enterprises, Inc. and are not to be distributed, copied, or used in any way without the written consent of Fleetwood Enterprises, Inc. CONTRACT NO. 91101		TITLE TYPICAL REQUIRED PIER LOCATIONS - MULTI SECTION		SHT. OF REV.
FLEETWOOD ENTERPRISES, INC.		CALC.	CALC.	CALC.	DRAWN BY JDO	INO.
MAY 09 1991		CALC.	CALC.	CALC.	DATE 5-7-91	72-18-0118



**NOTE:**

1. Foundation supports are required under each main rail @ 8'-0" o.c. maximum and shall be within 1'-0" from front and rear of unit. Foundation supports for 14' wide sections using 8" main rails to be 7'-0" o.c. maximum.
2. Parimeter piers must be placed under the floor at the following locations (as applicable):
  - a). Below jamb stud of sidewall door openings over 48" wide.
  - b). Below masonry faced fireplace when located in overhang portion of floor.
  - c). Below each porch post on recessed sidewalls when post spacing exceeds 42".
  - d). Parimeter pier load capacities shall not be less than
    - 1.) 1500# For piers under jamb studs and porch post up to 72" apart and for fireplaces.
    - 2.) 2200# For piers under porch posts between 73" and 120" apart.
- 2e. Below sidewall at tiedown strap labeled G-2
3. 3150# for piers under sidewall at labeled G-2 strap

TYPICAL PIER FOUNDATION SUPPORT UNDER MAIN RAILS. SEE CAPACITY REQUIREMENTS IN TABLE BELOW.

14' WIDE	PIER LOAD CAPACITY IN POUNDS	ALLOWABLE SOIL BEARING VALUE PSF	MINIMUM FOOTING SIZE	ALLOWABLE SOIL BEARING VALUE PSF	MINIMUM FOOTING SIZE	ALLOWABLE SOIL BEARING VALUE PSF	MINIMUM FOOTING SIZE	ALLOWABLE SOIL BEARING VALUE PSF	MINIMUM FOOTING SIZE
NO EAVE	4325	1000	24"x26"	1500	24"x18"	2000	24"x14"	3000	12"x18"
12" EAVE MAX	4550	1000	24"x28"	1500	24"x20"	2000	24"x14"	3000	12"x20"
18" EAVE MAX	4750	1000	24"x30"	1500	24"x20"	2000	24"x16"	3000	12"x20"
12' WIDE									
NO EAVE	3750	1000	24"x24"	1500	24"x16"	2000	24"x12"	3000	12"x16"
12" EAVE MAX	4000	1000	24"x24"	1500	24"x16"	2000	24"x12"	3000	12"x16"
18" EAVE MAX	4175	1000	24"x26"	1500	24"x18"	2000	24"x14"	3000	12"x18"

**NOTES:**

1. Piers can be concrete blocks shimmed with wedges or an adjustable metal or concrete assembly.
2. Footings can be concrete, foundation grade or pressure treated min. 2 x 12 lumber.
3. If soil bearing values are not available use the 1000 PSF column for min. footing sizes.
4. Additional information on piers and footings may be found in the Home Technical Installation Manual.



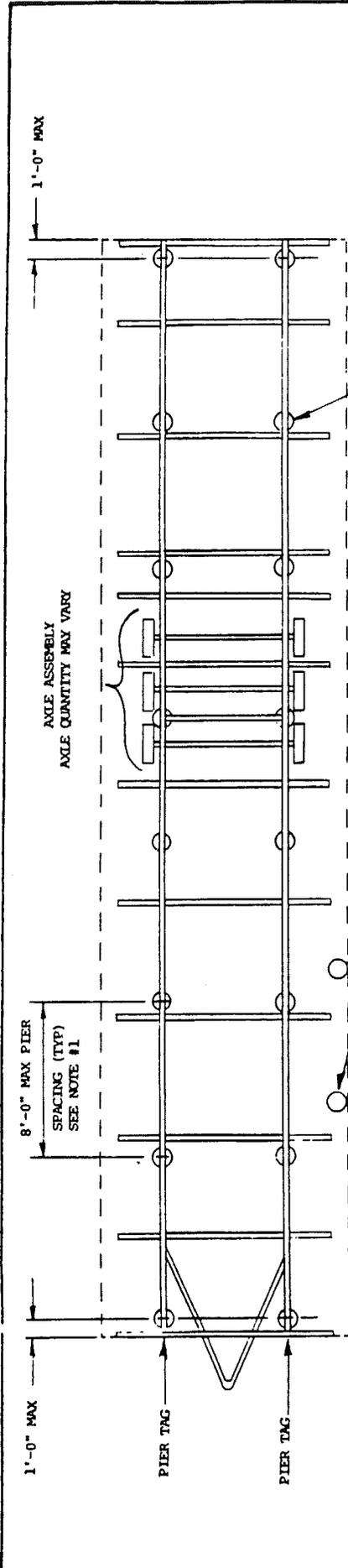
APPROVED  
 HOUSING CONSTRUCTION & SAFETY STANDARDS  
 MAR 27 1991  
 8

RADCO



TITLE: BASEMENT FRAME PIERING PLAN-20PSF ROOF LOAD 12' & 14' SINGLE SECTIONS  
 DRAWN BY: [Signature]  
 DATE: 3-15-91  
 REV: [ ]  
 NO.: 72-18-0001  
 APP: [ ]

0022054



**NOTE:**

1. Foundation supports are required under each main rail @ 8'-0" o.c. maximum and shall be within 1'-0" from front and rear of unit. Foundation supports for 14' wide sections using 8" main rails to be 7'-0" o.c. maximum.
2. Perimeter piers must be placed under the floor at the following locations (as applicable).
  - a). Below jamb stud of sidewall door openings over 48" wide.
  - b). Below masonry faced fireplace when located in overhang portion of floor.
  - c). Below each porch post on recessed sidewalls when post spacing exceeds 42".
  - d). Perimeter pier load capacities shall not be less than
    - 1.) 1500# For piers under jamb studs and porch post up to 72" apart and for fireplaces
    - 2.) 2200# For piers under porch posts between 73", and 120" apart.
- 2e. Below sidewall at tie-down strap labeled G-2
3. 3150# for piers under sidewall at labeled G-2 strap

TYPICAL PIER FOUNDATION SUPPORT UNDER MAIN RAILS. SEE CAPACITY REQUIREMENTS IN TABLE BELOW.

PIER LOAD CAPACITY IN POUNDS	ALLOWABLE SOIL BEARING VALUE PSF	MINIMUM FOOTING SIZE	ALLOWABLE SOIL BEARING VALUE PSF	MINIMUM FOOTING SIZE	ALLOWABLE SOIL BEARING VALUE PSF	MINIMUM FOOTING SIZE
4875	1000	- 24"x30"	1500	- 24"x20"	2000	- 24"x16"
5175	1000	- 24"x32"	1500	- 24"x22"	2000	- 24"x16"
5450	1000	- 24"x34"	1500	- 24"x22"	2000	- 24"x18"
					3000	- 12"x20"
					3000	- 12"x22"
					3000	- 12"x22"

**NOTES:**

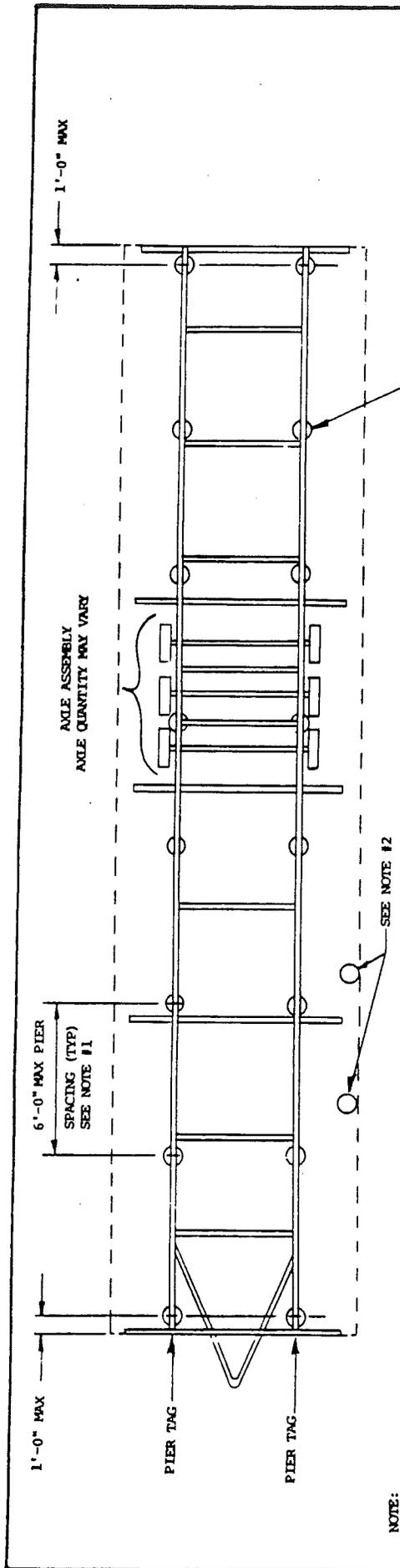
1. Piers can be concrete blocks shimmed with wedges or an adjustable metal or concrete assembly.
2. Footings can be concrete, foundation grade or pressure treated min. 2 x 12 lumber.
3. If soil bearing values are not available use the 1000 PSF column for min. footing sizes.
4. Additional information on piers and footings may be found in the Home Technical Installation Manual.



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APPROVAL

THIS BASEMENT FRAME PIERING PLAN-30PSF ROOF LOAD 14' SINGLE SECTION	DATE: 3-15-91	BY: [Signature]	NO. 72-18-0020
DRAWN BY: [Signature]	DATE: 3-15-91	BY: [Signature]	NO. 72-18-0020
DATE: 3-15-91	BY: [Signature]	NO. 72-18-0020	



**NOTE:**

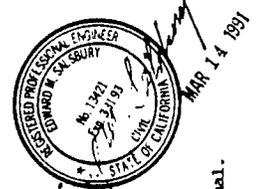
1. Foundation supports are required under each main rail @ 6'-0" o.c. maximum and shall be within 1'-0" from front and rear of unit.
2. Perimeter piers must be placed under the floor at the following locations (as applicable). 2a. Below sidewalk at tiedown strap labeled G-2 a). Below jamb stud of sidewall door openings over 48" wide. b). Below masonry faced fireplace when located in overhang portion of floor. c). Below each porch post on recessed sidewalls when post spacing exceeds 42". d). Perimeter pier load capacities shall not be less than
  - 1.) 1500# For piers under jamb studs and porch post up to 72" apart and for fireplaces.
  - 2.) 2200# For piers under porch posts between 72" and 120" apart.
  3. 3150# for piers under sidewall at labeled G-2 strap

TYPICAL PIER FOUNDATION SUPPORT UNDER MAIN RAILS. SEE CAPACITY REQUIREMENTS IN TABLE BELOW.

PIER LOAD CAPACITY IN POUNDS	ALLOWABLE SOIL BEARING VALUE PSF	MINIMUM FOOTING SIZE	ALLOWABLE SOIL BEARING VALUE PSF	MINIMUM FOOTING SIZE	ALLOWABLE SOIL BEARING VALUE PSF	MINIMUM FOOTING SIZE
3816	1000	- 24"x24"	1500	- 24"x16"	2000	- 24"x12"
3900	1000	- 24"x24"	1500	- 24"x16"	2000	- 24"x12"
					3000	- 12"x16"
					3000	- 12"x16"

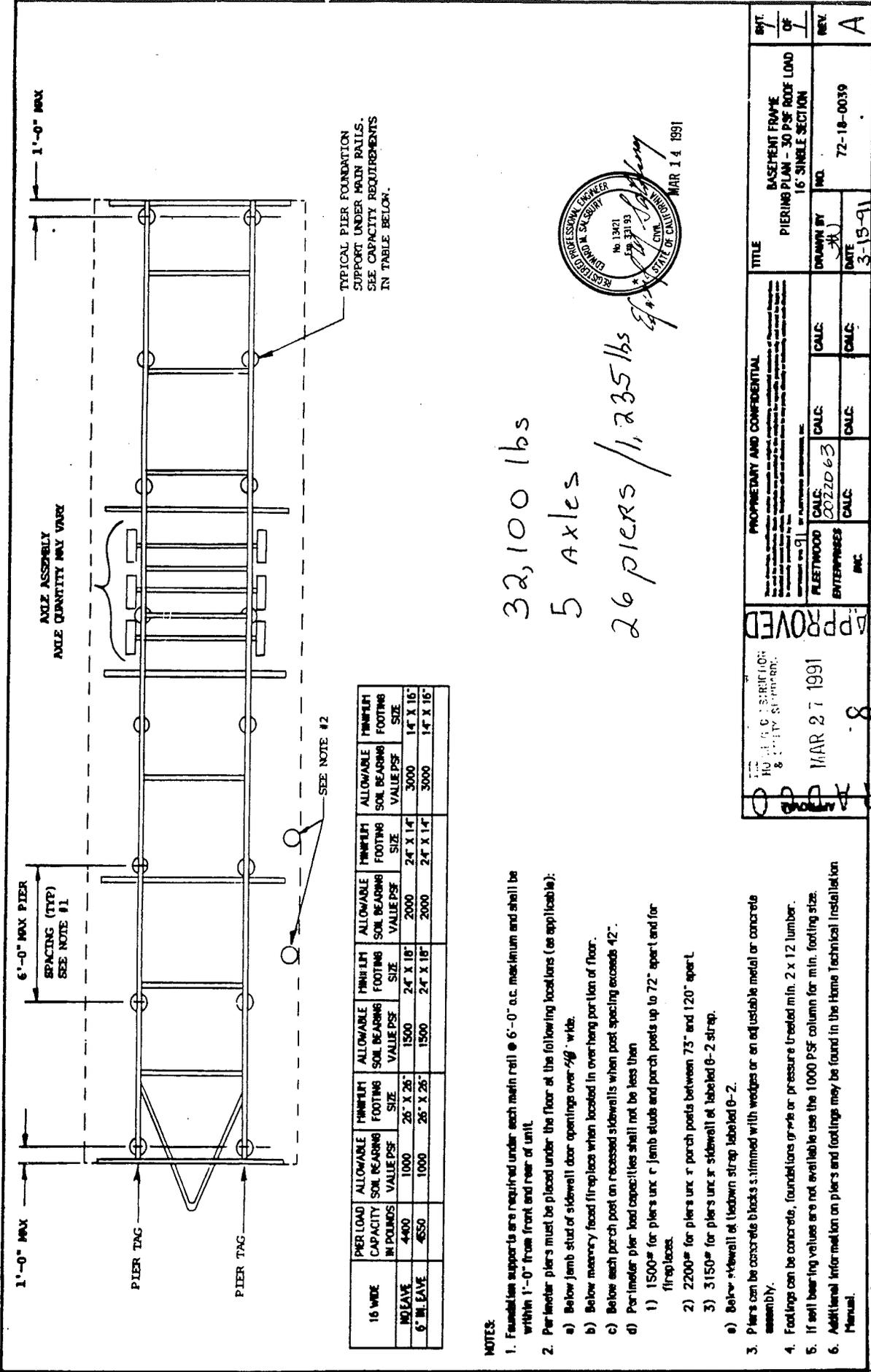
**NOTES:**

1. Piers can be concrete blocks shimmed with wedges or an adjustable metal or concrete assembly.
2. Footings can be concrete, foundation grade or pressure treated min. 2 x 12 lumber.
3. If soil bearing values are not available use the 1000 PSF column for min. footing sizes.
4. Additional information on piers and footings may be found in the Home Technical Installation Manual.



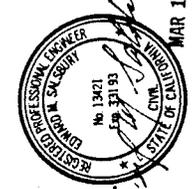
APPROVAL  
 R A D C O  
 HOUSING CONSTRUCTION & SAFETY STANDARDS  
 MAR 27 1991  
 8

TITLE: BASEMENT FRAME  
 PIERING PLAN-20PSF ROOF LOAD  
 16' SINGLE SECTION  
 DRAWN BY: SJC  
 DATE: 3-15-91  
 REV: 1110 APP  
 72-18-0002  
 FILE NO: 0022054



TYPICAL PIER FOUNDATION  
SUPPORT UNDER MAIN RAILS.  
SEE CAPACITY REQUIREMENTS  
IN TABLE BELOW.

32,100 lbs  
5 Axles  
26 piers / 1,235 lbs



MAR 14 1991

16 WIDE	PIER LOAD CAPACITY IN POUNDS	ALLOWABLE SOIL BEARING VALUE PSF	PIER/LEM FOOTING SIZE	ALLOWABLE SOIL BEARING VALUE PSF	PIER/LEM FOOTING SIZE	ALLOWABLE SOIL BEARING VALUE PSF	PIER/LEM FOOTING SIZE
NO GAVES	4400	1000	26" X 26"	1500	24" X 14"	3000	14" X 16"
6" IN LEAVE	6550	1000	26" X 26"	1500	24" X 14"	3000	14" X 16"

- NOTES:
- Foundation supports are required under each main rail @ 6'-0" o.c. maximum and shall be within 1'-0" from front and rear of unit.
  - Perimeter piers must be placed under the floor at the following locations (as applicable):
    - Below jamb stud of sidewall door openings over 5/8" wide.
    - Below masonry faced fireplaces when located in over-hang portion of floor.
    - Below each porch post on recessed sidewalls when post spacing exceeds 42".
    - Perimeter pier load capacities shall not be less than
      - 1500# for piers under jamb studs and porch posts up to 72" apart and for fireplaces.
      - 2200# for piers under porch posts between 73" and 120" apart.
      - 3150# for piers under sidewall of labeled 0-2 strap.
  - Below sidewall of leadown strap labeled 0-2.
  - Piers can be concrete blocks stiffened with wedges or an adjustable metal or concrete assembly.
  - Footings can be concrete, foundations grade or pressure treated min. 2 x 12 lumber.
  - If soil bearing values are not available use the 1000 PSF column for min. footing size.
  - Additional information on piers and footings may be found in the Home Technical Installation Manual.

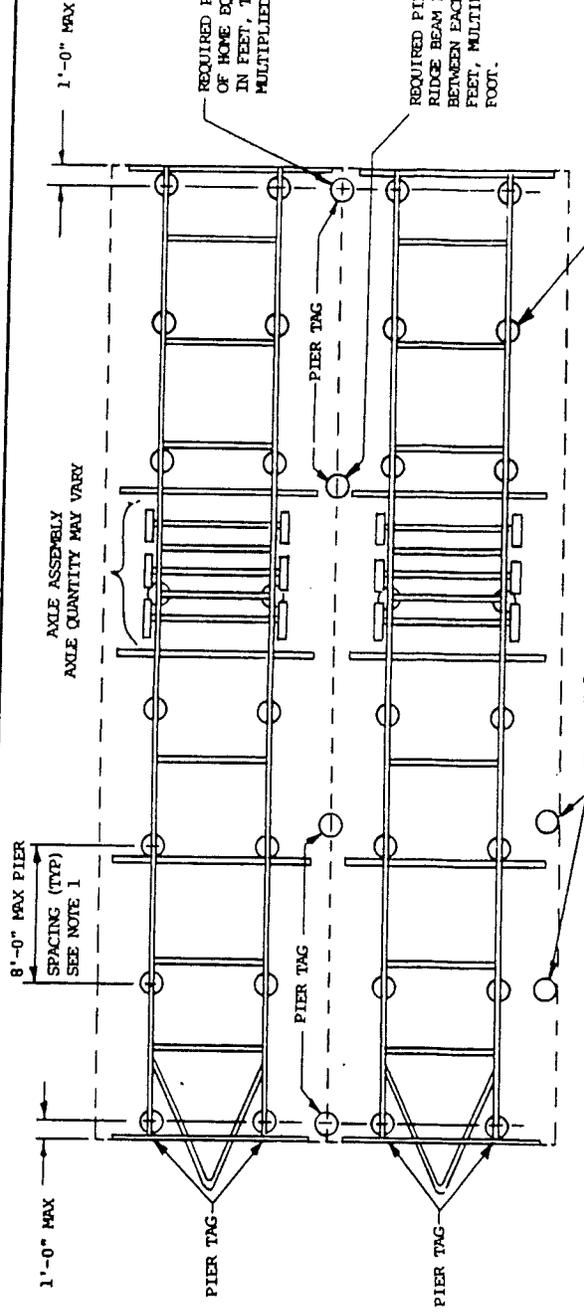
APPROVED

HOLOGRAPHIC SIGNATURE & CAPACITY SUPPORT

MAR 27 1991

8

PROPRIETARY AND CONFIDENTIAL	TITLE	BASINEMENT FRAME PIERING PLAN - 30 PSF ROOF LOAD OF 16" SINGLE SECTION	REV	A
FLEETWOOD ENTERPRISES INC.	DRAWN BY	NO.	72-18-0039	
0022063	DATE		3-15-91	
CALC.	CALC.	CALC.		
CALC.	CALC.	CALC.		



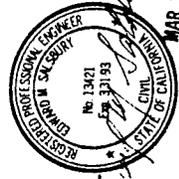
**NOTE:**

- Foundation supports are required under each main rail @ 8'-0" o.c. maximum and shall be within 1'-0" from front and rear of unit. Additional supports are required under the mating line rim joints at each end and under each ridge beam interior support post. Foundation supports for 14" wide sections using 8" main rails to be 7'-0" o.c. maximum.
- Perimeter piers must be placed under the floor at the following locations (as applicable):
  - Below jamb stud of sidewall door openings over 48" wide.
  - Below masonry faced fireplace when located in overhang portion of floor.
  - Below each porch post on recessed sidewalls when post spacing exceeds 42".
  - Perimeter pier load capacities shall not be less than:
    - 1500# for piers under jamb studs and porch post up to 72" apart and for fireplaces.
    - 2200# for piers under porch posts between 73" and 120" apart.
- 3150# for piers under sidewall at labeled G-2 strap

28" WIDE	PIER LOAD CAPACITY IN POUNDS	ALLOWABLE SOIL BEARING VALUE PSF	MINIMUM FOOTING SIZE	ALLOWABLE SOIL BEARING VALUE PSF	MINIMUM FOOTING SIZE	ALLOWABLE SOIL BEARING VALUE PSF	MINIMUM FOOTING SIZE	ALLOWABLE SOIL BEARING VALUE PSF	MINIMUM FOOTING SIZE
	4325	1000	24"x26"	1500	24"x18"	2000	24"x14"	3000	12"x18"
	4550	1000	24"x28"	1500	24"x20"	2000	24"x14"	3000	12"x20"
	4750	1000	24"x30"	1500	24"x20"	2000	24"x16"	3000	12"x20"

**NOTES:**

- Piers can be concrete blocks slurred with wedges or an adjustable metal or concrete assembly.
- Footings can be concrete, foundation grade or pressure treated min. 2 x 12 lumber.
- If soil bearing values are not available use the 1000 PSF column for min. footing sizes.
- Additional information on piers and footings may be found in the Home Technical Installation Manual.



**TITLE** BASEMENT FRAME  
PIERING PLAN-20 PSF ROOF LOAD  
28" WIDE SECTION

**DRAWN BY** S.T.J.  
**DATE** 3/15-91

**NO.** 72-18-0007  
**REV.** D

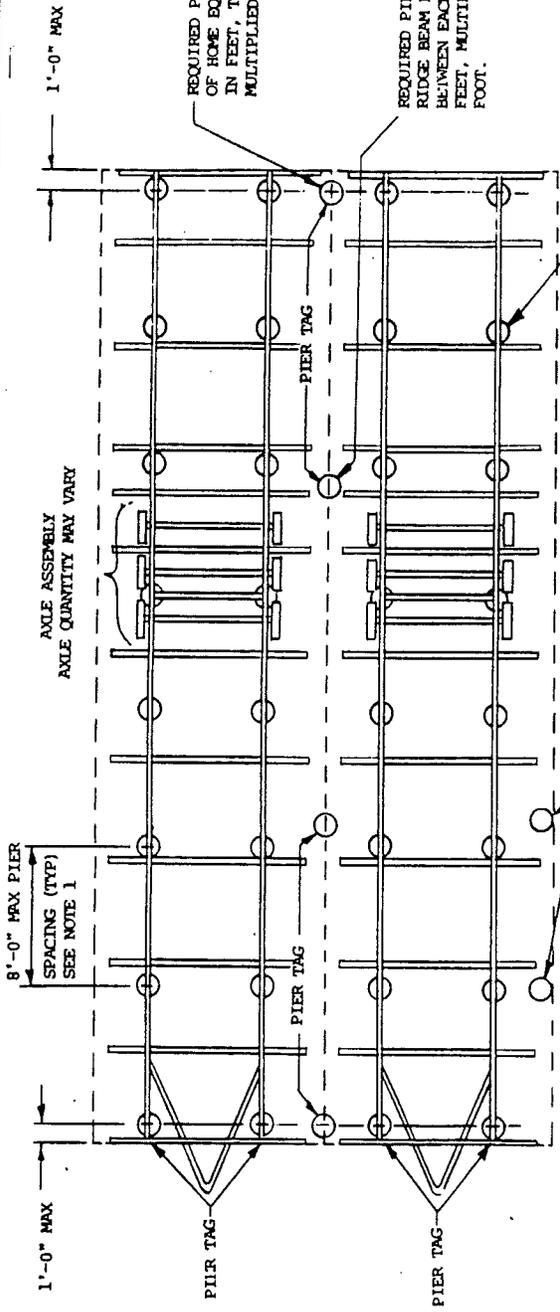
PROPRIETARY AND CONFIDENTIAL

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CONTRACT NO. 91-01 FLEETWOOD INTERNATIONAL, INC.

CALC.	0022054	CALC.	0022054
CALC.	0022054	CALC.	0022054

APPROVAL: MAR 27 1991



**NOTE:**

- Foundation supports are required under each main rail @ 8'-0" o.c. maximum and shall be within 1'-0" from front and rear of unit. Additional supports are required under the mating line rim joists at each end and under each ridge beam interior support post. Foundation supports for 14' wide sections using 8" main rails to be 7'-0" o.c. maximum.
- Parimeter piers must be placed under the floor at the following locations (as applicable):
  - Below jamb stud of sidewall door openings over 48" wide.
  - Below masonry faced fireplace when located in overhang portion of floor.
  - Below each porch post on recessed sidewalls when post spacing exceeds 42".
  - Parimeter pier load capacities shall not be less than:
    - 1) 1500# For piers under jamb studs and porch post up to 72" apart and for fireplaces.
    - 2) 2000# For piers under porch posts between 73" and 120" apart.

PIER LOAD CAPACITY IN POUNDS	ALLOWABLE SOIL BEARING VALUE PSF		MINIMUM FOOTING SIZE		ALLOWABLE SOIL BEARING VALUE PSF		MINIMUM FOOTING SIZE	
	NO EAVE	12" EAVE MAX.	18" EAVE MAX.		NO EAVE	12" EAVE MAX.	18" EAVE MAX.	
4875	1000	1000	1000	24"x30"	2000	2000	2000	24"x16"
5175	1000	1000	1500	24"x32"	2000	2000	3000	24"x16"
5450	1000	1000	1500	24"x34"	2000	2000	3000	24"x18"

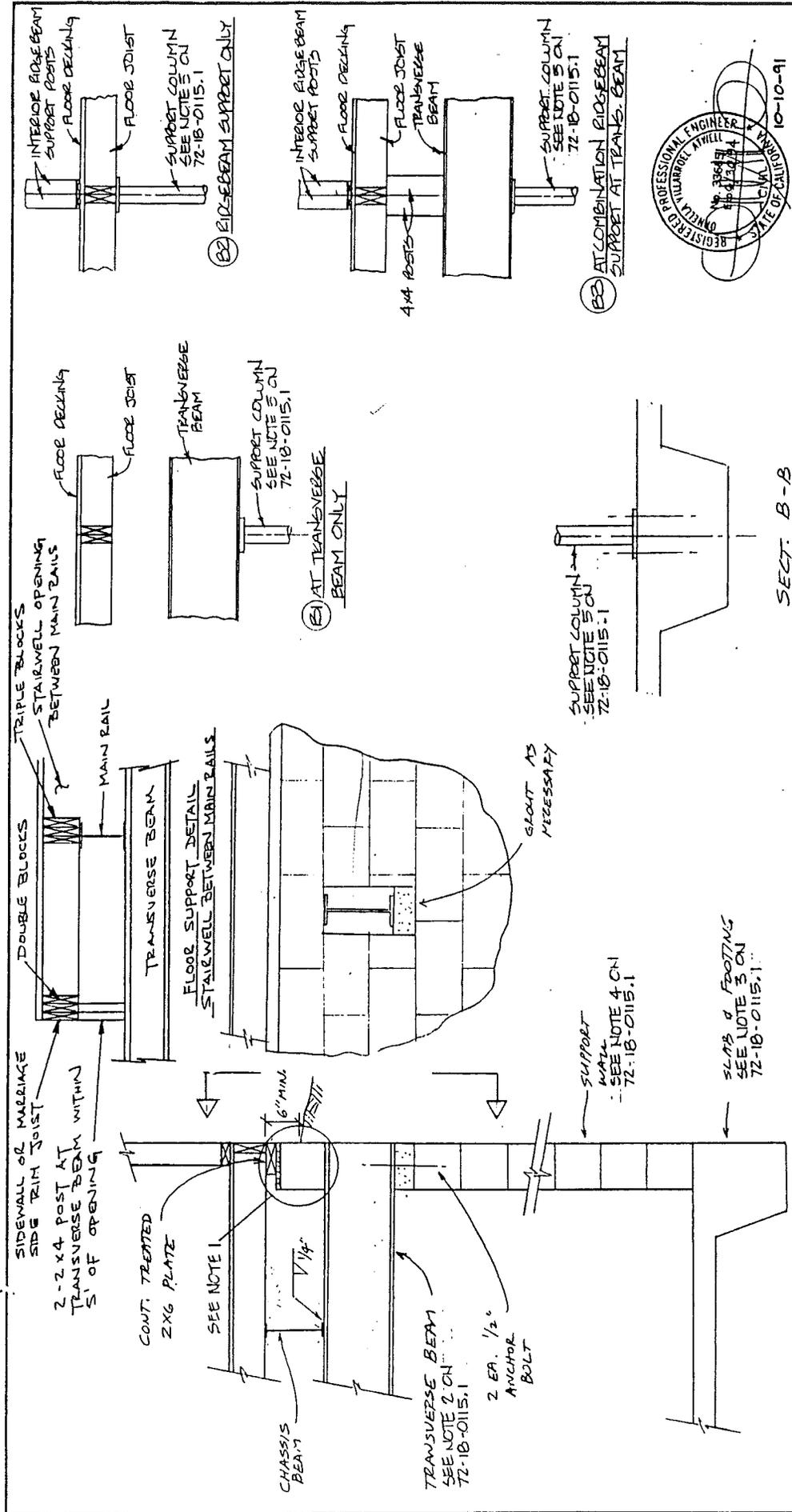


**NOTES:**

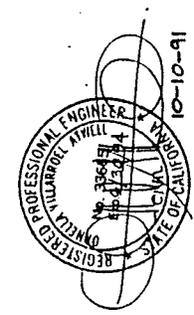
- Piers can be concrete blocks shimmed with wedges or an adjustable metal or concrete assembly.
- Footings can be concrete, foundation grade or pressure treated min. 2 x 12 lumber.
- If soil bearing values are not available use the 1000 PSF column for min. footing sizes.
- Additional information on piers and footings may be found in the Home Technical Installation Manual.

HOUSING CONSTRUCTION  
 & SAFETY DIVISION  
 MAR 27 1991  
 8

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<b>TITLE</b> PIERING PLAN- 30PSF 28' WIDE SECTION		<b>DATE</b> 3-15-91	<b>REV.</b> D



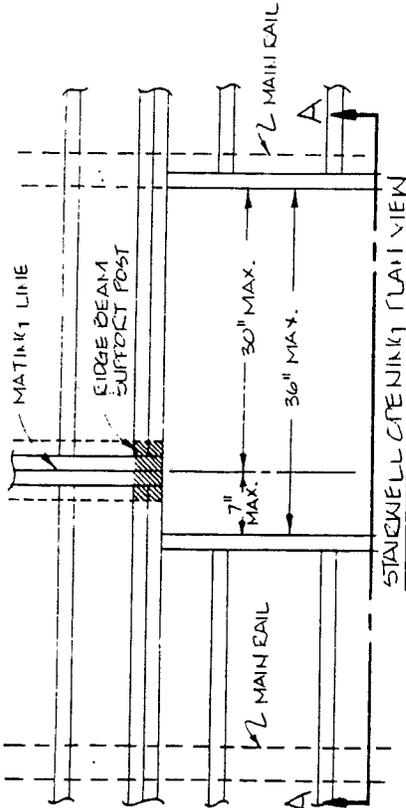
<b>APPROVED</b> HOUSING CONSTRUCTION & SAFETY STANDARDS OCT 18 1991 8		<b>APPROVED</b> PROPRIETARY AND CONFIDENTIAL <small>This drawing and the information contained herein are the property of Fleetwood Enterprises, Inc. and are to be used only for the project and site identified herein. No part of this drawing may be reproduced or transmitted in any form or by any means electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without the prior written permission of Fleetwood Enterprises, Inc.</small> FLEETWOOD ENTERPRISES, INC. 19100 W. 10TH AVE., SUITE 100, DENVER, CO 80233		TITLE SUPPORT SYSTEM FOR MANUFACTURED HOME ON BASEMENT 28" WIDE MAX. 40 PSF ROOF LIVE LOAD	SHEET 7 OF
DRAWN BY EBF	NO. 72-18-0115.2	CALC. CALC.	REV. H	DATE 10-14-91	
INC.	CALC.	CALC.	DATE 10-14-91	NO. 72-18-0115.2	



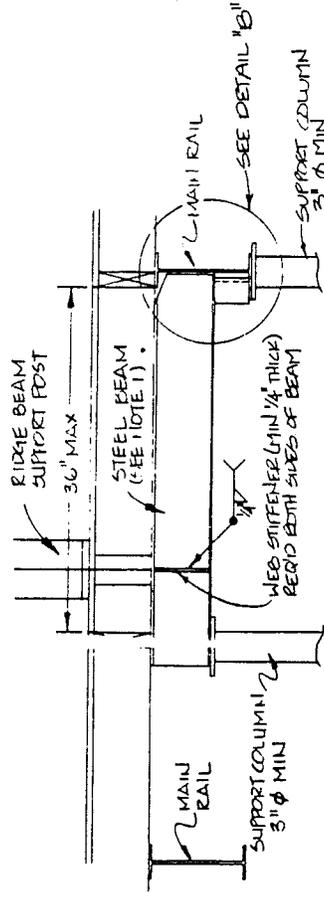
SECT. B-B

SECT. A-A

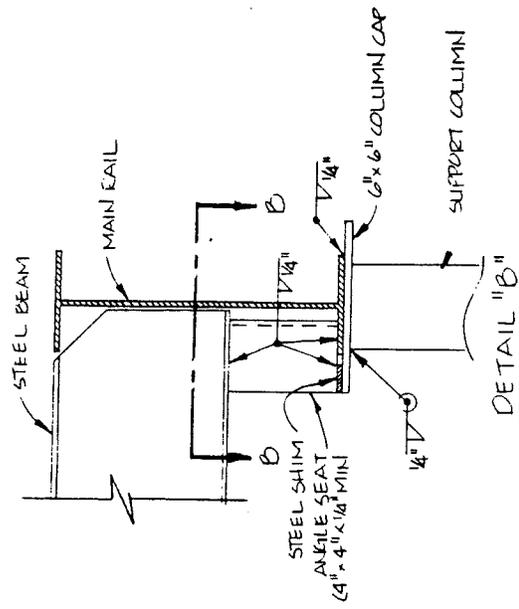
NOTE:  
1. Last row of blocks must be added after house is installed.



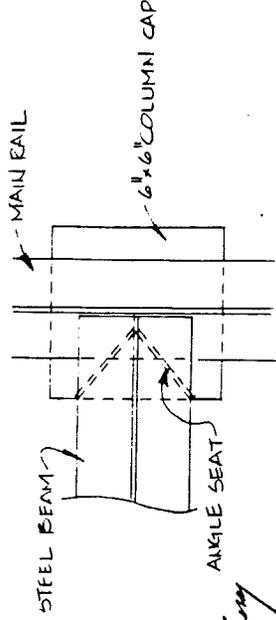
**NOTE:**  
 THIS DETAIL APPLIES ONLY WHEN SUPPORT COLUMN CAN NOT BE LOCATED DIRECTLY UNDER INTERIOR RIDGE BEAM SUPPORT POINTS BECAUSE OF OBSTRUCTIONS, SUCH AS STAIRS.



SECTION A-A



DETAIL "B"



SECTION B-B



MAR 14 1991

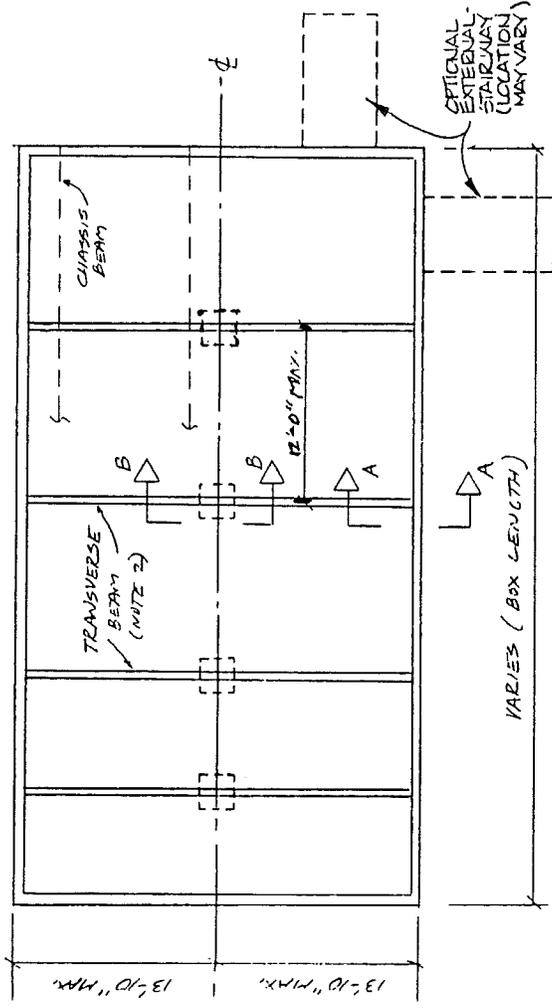
APPROVED  
 HJ HIGGINS, INC.  
 & CITY STAMPING  
 MAR 27 1991  
 8

- NOTES:**
1. Beam should be ASTM A36 with min.  $S_x = 9.00$  cu. in., such as W 6 x 15.
  2. Max. post load (for both halves) is 24,600 lbs. (40 PSF live + 10 PSF dead, 28' wide with 36'-0" trib. span).

PROPRIETARY AND CONFIDENTIAL <small>This drawing and the information contained herein are the property of T. Fleetwood Enterprises, Inc. and are to be used only for the project and location specified. No part of this drawing may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without the prior written permission of T. Fleetwood Enterprises, Inc.</small>		TITLE SUPPORT SYSTEM FOR MANUFACTURED HOME ON BASEMENT 28' WIDE MAX. 40 PSF ROOF LIVE LOAD	SHT. OF 1 1
FLEETWOOD ENTERPRISES, INC. CALC: 0022074 INC.	CALC: 0022074 CALC:	DRAWN BY JACK W.	REV. 5
DATE 3-15-91	CALC:	INO. 72-18-0115.3	REV.

**NOTES:**

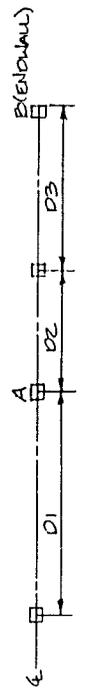
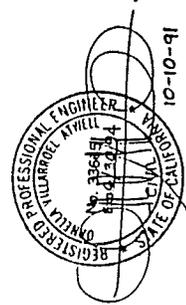
1. All construction must conform to '87 BOCA Code or '88 UBC and all local amendments and ordinances.
2. Transverse steel beam must be M12 x 11.8 or larger (Sx = 12.0 cu. in. min.) and must be ASTM A36 min. Transverse beams shall be spaced no more than 12'-0" apart. Transverse beams may be located under interior ridge beam supports. A support column must be located under each transverse beam and at every ridge beam support along the center line.
3. Concrete floor slab and footing to be designed by others.
4. Support walls to be designed by others. Support wall construction may be reinforced concrete, concrete masonry, all-weather wood, etc.
5. Support column to be designed by others. Support column may be steel pipe, timber post, or stud wall.
6. Any stairways constructed shall be free-standing and shall not transfer any loads to the floor of the manufactured home.
7. Rim joists, floor decking, outriggers or crossmembers in the area of an internal stairwell opening shall be removed after the house is set on the foundation.
8. If used, external stairway shall be located so as not to interfere with the ends of the transverse beams.
9. Support walls (at sidewall of manufactured home) must provide continuous support for the floor similar to that shown on 72-18-0115.2.
10. Temporary bracing should be used to vertically support the transverse beams as the house is rolled over these.



PLAN VIEW

**Warning:**

All structure should be in place (including basement walls, transverse beams, support columns, proper connections and bracing) before any part of the home is placed on the basement. It is the responsibility of the contractor to insure that adequate shoring and temporary bracing are used during the installation process to accommodate any loading other than the final in-place live and dead loads mentioned.



HOME WIDTH FT.	ROOF LIVE LOAD PSF	ROOF DEAD LOAD PSF	WIND		ALONG WALL		TRANS BEAM		GRAVITY		LATERAL	
			MPH	LBS./FT.	LBS./FT.	LBS.	LBS./FT.	LBS.	LBS./FT.	88 UBC	87 BOCA	
28	20	10	80	351	3805	9323	410	B1 + B2	212	6886	171	5712
28	30	10	80	430	3805	9323	547	B1 + B2	212	6886	171	5712
28	-0	10	80	508	3805	9323	683	B1 + B2	212	6886	171	5712

(1) Multiply the B2 value by the support post tributary.  
 (2) Seismic loads for Zone 4 are substituted for wind component. If seismic governs.  
 (3) Uplift never governs over dead loads for 80 mph winds.

**APPROVED** **APPROVAL** **OCT 18 1991** **8**

**HOUSING CONSTRUCTION & SAFETY STANDARDS**

**PROPRIETARY AND CONFIDENTIAL**

**TITLE** SUPPORT SYSTEM FOR MANUFACTURED HOME ON BASEMENT 28' WIDE MAX.

**DRAWN BY** B.F. **NO.** 72-18-0115.1

**DATE** 10-10-91

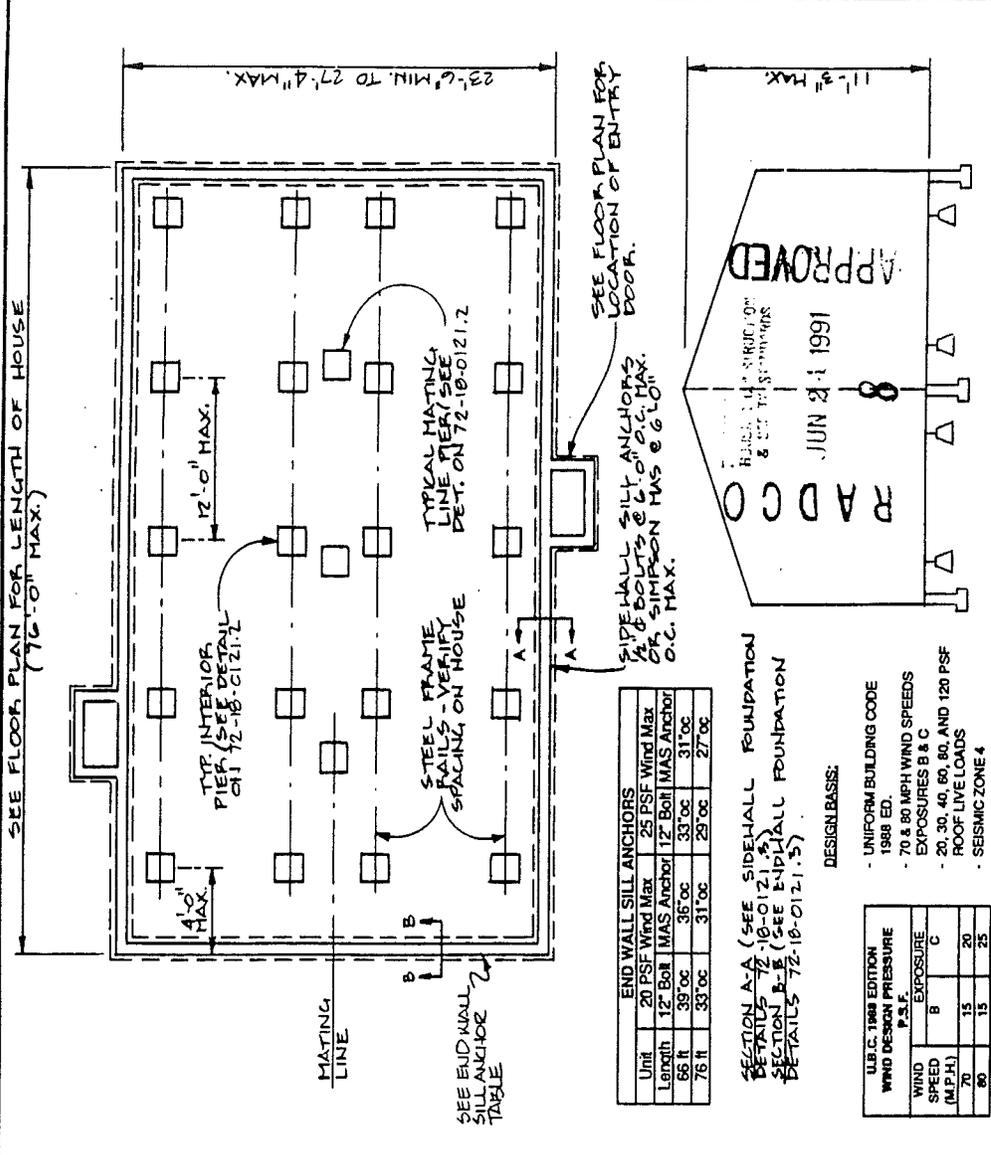
**REV.** H

**INTRODUCTION**

THESE DRAWINGS SHOW FOUNDATION DETAILS WHICH ARE APPLICABLE TO HOMES PRODUCED BY SUBSIDIARIES OF FLEETWOOD ENTERPRISES, INC. THE FOUNDATION PLAN SHOWN IS GENERAL AND IS TO BE ADJUSTED TO MEET THE SPECIFIC HOME BEING INSTALLED. THE FLOOR PLAN FOR THE HOME IS INCLUDED IN THE TECHNICAL INSTALLATION MANUAL PROVIDED WITH EACH HOME. THE MANUAL, FLOOR PLAN AND THESE DETAILS MUST BE USED TOGETHER TO ESTABLISH DIMENSIONS AND LOADS FOR THE FOUNDATION. WHERE THE WORD "MAX." IS USED WITH A DIMENSION, ANY DISTANCE UP TO BUT NOT EXCEEDING THE DIMENSION MAY BE USED. SEVERAL ALTERNATE CONSTRUCTION METHODS ARE SHOWN. ANY COMBINATION OF ALTERNATES MAY BE USED FROM WITHIN THOSE FOR THE DESIGN LOADS APPLICABLE TO THE CONSTRUCTION SITE. FOUNDATION SYSTEM DETAILS USED SHALL BE COMPATIBLE WITH LOCAL SOIL CONDITIONS.

THESE DESIGN DRAWINGS ARE SUPPLEMENTAL TO THE TECHNICAL INSTALLATION MANUAL. DETAILS AND DIMENSIONS OF OTHER TYPES OF FOUNDATIONS IN THE MANUAL ARE NOT APPLICABLE TO THIS DESIGN.

- GENERAL NOTES:**
- Contractor shall verify site conditions and all dimensions prior to starting work. Notify owner of any discrepancies.
  - All work shall conform to the requirements of this design and of the building code adopted by the agency having jurisdiction.
  - Design loads followed shall be consistent with the roof live load, wind load and seismic zone as established for permanent buildings within a specific local area.
  - The ground surface adjacent to the home shall be sloped away from the structure with a gradient of at least 1/2" per foot for a distance of 8' or more. Provisions shall be made for drainage to prevent accumulation of surface water.
  - Provide an 18" x 24" access crawl hole to under-floor area. Provide under-floor area ventilation of a net area of not less than 1 square foot for each 150 square feet of under-floor area. Cover vent openings with corrosion resistant wire mesh not less than 1/4" nor more 1/2" in any dimension.
  - Mating line piers shall be located directly below ridge beam support columns. Support post column locations are shown on the floor plan of the house by [N]. Column numbers are also shown on "Mating Line Pier Detail."
  - Refer to the Technical Installation Manual for ridge beam pier and main rail pier locations and loads. When spacing shown in the manual is less than shown here, the manual shall be followed.
  - Mud sill anchors shall be installed within 12" of each end of sill and at a spacing shown on the foundation plan. Mud sill anchors may be 1/2" dia. bolts or Simpson Strong Tie MAS. Anchor bolts shall be set 7" into concrete.
  - Anchor bolts shall be set 15" into concrete block stem wall.
  - MAS Anchors shall be set into concrete per manufacturer's specifications.
  - Stem wall may be built after house is in place.
  - Wall stems may be concrete or concrete blocks.
  - Concrete shall be 2000 psi minimum at 28 days.
  - Concrete blocks shall conform to ASTM C-90, special inspection not required. Blocks shall be 6" x L x height desired for site conditions. 8" slump stone may be used in lieu of concrete blocks.
  - Mortar mix shall be Type S, Table 24-A of U.B.C. or 1 part Portland Cement, 1/2 part hydrated lime, and 4 parts sand by volume; do not use lime with plastic or waterproof cement.
  - Masonry grout shall be 1 part Portland Cement, 3 parts sand, and 2 parts 3/8" gravel by volume, mixed to pouring consistency.
  - In concrete block stem walls, place a minimum of 2 - #4 reinforcing bars in block with mud sill anchors; fully grout each cell containing rebar. In poured in place concrete stem walls, the minimum vertical reinforcing shall be #4 bars @ 24" o.c.
  - Reinforcing bars for concrete or concrete block foundation shall be deformed bars meeting ASTM A-615, Grade 40. Lap all bars 24" minimum.
  - All lumber in contact with concrete shall be pressure preservative treated or a species approved for use directly in contact with concrete. Individual concrete or masonry piers shall project at least 8" above exposed ground unless the columns or posts which they support are treated wood.
  - Compaction control not required when nominal backfill is used.
  - Obtain from local building authorities the exposure type (C or B) and wind speed (70 mph or 80 mph) applicable to the foundation site. With these values, find the required Wind Design Pressure (See Chart). Use the Wind Design Pressure to determine the required footing dimensions.



END WALL SILL ANCHORS		
Unit	20 PSF Wind Max	25 PSF Wind Max
Length	12" Bolt	MAS Anchor 1/2" Bolt
66 ft	35" o.c.	33" o.c.
76 ft	33" o.c.	29" o.c.
	31" o.c.	27" o.c.

**SECTION A-A (SEE SIDEWALL FOUNDATION DETAILS 72-18-0121.3)**  
**SECTION B-B (SEE ENDWALL FOUNDATION DETAILS 72-18-0121.5)**

- DESIGN BASIS:**
- UNIFORM BUILDING CODE - 1988 ED.
  - 70 & 80 MPH WIND SPEEDS EXPOSURES B & C
  - 20, 30, 40, 60, 80, AND 120 PSF ROOF LIVE LOADS
  - SEISMIC ZONE 4

U.B.C. 1988 EDITION WIND DESIGN PRESSURE		EXPOSURE	
WIND SPEED (M.P.H.)	B	C	
70	15	20	
80	15	25	

APPROVED

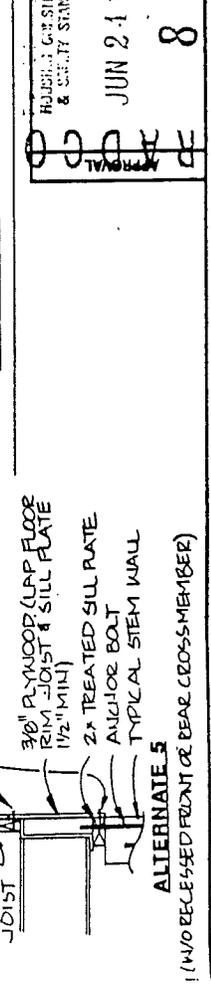
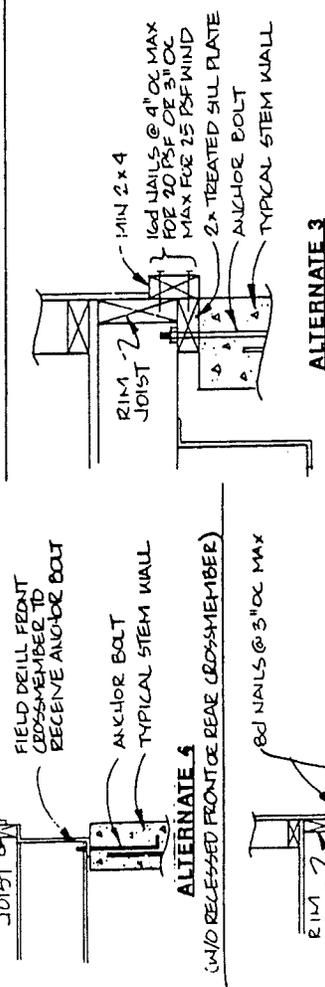
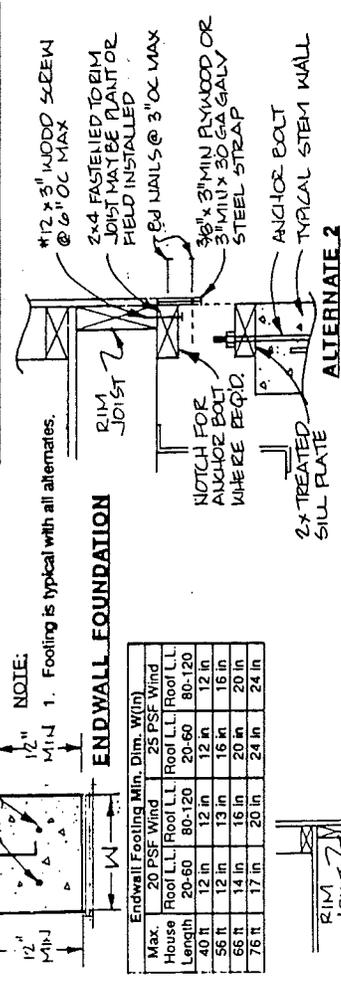
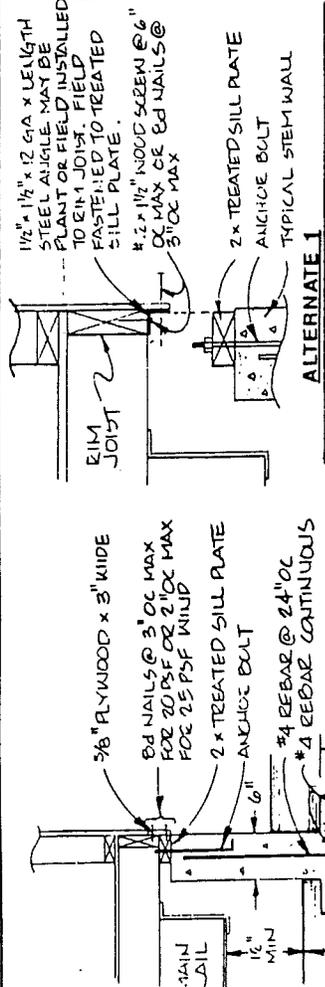
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JUN 24 1991

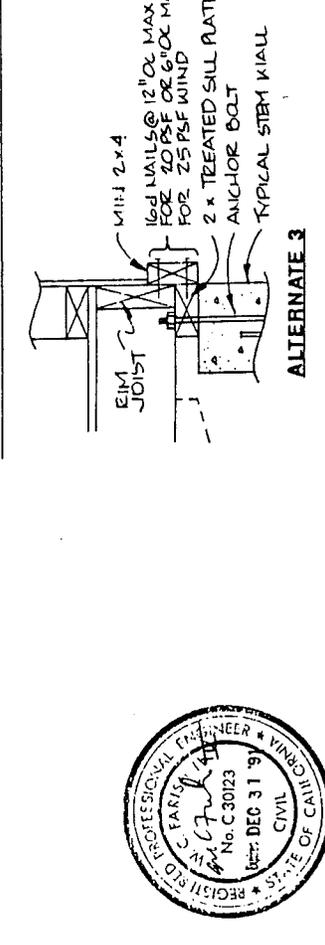
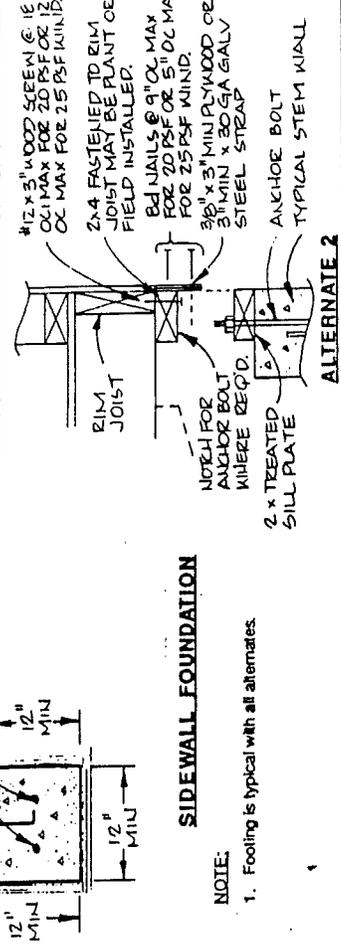
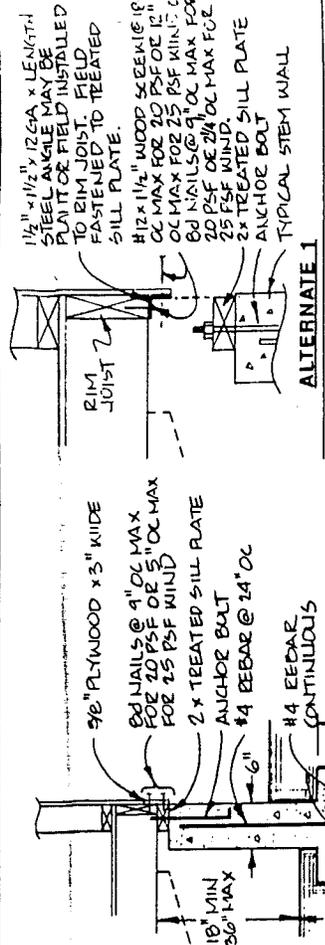
REGISTERED PROFESSIONAL ENGINEER & SURVEYOR

SHT. OF		TITLE		CONCRETE PERIMETER FOUNDATION DETAILS FOR 28" WIDE MAX. HOMES		REV	
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			DRAWN BY	C.C.			
			CALC.	CALC.			
			CALC.	CALC.			
			CALC.	CALC.			
			CALC.	CALC.			





Endwall Footing Min. Dim. W(in)	
Max. House Length	25 PSF Wind
40 ft	20-60
56 ft	20-60
66 ft	20-60
76 ft	20-60
	25 PSF Wind
40 ft	12 in
56 ft	12 in
66 ft	16 in
76 ft	20 in
	25 PSF Wind
40 ft	12 in
56 ft	12 in
66 ft	16 in
76 ft	20 in



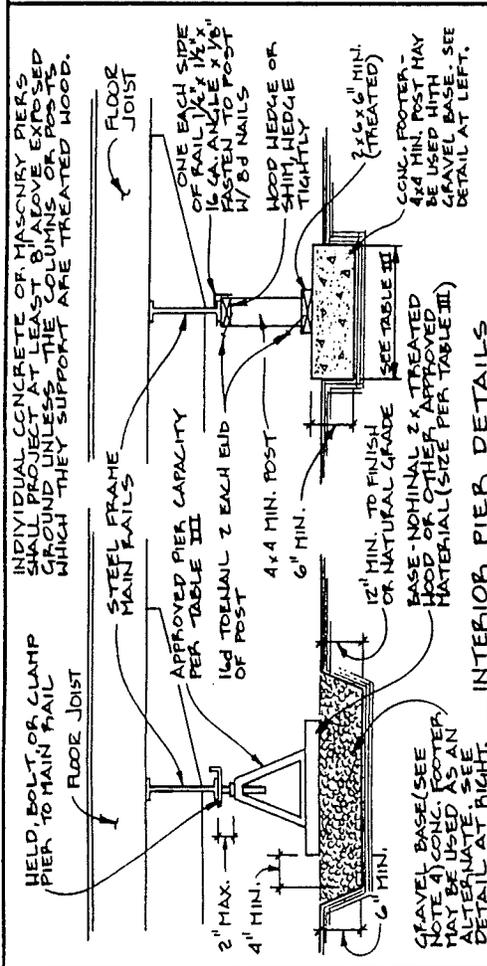
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HOUSEHOLD CONSTRUCTION & SAFETY STANDARDS

JUN 24 1991

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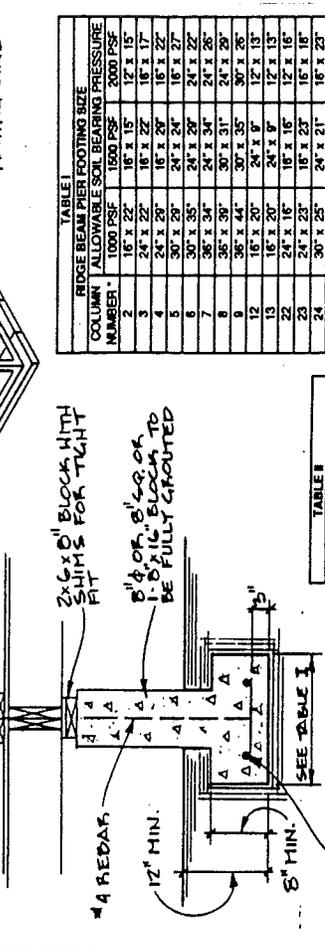
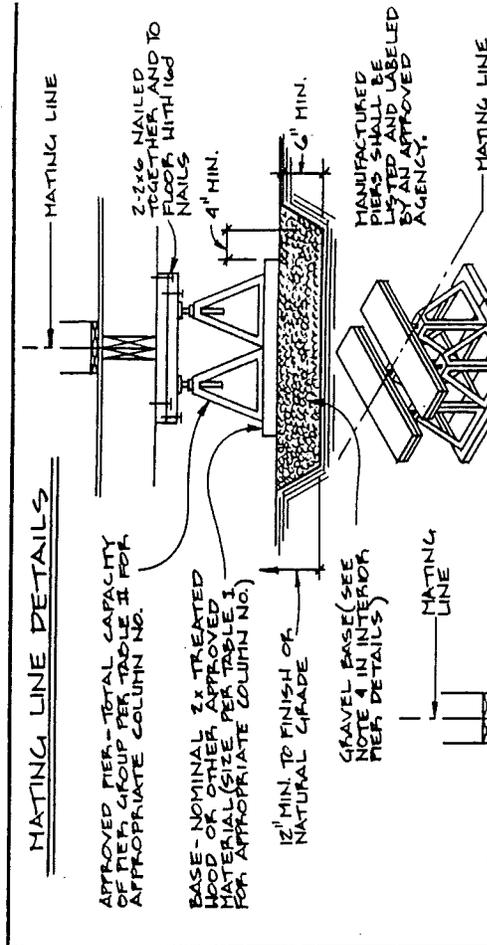
PROPRIETARY AND CONFIDENTIAL	TITLE	CONCRETE PERIMETER FOUNDATION DETAILS FOR 28' WIDE MAX. HOMES
FLEETWOOD ENTERPRISES INC	DRAWN BY	NO.
MC	DATE	72-18-0121.3
		6-6-91



**INTERIOR PIER DETAILS**

MANUFACTURED HOME FOUNDATION SYSTEM - WOOD PADS:

- This type of footing shall consist of a wood pad and a gravel base.
- Fasteners shall be stainless steel or hot-dipped galvanized. Hot-dipped zinc-coated nails shall be coated after manufacture to their final form, including pointing, heading, threading or twisting, as applicable. Electroplated or mechanically plated nails or staples, and hot-dipped zinc-coated nails, shall not be permitted. Staples and nails installed below grade shall be stainless steel types 304 and 316 as defined by the ANSI Classification.
- The gravel base shall be not less than 6 inches thick and shall extend not less than 4 inches beyond all the edges of the wood pads. The bottom of the gravel base shall be a minimum of 12 inches below natural or finished grade.
- Gravel base at footing areas within the zone of load influence to be grouted 3/8-inch to 3/4-inch gravel, or coarse sand not smaller than 1/16-inch grains, or crushed stone having a maximum size of 1 1/2-inch, so constituted and placed to provide an allowable bearing capacity of 3000 pounds per square foot.
- All lumber and plywood required to be preservative treated shall be preservative treated in accordance with the American Wood Preservers Bureau Standard AWPB-FDN. Quality Control Program for Softwood Lumber, Timber and Plywood Pressure Treated with Waterborne Preservatives for Ground Contact Use in Residential and Light Commercial Foundations - 1980. Each piece of lumber or plywood less than 6" above finish grade shall be preservative treated and shall have the following information permanently affixed:
  - Identity of company doing treatment and date of treatment (month and year).
  - Symbol for the type of preservative used.
  - The American Wood Preserver Bureau quality control trademark. (Report No. AA-517).
  - The letters "TSC" specifying "Treatment Services Only" where applicable.
- AWPB-FDN (Identifies authorization under this report).
- Where lumber is cut after treatment, the cut surface shall be brush-coated with not less than 3 percent solution of the same preservative used in the original treatment, or shall be field treated in conformance with AWPA Standard M4-80 using 5 percent solution of pentachlorophenol, copper naphthenate containing a minimum of 2 percent copper metal, a 3 percent solution of ACA, CCA types A, B or C, or a 5 percent solution of FCAP or ACC, or crocoate in conformance with AWPA Standard M4-80 paragraph 1.5.11.



**TABLE I**

RODGE BEAM PIER FOOTING SIZE	ALLOWABLE SOIL BEARING PRESSURE		
2	16 x 22	16 x 15	12 x 17
3	24 x 28	16 x 22	16 x 17
4	30 x 28	16 x 29	16 x 27
5	30 x 28	24 x 24	16 x 27
6	30 x 35	24 x 29	24 x 25
7	38 x 34	24 x 34	24 x 28
8	38 x 39	30 x 31	30 x 28
12	16 x 20	24 x 9	12 x 13
13	16 x 20	24 x 9	12 x 13
22	24 x 16	16 x 16	12 x 16
23	24 x 23	16 x 23	16 x 16
24	30 x 25	16 x 21	16 x 21
25	38 x 26	24 x 26	24 x 20
26	38 x 31	24 x 31	24 x 27
27	38 x 36	24 x 36	24 x 27
31	24 x 18	16 x 18	12 x 18
32	24 x 18	16 x 18	12 x 18
33	24 x 28	16 x 29	16 x 22
34	30 x 28	24 x 22	16 x 22
42	24 x 16	16 x 16	12 x 16
43	24 x 22	16 x 22	16 x 16
50	30 x 33	24 x 28	24 x 21

Applicable column numbers are shown on floor plan for specific houses being installed.

**TABLE II**

COLUMN NUMBER	MIN. REQUIRED PIER CAPACITY
13	2850
14	2850
34	5900
35	5900
36	7800
7, 23, 26, 27	8000
8	10000
9	11000

**APPROVED**

DATE: JUN 21 1991

8

PROPRIETARY AND CONFIDENTIAL

CONCRETE PERIMETER FOUNDATION DETAILS FOR 28" WIDE MAX. HOMES

NO. 72-18-0121.2

DRAWN BY: C.G.

DATE: 6-6-91

REV. QF

INC. ENTERPRISES

CALC. DOZZLOPE

CALC. DOZZLOPE

CALC. DOZZLOPE

CALC. DOZZLOPE

APPROVAL

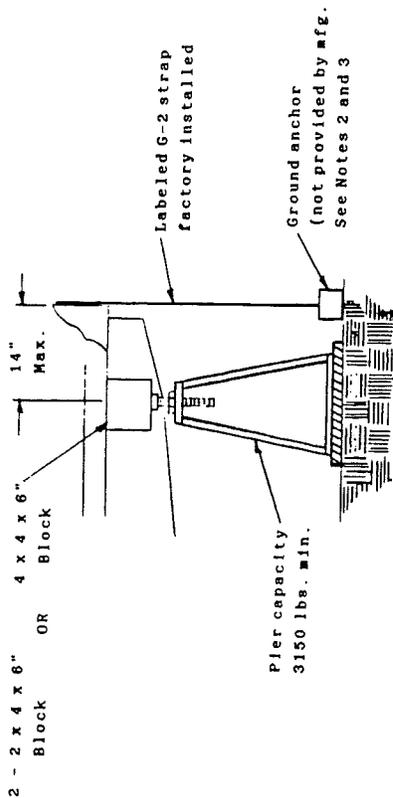
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NO. 13621

EST. 33197

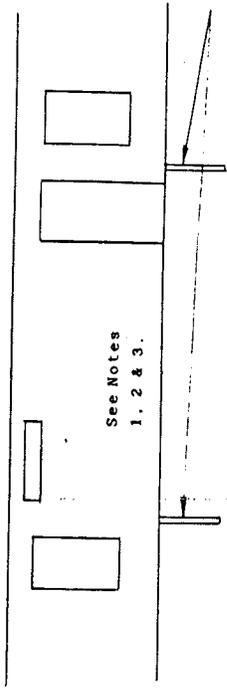
STATE OF CALIFORNIA

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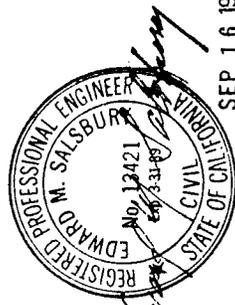


**SHEARWALL TIEDOWN**

1. Shearwall ties shall be installed in accordance with these instructions. The straps have been built into the house.
2. Tiedown strap material shall be 1 1/4" wide x 0.035" thick galvanized with 0.030 oz. per sq. ft.; steel conforming to Federal Specification QQ-S-781-H, Type 1, Finish B, Grade 1 or equivalent. All hardware shall be used in accordance with the anchor manufacturer's instructions.
3. Ground anchors shall be capable of resisting an ultimate load of 4725 lbs. (3150 lbs. design) and shall be installed in accordance with the anchor manufacturer's instructions.
4. Diagonal frame tie strap shall not be attached to the same ground anchor as a shearwall tie strap.

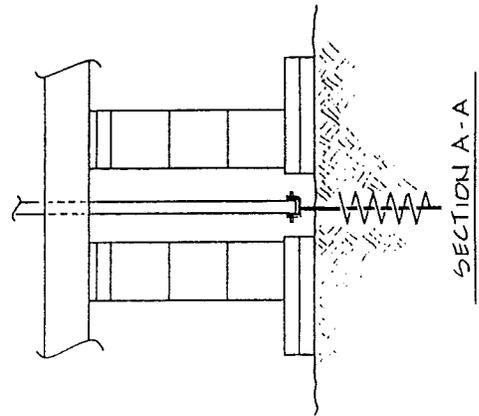
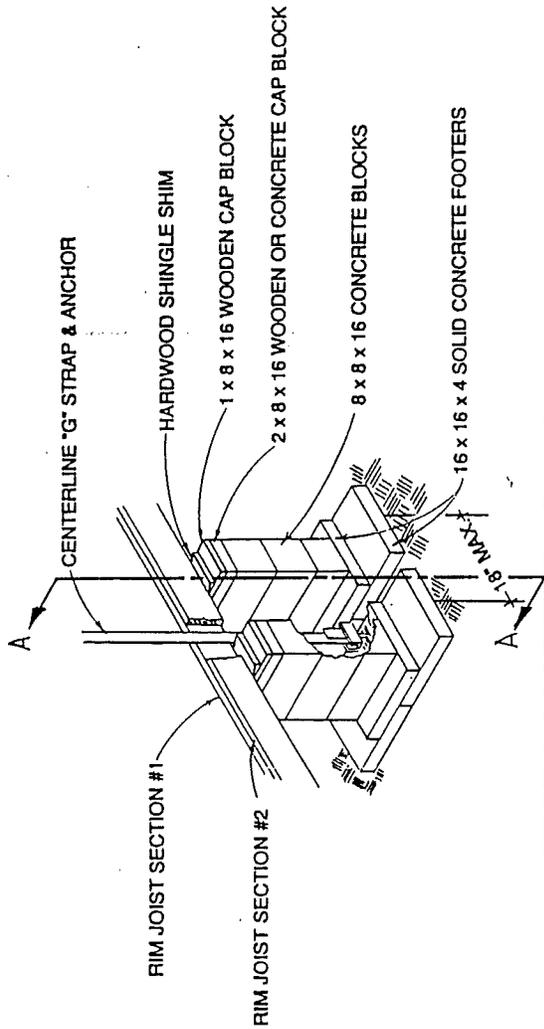


Factory installed shearwall G-2 strap. Number of straps on home may vary.



APPROVED  
 FEDERAL MANUFACTURED HOUSING CONSTRUCTION & SAFETY STANDARDS  
 SEP 16 1987  
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PROPRIETARY AND CONFIDENTIAL <small>These drawings, specifications and other documents are prepared for the exclusive use of the party contracting with the party issuing or preparing them. They are not to be used for any other purpose without the written consent of the party issuing or preparing them.</small>		TITLE SHEARWALL TIEDOWN INSTALLATION		SHT. OF
FLEETWOOD ENTERPRISES, INC.	CALC.	CALC.	DRAWN BY STJ	REV
CALC.	CALC.	CALC.	DATE 9-8-87	72-15-0021



**NOTE:**

1. TOTAL PIER CAPACITY OF THIS SYSTEM ON 1000 PSF ALLOWABLE SOIL BEARING VALUE IS 7112# REGARDLESS OF "G" STRAP ANCHOR INSTALLATION.

APPROVED  
 HADCO  
 SEP 25 1991  
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PROPRIETARY AND CONFIDENTIAL <small>This drawing and the information contained herein are the property of Fleetwood Enterprises, Inc. and are to be used only for the project for which they were prepared. No part of this drawing may be reproduced or transmitted in any form or by any means electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without the prior written permission of Fleetwood Enterprises, Inc.</small> CONTRACT NO. 91 BY FLEETWOOD ENTERPRISES, INC.		TITLE ALTERNATE PIERING AT G-STRAP		SHT. / OF /
FLEETWOOD ENTERPRISES INC.	CALC. CALC. CALC.	CALC. CALC. CALC.	DRAWN BY #1 DATE 9-4-91	NO. 72-15-0031
				REV.

REQUIRED PIER LOAD CAPACITY IN POUNDS	PIER LOAD CAPACITIES AND FOOTING SIZES			
	MINIMUM FOOTING SIZES - ONE PIECE AND 16" X 16" ALLOWABLE SOIL BEARING VALUES			
	1000 PSF	1500 PSF	2000 PSF	3000 PSF
1040	ONE PIECE 16" X 16" SINGLE	ONE PIECE 16" X 16" SINGLE	ONE PIECE 16" X 16" SINGLE	ONE PIECE 16" X 16" SINGLE
1200	12" X 12" SINGLE	12" X 12" SINGLE	12" X 12" SINGLE	12" X 12" SINGLE
1400	12" X 16" SINGLE	12" X 12" SINGLE	12" X 12" SINGLE	12" X 12" SINGLE
1600	12" X 16" SINGLE	12" X 12" SINGLE	12" X 12" SINGLE	12" X 12" SINGLE
1800	12" X 20" SINGLE	12" X 14" SINGLE	12" X 12" SINGLE	12" X 12" SINGLE
2000	12" X 22" DOUBLE	12" X 16" SINGLE	12" X 12" SINGLE	12" X 12" SINGLE
2200	12" X 24" DOUBLE	12" X 16" SINGLE	12" X 12" SINGLE	12" X 12" SINGLE
2400	24" X 14" DOUBLE	12" X 16" SINGLE	12" X 14" SINGLE	12" X 12" SINGLE
2600	24" X 16" DOUBLE	12" X 22" SINGLE	12" X 16" SINGLE	12" X 12" SINGLE
3000	24" X 18" DOUBLE	24" X 12" DOUBLE	12" X 18" SINGLE	12" X 12" SINGLE
3200	24" X 20" DOUBLE	24" X 14" DOUBLE	12" X 20" SINGLE	12" X 14" SINGLE
3400	24" X 22" DOUBLE	24" X 14" DOUBLE	12" X 22" SINGLE	12" X 14" SINGLE
4000	24" X 24" DOUBLE	24" X 16" DOUBLE	24" X 12" DOUBLE	12" X 16" SINGLE
4400	24" X 26" DOUBLE	24" X 18" DOUBLE	24" X 14" DOUBLE	12" X 18" SINGLE
4800	24" X 28" DOUBLE	24" X 20" DOUBLE	24" X 16" DOUBLE	12" X 20" SINGLE
5200	24" X 30" DOUBLE	24" X 22" DOUBLE	24" X 18" DOUBLE	12" X 22" SINGLE
6000	36" X 24" DOUBLE	24" X 24" DOUBLE	24" X 18" DOUBLE	24" X 12" DOUBLE
6400	36" X 26" DOUBLE	24" X 26" DOUBLE	24" X 20" DOUBLE	24" X 14" DOUBLE
7100	36" X 28" DOUBLE	24" X 28" DOUBLE	24" X 22" DOUBLE	24" X 16" DOUBLE
7600	36" X 30" 2-QUADS	24" X 30" DOUBLE	24" X 24" DOUBLE	24" X 16" DOUBLE
8000	36" X 32" 2-QUADS	24" X 32" DOUBLE	24" X 24" DOUBLE	24" X 16" DOUBLE
8600	36" X 36" 2-QUADS	24" X 34" DOUBLE	24" X 26" DOUBLE	24" X 18" DOUBLE
9200	36" X 38" 2-QUADS	24" X 36" DOUBLE	24" X 28" DOUBLE	24" X 20" DOUBLE
10000	36" X 40" 2-QUADS	36" X 28" DOUBLE	24" X 30" DOUBLE	24" X 20" DOUBLE
11000	36" X 44" 2-QUADS	36" X 30" 2-QUADS	24" X 34" DOUBLE	24" X 22" DOUBLE
12000	36" X 48" 2-QUADS	36" X 32" 2-QUADS	24" X 36" DOUBLE	24" X 24" DOUBLE

2-QUADS - TWO (2) QUAD FOOTINGS SIDE BY SIDE WITH TWO (2) PIERS DISTRIBUTING THE LOAD.

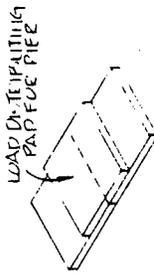
**NOTES:**

- Maximum pier spacing for 12/24, 13/26, 14/28, 16/32 & 14/28 wide is 8'-0" o.c. (Spacing reduced to 7'-0" maximum on 14/28 wide units only when main rail is 8")  
Maximum pier spacing for 16" wide is 6'-0" o.c.  
Maximum pier spacing for 18" wide is 5'-0" o.c.
- Footings to be minimum 4" nominal unit reinforced concrete.
- Pier loads and/or pier spacing determined in accordance with this page may be used in lieu of the pier spacing under conditions shown in the Piering Plan drawing as long as the maximum spacing is not exceeded per note 1.  
Other requirements of the Piering Plan drawing are to be followed.



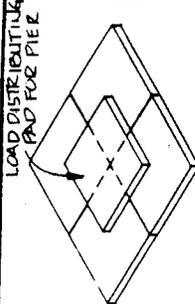
MAX CAPACITY SEE CHART  
SINGLE FOOTING

ALLOWABLE S.O.I. BEARING VALUE	MAX. LOAD ON SINGLE 16" X 16" PAD
1000 PSF	1778 LBS
1500 PSF	2667 LBS
2000 PSF	3556 LBS
3000 PSF	5334 LBS



MAX CAPACITY SEE CHART  
DOUBLE FOOTING

ALLOWABLE S.O.I. BEARING VALUE	MAX. LOAD ON DOUBLE 16" X 16" PAD
1000 PSF	3556 LBS
1500 PSF	5334 LBS
2000 PSF	7112 LBS
3000 PSF	10668 LBS



MAX CAPACITY SEE CHART  
QUAD FOOTING

ALLOWABLE S.O.I. BEARING VALUE	MAX. LOAD ON QUAD 16" X 16" PAD
1000 PSF	14224 LBS
1500 PSF	21336 LBS
2000 PSF	28448 LBS
3000 PSF	42672 LBS

**FORMULA TO DETERMINE SPACING AT MAIN RAILS USING SINGLE PAD FOOTINGS**

To determine the on center spacing using (1) one 16" x 16" footing pad calculate the following using the example shown:

Pier Load Capacity      Max. On Center      Load On Main Rail  
 From Piering Plan Dwg      Main Rail Spacing      Per Linear Foot  
 4550 lbs      +      8'-0"      =      569 lbs  
  
 Max Load On      Load On Main Rail      Max. On Center  
 Single Pad      Per Linear Foot      Spacing  
 1778 lbs      +      569 lbs      =      3'-1" on center  
 (1000 per Soil)

**TO DETERMINE FOOTING SIZE FOR VARIOUS ON CENTER SPACING**

Using the determine load on main rail per linear foot (569 lbs) multiplied by the on center spacing desired will determine the type footing required.

Example:  
 569 lbs x 5' o.c. = 2845 lbs = 24" x 18" footing or double footing configuration.  
 or  
 569 lbs x 7' o.c. = 3983 lbs = 24" x 24" footing or quad footing configuration.



APPROVED: **RADCO**  
 HOSKINS CONSULTING & SHEET SERVICES  
 MAR 27 1991  
 8

PROPRIETARY AND CONFIDENTIAL  
 FLEETWOOD ENTERPRISES INC.  
 TITLE: PIER LOAD CAPACITY USING ONE PIECE FOOTINGS OR 16" X 16" FOOTINGS  
 DRAWN BY: *[Signature]*  
 DATE: 3-15-91  
 NO. 72-17-0064  
 REV. B