NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

HEAVY USE AREA PROTECTION

(Ac.)

CODE 561

DEFINITION

The stabilization of areas frequently and intensively used by people, animals or vehicles by establishing vegetative cover, by surfacing with suitable materials, and/or by installing needed structures.

PURPOSE

- Reduce soil erosion
- Improve water quantity and quality
- Improve air quality
- Improve aesthetics
- Improve livestock health

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to urban, agricultural, recreational or other frequently and intensively used areas requiring treatment to address one or more resource concerns.

CRITERIA

General Criteria Applicable to All Purposes

All planned work shall comply with Federal, state, and local laws and regulations.

Measures shall be taken to limit the generation of particulate matter.

Safety of the users shall be incorporated into the design of the heavy use area protection.

Design Load. The design load will be based on the type of traffic (vehicular, animal, or human) anticipated on the heavy use area. The minimum design load for areas that support vehicular traffic will be a wheel load of 4000 lbs.

Foundation. All site foundations shall be evaluated for soil moisture, permeability, texture and bearing strength in combination with the design load and anticipated frequency of use.

A base course of gravel, crushed stone, other suitable material and/or geotextile shall be provided on all sites with a need for increased load bearing strength, drainage, separation of material and soil reinforcement. Natural Resources Conservation Service (NRCS), National Engineering Handbook (NEH), Parts 642 and 643 (formerly, NEH, Section 20) and AASHTO M-288 (latest edition) provide guidance in quality specification and geotextile selection.

An impervious barrier shall be provided on sites with a porous foundation (high permeability rate), where there is a need to protect ground water from contamination.

Foundation preparation shall consist of removal and disposal of soil and other material that are not adequate to support the design loads.

Surface Treatment. The surface treatment shall meet the following criteria:

Bituminous Pavement. The thickness of the pavement course, the kind and size of aggregate, the type of proportioning of bituminous materials, and the mixing and placing of these materials shall be in accordance with Department of Transportation criteria for the expected loading.

Concrete. The quality and thickness of concrete and the spacing and size of reinforcing steel shall be appropriate for the

expected loading. *The concrete mix design shall meet a minimum strength of 3000 psi after 28 days. Reinforcing shall be by 10 gage, 6-inch by 6-inch welded wire mesh, fiber reinforcement (FRC), or other means as specified.*

Other Cementious Materials. Soil cement, roller compacted concrete, and coal combustion by-products (flue gas desulphurization sludge and fly ash) may be used as surface material if designed and installed to withstand the anticipated loads and surface abrasion.

Aggregate. A fine or coarse aggregate surface shall be a minimum of *4 inches* thick.

Other. Surfacing materials, such as cinders, tanbark, bark mulch, brick chips, shredded rubber and/or sawdust, shall have a minimum layer thickness of *4 inches*.

Structures. All structures shall be designed according to appropriate Oklahoma standards and specifications or Engineering Handbook recommendations.

Sprays and Artificial Mulches. When utilizing sprays of asphalt, oil, plastic, manufactured mulches, and similar materials, the manufacturer's recommendations for application shall be incorporated into the design.

Drainage and Erosion Control. Provision shall be made for surface and subsurface drainage, as needed, and for disposal of runoff without causing erosion or water quality impairment. Provision shall be made to exclude unpolluted run-on water from the treatment area. All treatment areas shall be shaped to prevent ponding of water.

Vegetative Measures. Liming, fertilizing, soil preparation, seeding, mulching, sodding and vegetation management shall be according to the planned use and appropriate conservation practice standard in the local technical guide. If vegetation is not appropriate, other measures shall be used to accomplish the intended purpose.

Additional Criteria for Areas Utilized by Livestock

The size of heavy use areas utilized by livestock is dependent on the landowner's operation including type and number of animal, confinement periods, and/or the intended use. The size of treatment areas can range from 30 square feet per animal in partial-confinement to 400 square feet per animal in total confinement to 4000 or more square feet for animal exercise areas. Heavy use protection areas should be kept as small as practicable.

The protected area around facilities such as portable hay rings, water troughs, feeding troughs, mineral boxes and other facilities where livestock concentrations cause resource concerns shall be a *minimum of 7 feet. For structures that require an apron for protection (i.e. watering facilities), the total protected area from the edge of the structure to the edge of the protected area shall be a minimum of 10 feet.*

The length of the treatment area will depend on the type of facility being protected. For circular facilities like hay rings or watering facilities, the length would be the full circumference of the circle. For rectangular facilities like mineral boxes or feed or water troughs, the length of the treatment area shall extend a minimum of 2 feet beyond the ends of the facility. If livestock can use the facility from both sides, both sides shall be treated.

Unless the treated area is excavated to allow for installation of treatment materials, containment features will be installed as needed to keep the amendments in place. Containment features could include, but are not limited to, treated lumber, railroad ties, steel edging, and prefabricated polyethylene cellular materials.

Oklahoma conservation practice standards Critical Area Planting (342); Fencing (382); Prescribed Grazing (528); Filter Strip (393); or Use Exclusion (472) shall be used as companion practices, when needed to meet the intended purpose of the heavy use area protection.

Provisions shall be made to collect, store, utilize and/or treat manure accumulations and contaminated runoff in accordance with other Oklahoma conservation practice standards.

Additional Criteria for Areas Utilized for Recreation

The treated area shall be conducive to the overall recreation area and aesthetically blend with the general landscape and surroundings.

Plants, landscaping timbers, traffic control measures, wooden walkways, etc. shall be evaluated for effectiveness, aesthetics and accessibility as covered by the Americans with Disabilities Act.

CONSIDERATIONS

When stabilizing heavily used areas consider adjoining land uses and the proximity to residences, utilities, cultural resource areas, wetlands or other environmentally sensitive areas, and areas of special scenic value.

For heavy use areas conducive to protection by vegetation, consideration must be given to the effect(s) of treading and/or miring. The vegetative species selected should tolerate and persist under heavy use conditions. If practicable, consider increasing the size of the area and/or establishing a rest/non-use period to allow plant recovery and increase vigor.

Heavy use area protection effects on the water budget, especially on volumes and rates of runoff, infiltration, and transpiration due to the installation of less pervious surfaces, should be considered in the selection of surfacing materials.

The transport of sediments, nutrients, bacteria and organic matter from animal manures; oils, chemicals and particulate matter associated with vehicular traffic; and soluble and sediment-attached substances carried by runoff should be considered in selection of companion conservation practices.

Consider using additional air quality conservation practices such as Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603) to impede transport of particulate matter between the source (i.e., heavy use area) and nearby sensitive areas.

If the purpose of the heavy use area protection is improvement of water quality, the heavy use area should be relocated as far away from the waterbody or watercourse as possible. Any work in and/or discharges near streams, wetlands or waterbodies may require a permit from the US Army Corps of Engineers, state water quality (permitting) authority, or local authority.

When surface treatments such as bark mulch, wood-fiber or other non-durable materials are used for short-term livestock containment areas, consideration should be given to vegetation of the affected area with a cover crop.

For areas with aggregate surfaces that will be frequently scraped, consideration should be given to the use of concrete or cementitious materials to lessen the recurring cost of aggregate replacement.

PLANS AND SPECIFICATIONS

Plans and specifications for heavy use area protection shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. Plans and specifications shall include construction plans, drawings, job sheets or other similar documents. These documents shall specify the requirements for installing the practice, including the kind, amount and quality of materials to be used.

OPERATION AND MAINTENANCE

An Operation and Maintenance (O&M) plan shall be prepared for and reviewed with the landowner or operator. The plan shall specify that the treated areas and associated practices are inspected annually and after significant storm events to identify repair and maintenance needs.

The O&M plan shall detail the level of repairs needed to maintain the effectiveness and useful life of the practice.

For livestock operations, the O&M plan for heavy use areas may be included as a part of the overall waste management plan. Periodic removal and management of manure accumulations will be addressed in the O&M plan.

Conservation practices that limit particulate matter emission should be implemented into long-term maintenance plans.

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NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE GENERAL SPECIFICATIONS

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CONSTRUCTION SPECIFICATIONS

Concrete. All concrete is to consist of a workable mix that can be placed and finished in an acceptable manner. The mix design and testing of concrete shall be consistent with the size and requirements for the job. Concrete shall be placed to the lines and grades as shown on the plans or as staked in the field.

The type of cement, air entrainment, slump, aggregate, or other properties shall be specified as necessary. Unless otherwise specified, the concrete mix shall produce a strength of not less than 3,000 psi in 28 days.

The concrete shall be delivered to the site and discharged into forms within 1-1/2 hours after the introduction of the cement to the aggregates, unless a mix design with set retarder is approved for use by the technician. If needed, reinforcing steel shall be placed as indicated on the plans and shall be held securely in place during concrete placement.

Subgrades and forms shall be installed to line and grade, and the forms shall be mortar tight and unyielding as the concrete is placed. The concrete shall be consolidated in the forms as it is placed to insure a tight bond to reinforcing steel and to yield a dense concrete.

Concrete shall not be placed when the outside temperature is below 40 degrees or above 90 degrees Fahrenheit. Concrete placed during cold weather shall be protected from freezing during the curing period. The concrete shall be cured by covering it with burlap, canvas, or other suitable material and kept from drying out for at least 7 days. The concrete may be cured by coating the surface with an approved white-pigmented curing compound.

Slabs shall have a broomed or other non-slip finish.

Fiber Reinforced Concrete. Fiber Reinforced Concrete (FRC) may be specified in lieu of welded wire fabric *for slabs where vehicle, tractor, or other heavy point loads are not anticipated or* if approved by an engineer. Polymer fibers may also be used as an additive in most concrete mixes to reduce shrinkage cracks. Oklahoma Engineering Technical Note OK-14 provides information on the use of FRC.

Rock. Rock used as a protective lining shall be durable and meet the specified gradation requirements. Only angular to subrounded rock shall be used. Rock may be placed by equipment or by hand. Placement must ensure that rocks are reasonably homogeneous with larger rocks uniformly distributed and in firm contact with one another and smaller rocks filling in the voids.

Cellular Containment. Where needed, an approved plastic (PE) three-dimensional cellular containment grid shall be installed to hold rocks in place. The cellular containment shall be the same thickness as the rock liner.

Geotextile. The geotextile shall be a Class 1 nonwoven geotextile fabric with a minimum weight of 8 ounces per square yard. The fabric shall also meet the following requirements:

Property	Test Method	Requirement
Tensile Strength	ASTM D4632	180 lb. - min.
Elongation at Failure	ASTM D4632	$\geq$ 50%
Puncture	ASTM D4833	80 lb. - min.
Ultraviolet Light (% residual tensile strength)	ASTM D4355	70 % - min.
Apparent Opening Size	ASTM D4751	# 40 sieve - max.
Permittivity	ASTM D4491	0.70/sec - min.

Installation shall be in accordance with the manufacturers' recommendations. In no case shall material be dropped onto an uncovered geotextile from a height greater than 3 feet.

Prior to placement of the geotextile, the soil surface shall be prepared reasonably smooth and free of loose rocks, holes, projections, mud or standing water. The geotextile shall not be placed until it can be properly anchored and covered within 48 hours.