

This drawing is based on a design prepared by the **Moffett Plan Service (MPPS)** of Iowa State University. For more specific details concerning the design refer to **Moffett Plan Service Publication M-5, Circular Concrete Manure Tanks (March 1988)**. This drawing may be used for tanks which are above or below ground. The design is in accordance with ultimate strength design requirements detailed in ACI 318-95.

**Design Loading:**

1. Manure load: 65 psf/ft. of depth.
2. Soil backfill load: 65 psf/ft. of depth with no surcharge or 80 psf/ft. of depth with 120 psf elevated surcharge. This requires the structure backfill to be adequately drained. To meet this requirement see backfill details on this sheet.

**Construction Notes:**

1. Reinforcing steel for footing and walls shall have a tension yield point of  $f_y = 60,000$  psi. Refer to Sheet 2 for floor reinforcing steel grades.
2. For safety implies refer to the table on Sheet 2. All bands in reinforcing steel shall have a minimum inside radius of 3 bar diameters.
3. All concrete shall have a minimum 28 day compressive strength of 4,000 psi. The mix design shall be submitted to MPPS prior to placement. Unless shown otherwise in the construction specifications, the following requirements shall apply:
  - Cement shall be Type I or Type II
  - Slump – 4 inches plus or minus 1 inch.
  - Air content from 5 to 7 percent
  - Aggregate size – maximum of 1 inch diameter
  - Construction joints – cleaned prior to subsequent concrete placement.
  - Cure concrete for a minimum of 7 days – acceptable methods are:
    - membrane forming curing compound of rate of 1 gal/150 sq ft.
    - leaving the forms in place
    - hooding / continuous spray

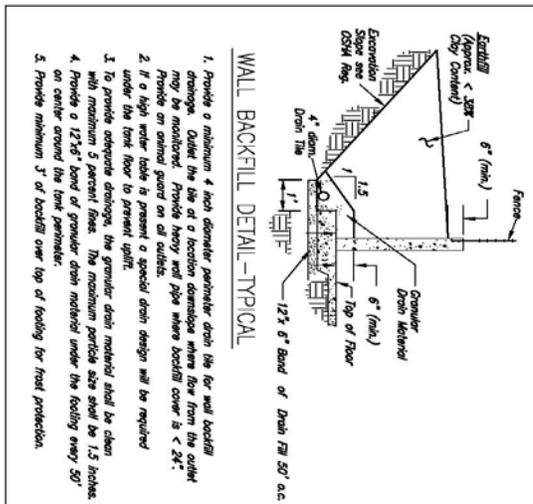
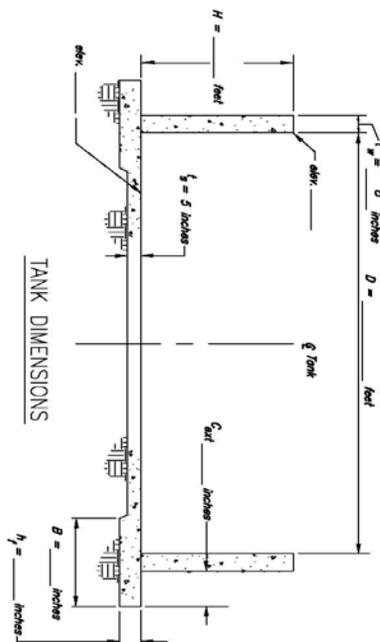
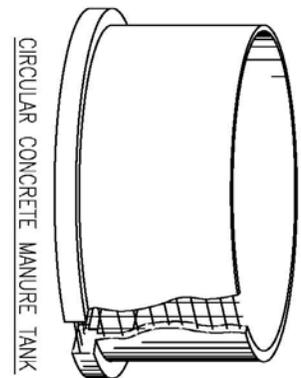
4. Construction joints may be used to ease construction. The location of construction joints shall be approved by the Engineer prior to placing the concrete.
5. Refer to manufacturer's recommendation for placing workmanship methods.
6. Backfill shall be brought up uniformly around the tank. The maximum difference in the finished backfill elevations around the tank shall be 4 feet.
7. All construction methods shall meet OSM regulations.
8. Installation of this structure shall conform to MPPS Construction Specification 31A.

**Safety Considerations:**

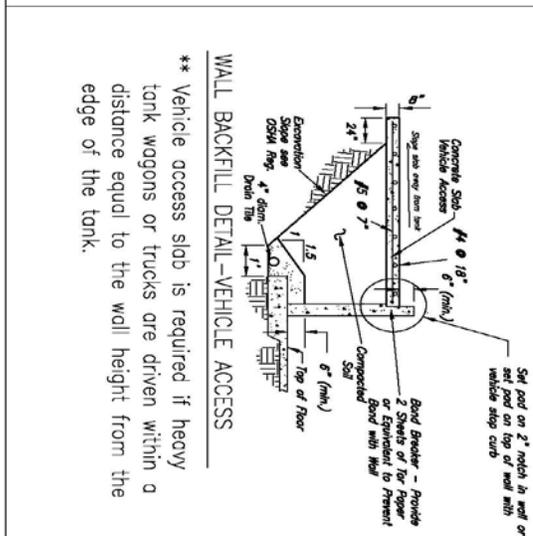
1. The tank shall be surrounded by a chain link or woven wire fence.
2. Posts shall not be cast into the concrete wall unless an 8" rebar is welded to the base of the post and the posts are capped at time of installation.
3. Safety steps shall be installed of pushoff locations to prevent accidental entry of equipment.
4. Warning signs shall be erected around the tank indicating that entry may result in injury or death.

**Vehicle Access**

If heavy tank wagons, or trucks will be driven within a distance equal to the wall height from the edge of the tank, cast a 8 inch thick concrete slab along the traffic route by the tank. The concrete slab should be large enough to eliminate any wheel loads directly on the natural ground or backfill by the tank. The purpose of the slab is to distribute the loading along the tank wall and prevent mud and erosion.



1. Provide a minimum 4 inch diameter granular drain for wall backfill drainage. Detail the size of backfill depending where flow from the outlet may be contained versus flow where backfill cover is < 24".
2. If a high water table is present a special drain design will be required under the tank floor to prevent uplift.
3. To provide adequate drainage, the granular drain material shall be clean with maximum 5 percent fines. The maximum particle size shall be 1.5 inches.
4. Provide a 12"x6" band of granular drain material under the footing away 50' on center around the tank perimeter.
5. Provide minimum 3" of backfill over top of footing for frost protection.



\*\* Vehicle access slab is required if heavy tank wagons or trucks are driven within a distance equal to the wall height from the edge of the tank.

