CONSTRUCTION SPECIFICATION 614 – WATERING FACILITY

1. SCOPE

The work consists of furnishing materials and installing all components of the watering facility as required in this specification and the associated plans (drawings).

2. MATERIALS AND FABRICATION

Use materials that conform to the quality noted in the plans, applicable WV 700 Series Construction Specifications, applicable ASTM or commercial specifications and/or as shown below.

Provide embedment, anchor pads, fence or other protection for precast concrete, steel, plastic, fiberglass, or other approved pre-manufactured troughs or tanks as shown on the plans or required by the manufacturer.

CONCRETE AND MASONARY

Precast concrete and masonry structures are acceptable when the design has been reviewed and approved prior to installation. Fill plumbing openings in precast concrete troughs or tanks with a non-shrink hydraulic cement or epoxy after installation of the plumbing.

For on-site cast troughs or tanks, produce or acquire concrete with a minimum strength of 3,000 pounds per square inch (psi), or as specified on the plans. Ready-mixed concrete, pre-bagged commercially available concrete mix, or site mixed concrete is acceptable. Use mixing water that is clean and free of substances that would affect the strength or durability of the concrete. Mix the concrete to a consistency that allows proper consolidation (approximately 3”-6” slump).

The minimum wall and bottom thickness are 4 inches for concrete troughs or tanks. Exception: When precast troughs or tanks contain 1.5 pounds of fiberglass reinforcing fibers per cubic yard of concrete, the minimum wall thickness is 3 inches. The batter on the inside face of the concrete trough or tank wall is 2 inches from top to bottom. The minimum steel reinforcement is 6 x 6 – 8 x 8 gauge (W2.1 x W2.1) rectangular welded wire reinforcement. Install waterstops in construction joints to waterproof concrete troughs or tanks.

METAL

Obtain steel tanks with a minimum bottom thickness of 20 gauge. Use steel tanks that are galvanized with 2 ounces per square foot for protection from deterioration. Anchor tanks with steel T-fence posts or other heavy duty steel fence posts conforming to ASTM A702.

WOOD

For anchoring or protection, use wood products graded and stamped with the species, grade, and moisture content by an agency accredited by the American Lumber Standards Committee. In the absence of a quality stamp, the contractor or material supplier can provide written certification that the wood meets the required quality criteria.

For pressure treated wood, use products made of Douglas Fir or Southern Yellow Pine treated with preservatives compliant with American Wood Preservers Association (AWPA) Standard C16. When non-pressure treated wood is required (i.e.,organic farms), use locust

or orange wood for anchoring or protection. Use other woods when approved by the NRCS representative.

RUBBER
Acquire rubber tires to use for troughs that are free of holes or deep abrasions. Cut the tire sidewall at an inward angle that does not expose any metal chords in the tire.

Thoroughly clean tires that were filled with antifreeze or other toxic liquids before use as watering facilities. As a minimum, scrub the inside of the tire with detergent and rinse with a high pressure washer. Repeat the process at least four (4) times.
As shown on the plans, install the tire on compacted soil with 6 to 8 inches of the tire below grade. Install a 4 to 6 inch thick slab of concrete to seal the hole in the bottom of the tire trough.

AGGREGATE
Aggregates used for stabilization around the watering facilities shall meet the requirements of WV Conservation Practice Standard Heavy Use Area Protection (561). The size and gradation shall be as specified on the plans. The aggregate shall be hard, durable, and resistant to weathering.

GEOTEXTILE
Use nonwoven or woven geotextile material . The purpose of geotextile fabric is to separate the ground (soil) from the gravel. Fabrics shall meet Class IV material as noted in Construction Specification 795, Table 1 or 2. Materials such as, but not limited to, GeoTex 200 ST, Mirafi 500X or Thrace-Linq GTF 200S meet this specification.

PLASTIC AND FIBERGLASS
Use plastic and fiberglass structures made of ultraviolet resistant materials or with a durable coating for protection from sunlight. Do not use cast-iron, plastic, or fiberglass bathtubs as a trough or tank.

PIPES IN WATER TROUGHS /TANKS
Use a minimum diameter pipe of 1.25 inches for gravity flow systems, 0.75 inches for pumped pressure systems or the size of the pipeline feeding the trough unless otherwise specified on the plans..

Use polyvinyl chloride (PVC), galvanized steel, or copper pipe through the walls, bottom and/or inside of the trough or tank that meets one of the following specifications:

Type Pipe	Applicable Specification
PVC	ASTM D-1785, ASTM D-2241 (SDR 26 or less), ASTM D-2665
Steel	ASTM A-120, ASTM A-53, AWWA C-202
Copper Alloy	ASTM B-42, ASTM B-43, ASTM B-88, ASTM B-302, ASTM B-306, ASTM B-585, ASTM B-586, ASTM B-641, ASTM B-642

Install collars where pipes pass through the wall or bottom of the trough/tank. Use steel standpipes or install a metal, wood, concrete, fiberglass or other equally durable plate across the top of the tank to prevent livestock from damaging the pipe, valve or standpipe. Install valves and/or standpipes near the center of the trough to prevent access by livestock.

Install automatic water level control and/or overflow devices on all open troughs or tanks. Pipe overflow to a protected and stabilized point of release, but at least 6 feet from the outside edge of the trough or tank. Make provisions for draining each trough or tank. Use overflow pipe as trough drain when installed to allow removal of the overflow standpipe and complete drainage of the trough. Protect the overflow pipe and drain from frost or freeze damage by having continuous flow, freeze proof troughs, or electric heaters.

ON –DEMAND WATERING SYSTEMS

Install on-demand watering systems according to the manufacturer specifications and according to the electrical, waterline pressure (minimum and maximum), and cumulative flow rate (GPM/hole or bowl) criteria.

Anchor troughs by attaching to a four-inch thick concrete pad or to solid wood, steel or other rigid post. Install post a minimum of 36 inches in the ground, as shown on the drawings, or as specified by the manufacturer.

Use portable troughs or tanks as part of an intensive grazing system, where it is necessary or advantageous to move the facility from division to division. These troughs are lightweight plastic or metal. Move to the desired location by hand or on skids. Block and anchor on level area to prevent movement.

3. FOUNDATION PREPARATION

Clear the foundation area and adjacent work area of organic matter and material not suitable for the subgrade. Grade and smooth the foundation and work area to permit free drainage of surface water. Place the tank or trough on original ground or if necessary, backfill low areas with gravel.

Install trough or tank inlet and outlet pipes as shown on the plans. Clear the trench bottom and backfill material of rocks or other sharp-edged material that could damage the pipe prior to placing backfill. Prevent pipe damage when the trench is backfilled. Backfill over excavated areas with moist soil compacted to the density of the surrounding material. When placing backfill within two feet of a structure to planned grade lines, compact the backfill using hand-operated compaction equipment.

4. EROSION AND POLLUTION CONTROL

Conduct construction operations to minimize erosion, air, and water pollution within construction limits.

5. SEEDING

Vegetate all disturbed areas according to Conservation Practice Standard Critical Area Planting (342) or as shown on the plans.

6. FINAL SITE

Upon complete of construction, grade all disturbed areas to blend with the surrounding ground. Perform all construction in an acceptable manner.