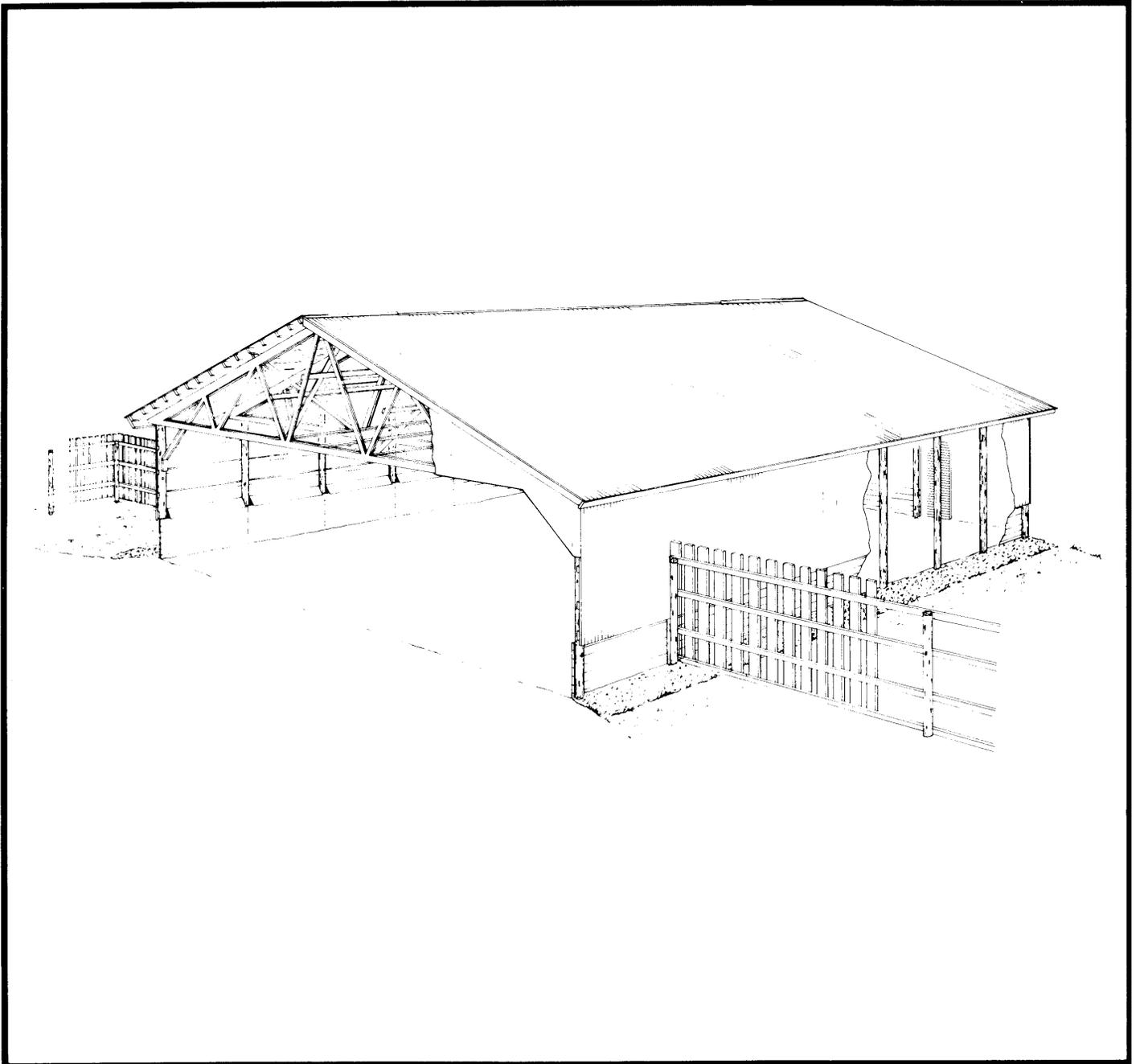




## OPEN END POLE BARN



The Canada Plan Service prepares detailed plans showing how to construct modern farm buildings, livestock housing systems, storages and equipment for Canadian Agriculture.

This leaflet gives management information and describes one of these detailed plans. To obtain a copy of the Canada Plan Service detailed plan, contact your local provincial agricultural engineer or extension advisor.

## OPEN END POLE BARN

### PLAN M-8161 Rev. 81-09

This plan consists of 4 sheets giving details for a general purpose livestock loose-housing barn. This barn is open at one end (for ventilation and livestock traffic) instead of along one side. This makes it especially suitable for sheltering a bedded area for beef or dairy cattle: with over 3.4 m clearance from floor to roof trusses, the manure pack can accumulate all winter and be removed easily with tractor and manure loader when fields are ready for manure spreading.

**LOCATION** This barn should face with the open end to the south so that the bedded area gets plenty of sunlight, yet is sheltered from cold winter winds. To keep runoff out of the feedlot, locate only the open end and one 2.4 m bent of the long walls within the feedlot fence. This creates a "wind pocket" outside each corner at the open front, helping to reduce wind and snow problems inside.

Build on a high, well drained site. This plan shows an earth floor, which should be filled to about 300 mm above the original outside grade to prevent water from draining into the bedded area. If only soft clay is available for fill, tractors and hooves will cut into the soil; in this case a paved floor such as concrete or asphalt is recommended. To collect roof drainage, spread a strip of gravel along the side walls, in preference to eaves-troughing.

**CONSTRUCTION FEATURES** For versatility and ease of cleaning, this building has a post-free interior using roof trusses spanning 12, 15 or 18 m, depending on requirements. Roof trusses should be selected for local design snow loads, using either the CPS doubled nailed truss designs or commercial prefabricated trusses. Trusses are bolted to wall poles at 2.4 m on center, and the roofing is nailed to purlins 3.0 m long placed on edge over the trusses to span the 2.4 m truss spacing.

Where a heavy-duty truss spaced at 2.4 m centers will support the design snow load, use a single truss bolted to notched poles. For heavier snow loads, make the pole notches wider and use two trusses nailed together, hoisted as one, and bolted securely into the pole. For roof purlins use 3.0 m lengths on edge and make a strong 600 mm lap joint over each truss or truss pair. This doubles the purlin material where the greatest bending strength is required, and is considerably cheaper than using bigger purlins with the ends butted at each truss. With purlins lapped, there is no careful cutting and fitting required, but remember to offset the nailing of the roofing. Purlins must be very securely tied to the trusses to prevent uplift due to wind; use either wood cleats or galvanized steel nailing clips at each purlin-to-truss connection.

The walls are framed on pressure-treated wood poles, with either treated planking or concrete infill panels to close the base of the walls. Planking is spiked to the inside of the poles so that the wall is smooth for easier removal of manure.

To start the walls, dig or auger the holes about 1.5 m deep in the ground, then pour a concrete footing at the bottom of each hole. Pour and tamp the concrete footings to an exact level line 1.2 m below the floor datum elevation. This step is very important, since the truss-notches and bolt holes can be measured and cut into the wall poles before erecting; this is much quicker and more accurate than notching and drilling the poles after erecting, by working from a scaffold or ladder.

Bolt the trusses securely to the poles and immediately cross-brace the end pairs of trusses to prevent a truss collapse if a wind should come up during or after construction. Plan M-9102 gives requirements for bracing and lateral support of trusses.

Wall exterior siding may be vertical galvanized steel, exterior plywood or aspenite, or vertical boards. With metal siding, cattle can easily dent the walls unless extra guard rails are added wherever they can reach it. Many feedlot operators prefer rough-sawn vertical boards for siding; this will continue to look good over the years if coated with a penetrating wood stain.

**VENTILATION AND LIGHTING** The open-end barn gives better wind and snow protection than the open-front types, but is more likely to "sweat" with moisture from the livestock and manure pack inside. An open ridge ventilation slot is essential to control this sweating, especially during cold nights without much wind. Stop the ridge vent about 2.4 m from each end wall to keep out downdrafts and snow where the ends of the roof ridge deflect wind and cause strong air turbulence. Slots at the eaves are also required to improve air circulation under the roof. To reduce snow infiltration, it is important to open these eave slots just behind the face boards, not adjacent to the wall.

For summer, large sliding doors in the back end wall can be opened wide for good wind circulation. These doors are also convenient for adding bedding and hauling out manure without going through the feedlot. Poles hung across the inside of the sliding door openings help prevent manure pressure from pushing against the doors. If these poles are hung on short loops of chain, they can be removed easily whenever the doorways are used for access.