

Watering Facility (No.) 614

DEFINITION

A permanent or portable device to provide an adequate amount and quality of drinking water for livestock and or wildlife.

PURPOSE

To provide access to drinking water for livestock and/or wildlife in order to:

- Meet daily water requirements
- Improve animal distribution

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and/or wildlife

CRITERIA

General Criteria Applicable To All Purposes

Watering facilities shall be planned, designed, and installed to meet all federal, state, local, and tribal laws and regulations.

Vegetation. Disturbed areas shall be established with vegetation or otherwise stabilized as soon as practical after construction. Seedbed preparation, seed fertilizing, and mulching shall conform to NRCS conservation practice standard Critical Area Planting (342).

Use vegetation adapted to the site that will accomplish the desired purpose. Preference shall be given to native species in order to reduce the introduction of invasive plant species; provided management of existing invasive species; and minimize the economic, ecological, and human

health impacts that invasive species may cause. If native plant materials are not adaptable or proven effective for the plant use, then non-native species may be used. Refer to the Field Office Technical Guide, Section II, Invasive Plant Species, for plant materials identified as invasive species.

Criteria Applicable to Trough or Tank Type Watering Facilities

Include design elements to meet the specific needs of the animals that are planned to use the watering facility, both livestock and wildlife.

Incorporate escape features into the watering facility design *unless* local knowledge and experience indicate that wildlife *will not* be at risk of drowning.

Capacity. Design watering facilities with adequate capacity and supply to meet the daily water requirements of the livestock and/or wildlife planned to use the facility. Include the storage volume necessary to provide water between periods of replenishment.

For livestock, use a minimum of one gallon per day per 100 pounds of body weight to calculate the daily water requirement. Livestock include, but not limited to, cattle (beef or dairy), horses, mules, donkeys, camelids, captive cervids, sheep, goats, and hogs. Livestock fed dry feeds and dry hay containing only 10% to 12% moisture will require more water than grazing on lush, green grass which averages 75% to 80% moisture. All animals require more water as day time temperatures increase above 50 degrees. Use a minimum of two gallons per day per 100 pounds of body weight to calculate the daily water requirement for the following conditions:

- Providing water for lactating females. Lactating females require more water than other females and are affected by pounds of milk produced.
- Grazing periods are 14 days or longer.
- Pastures are used without a rest period during the grazing season.

For wildlife, base water quantity and quality requirements on targeted species needs.

Within a pasture, water storage capacity or other water sources shall be provided to meet water requirements for a minimum of 3 days where water supply, pipeline, power, or pump failure could cause loss of pipeline supplied water. However, where water supplies are dependable and livestock are checked daily, troughs with little water storage capacity may be used.

Location. Locate facilities to promote even grazing distribution and reduce grazing pressure on sensitive areas. Design the watering facility to provide adequate access to the animals planned to use the facility.

In gentle relief areas that are nearly level to gently sloping, watering facilities may be located with a livestock travel distance of up to 0.25 miles where needed to enhance the grazing distribution. As relief becomes more steep or hilly, reduce the maximum livestock travelling distance to 0.10 mile.

To decrease concentration of livestock near sensitive areas, locate the water facility as far away as possible while maintaining the required travel distance. Sensitive areas include, but are not limited to, areas where there is risk of sediment and/or pollutant delivery to perennial and intermittent streams, creeks, drainage ditches, springs, ponds, wells, steep slopes, rapidly permeable soils, wetlands, woodlots, scenic value sites and cultural resource areas.

Overflow. Where water is supplied continuously or under pressure to the watering facility, use automatic water level controls to control the flow of water to the facility and to prevent unnecessary overflows, as appropriate.

Overflow facilities shall be installed on all watering facilities where inflow is not controlled by automatic flow control switches or valves.

Overflows shall be piped to a stable or suitable point of release to prevent erosion or hazardous conditions at the overflow outlet. The overflow outlets shall be protected from damage with rock, steel pipe, concrete, or other durable material. The overflow shall extend a minimum of 20 feet beyond the tank. The overflow pipe shall be a minimum of 1/2 inch larger than the inflow pipe or 2 inches, whichever is larger.

Protection. All components of the watering facility system including valves and controls shall have appropriate protective structures installed that will protect them from damage by livestock, wildlife, *freezing, ice damage*, or other site-specific hazards.

Protect areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns. The site shall be well drained, or drainage measures shall be provided. Areas adjacent to the trough or tank that will be used by livestock shall be graveled, paved, or otherwise treated to provide firm footing and reduce erosion. Design of the protective surface around the trough shall be in accordance with Michigan NRCS practice standard Heavy Use Area Protection (561). This practice shall be extended to a minimum of 6 feet beyond the trough or tank

Install permanent watering facilities on a firm, level, foundation that will not settle differentially *such as bedrock, compacted gravel and stable, well compacted soils*. Where these materials are not present, the bottom shall be placed on a minimum 4-inch *compacted* layer of fine gravel or sand.

Design and install watering facilities to prevent overturning by wind and animals.

Materials. Construct watering facilities from durable materials that have a life expectancy that meets or exceeds the useful life of the installation. Tanks and troughs shall be designed to withstand all anticipated internal and external loadings. *Follow appropriate NRCS design procedures for the material being used or industry standards where NRCS standards do not exist.*

Lightweight troughs or tanks made of fiberglass, plastic, wood, or steel may be moveable or permanent installations.

Concrete Tanks or Troughs. Concrete structures shall be constructed from a concrete mix producing a minimum compressive strength of 3,000 psi at 28 days. Concrete construction shall be in accordance with NRCS Construction Specification MI-158 Concrete Construction.

Acceptance of pre-cast components shall be based on an engineering analysis provided by the supplier. If placement requirements are an integral

part of the design, then placement specifications shall be required.

Interior walls of troughs or tanks subject to freezing shall have a minimum taper of 1 inch horizontal to 12 inches vertical.

Steel Tanks. All steel tank material shall be galvanized, stainless steel, or factory coated with plastic or epoxy in a manner suitable for use in high exposure conditions.

Top edges of tanks shall be reinforced with rolled pipe, galvanized tube angle iron, or other suitable reinforcement. Top edge reinforcement is not required for corrugated steel, 12 gauge or heavier.

Tanks with steel bottoms shall be minimum 24 gauge for less than 6 feet diameter, and 20 gauge for larger diameters.

The bottom shall be joined in such a manner as to provide a locked and water tight seam. The underside bottom shall be thoroughly coated with asphaltic compound or other suitable permanent waterproof coating prior to final placement.

Where the trough or tank steel rim and concrete floor join, a heavy coating of a non-conductor of electricity such as asphalt or similar coating shall protect the metal rim.

Steel walls for concrete, bentonite, or membrane bottom tanks shall be constructed of galvanized steel not less than 16 gauge.

Fiberglass. Fiberglass tanks or troughs shall have a nominal minimum thickness of 3/16 inch.

Fiberglass structures shall be made of ultraviolet resistant materials or shall have a durable coating to protect the structure from deterioration due to sunlight.

Fiberglass for use in tanks with concrete bottoms shall have a minimum nominal thickness of 1/4 inch.

The tank top edge shall be flanged reinforced by a 2 inch straight flange, minimum of 3/8 inch thick or 2 inch curled or rolled flange, minimum of 1/4 inch thick.

Plastic. Plastic tank or troughs shall be made of HDPE or equivalent materials.

Where a plastic tank or trough is planned to be used during winter weather, a deicer mechanism shall be installed to prevent freezing conditions within the tank or trough.

Plastic structures shall be made of ultraviolet-resistant materials or shall have a durable coating to protect the structure from deterioration due to sunlight

Pipelines. Use the criteria in NRCS Conservation Practice Standard Pipeline (516) to design piping associated with the watering facility. Include backflow prevention devices on facilities connected to wells, domestic or municipal water systems.

Roofs. Roofs may be placed over the trough or tank to provide shade and reduce loss of water by evaporation.

When a roof is placed over the trough or tank to provide shade, the roof shall be designed for snow and wind loads as specified in *the current Michigan Building Code* and shall be durable to withstand anticipated livestock and wildlife activities.

Criteria Applicable to Surface Water Livestock Access Type Watering Facilities

Design of surface water livestock access type watering facilities shall be in accordance with the following criteria in the NRCS conservation practice standard Stream Crossing (578):

- Additional Criteria Applicable to Ford-Type Crossings
- Location, Width, Side Slopes, Stream Approaches, Rock, Fencing, and Vegetation sections of General Criteria Applicable To All Purposes

Ramp slope shall be 6H:1V or flatter for surface water livestock access watering facilities.

Surface water livestock access type watering facilities shall extend into the surface water only as far as needed to provide access for watering.

Provide livestock watering access locations, at least one every quarter mile in accordance with NRCS conservation practice standard Prescribed Grazing (528).

Investigate required federal, state, and local permits depending on the jurisdictional authority for the stream, county drain, or inter-county drain. Permits that may apply include, but are not limited to, the following:

1. Part 301, Inland Lakes and Streams, of the Natural Resources and Environmental Protection Act, 1994, P.A. 451. Permits for development of surface water livestock access-type watering facilities if any of the following occurs:
 - A. Dredging or other disruption of stream bottom material;
 - B. Filling, including the placement of concrete, gravel, crushed stone, rock, or peastone;
 - C. Sloping and shaping of the immediate streambank, and other land alteration within 500 feet of the stream;
 - D. Construction of ponds within 500 feet of a lake or stream;
 - E. Alteration of wetland areas;
 - F. Disruption of flood flows; or
 - G. Certain streams classified by state and federal governments as wild and scenic rivers may have additional restrictions.
2. Permit from the County Drain Commissioner, County Drain Board, or Inter-County Drainage Board if surface water livestock access-type watering facility is constructed along county drains.

CONSIDERATIONS

Consider the potential effects of installation and operation of the watering facility on cultural, archaeological, historic and economic resources.

Considerations Applicable to Trough or Tank Type Watering Facilities

Consider designing fences associated with watering facilities to allow safe access and exit for area wildlife species. To protect bats and other species that access water by skimming across the surface, fencing material should not extend across the water surface. If fencing across the water is necessary, it should be made highly visible by avoiding the use of single wire fences and using fencing materials such as woven wire or by adding streamers or coverings on the fence.

For watering facilities that will be accessible to wildlife, give consideration to the effects the location of the facility will have on target and non-target species. Also consider the effect of introducing a new water source within the

ecosystem in the vicinity of the facility. This should include things such as the concentration of grazing, predation, entrapment, drowning, disease transmission, hunting and expansion of the wildlife populations beyond the carrying capacity of available habitat.

Watering facilities often collect debris and algae and should be cleaned on a regular basis. Consider increasing the pipe sizes for inlets and outlets to reduce the chances of clogging. Maintenance of a watering facility can be made easier by providing a method to completely drain the watering facility.

Steep slopes leading to watering facilities can cause erosion problems from over use by animals as well as problems with piping and valves from excess pressure. Consider choosing the location of watering facilities to minimize these problems associated with steep topography.

When watering tanks are located on fence lines, consider wooden post and planking fence.

When roofs are placed over a trough or tank, consider the need for managing roof runoff in accordance with the practice standard Roof Runoff Structure (558) in order to minimize the potential for roof runoff water to come in contact with wastes or cause soil erosion.

Considerations Applicable to Surface Water Livestock Access Type Watering Facilities

Livestock watering access may be recessed back from the stream channel for a distance up to the width of the access in order to provide ice flow protection in the winter. These recessed sites must maintain sufficient water circulation to minimize the potential for accumulation of stagnant water.

Consider cutoff walls at the stream edges when needed to protect against undercutting.

Consider effects on upstream and downstream flow conditions that could result in increases in erosion, deposition, or flooding.

Consider effects on aquatic organism passage and wildlife habitats.

PLANS AND SPECIFICATIONS

Plans and specifications for watering facilities shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

Support data documentation requirements are as follows:

- Inventory and evaluation records
 - CONS-6 notes or special report
- Survey notes, where applicable
 - Design survey
 - Construction layout survey
 - Construction check survey
- Design records
 - Physical data, functional requirements, and site constraints, where applicable
 - Soils/subsurface investigation report, where applicable
- Design and quantity calculations
- Construction drawings/specifications with:
 - Location map
 - “Designed by” and “Checked by” names or initials
 - Approval signature
 - Job class designation
 - Initials from preconstruction conference
 - As-built notes
- Construction inspection records
 - CONS-6 notes or separate inspection records
 - Construction approval signature
- Record of any variances approved, where applicable
- Record of approvals of in-field changes affecting function and/or job class, where applicable

OPERATION AND MAINTENANCE

An Operation and Maintenance (O&M) plan shall be developed for this practice. The O&M plan shall be consistent with the purposes of the practice, its intended life, safety requirements, and the criteria for the design.

REFERENCES

Brigham, William and Stevenson, Craig, 1997, Wildlife Water Catchment Construction in Nevada, Technical Note 397.

Tsukamoto, George and Stiver, San Juan, 1990, Wildlife Water Development, Proceedings of the Wildlife Water Development Symposium, Las Vegas, NV, USDI Bureau of Land Management.

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National Research Council, 1996 Nutrient Requirements of Domestic Animals, National Academy Press.

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Engineering Field Handbook, Chapters 5,
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