

**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, surfacing with suitable materials, and/or installing needed structures.

PURPOSE

This practice may be used as a part of a conservation management system to support one or more of the following purposes.

1. To provide a stable, non-eroding surface for areas frequently used by animals, people or vehicles
2. To protect and improve water quality
3. Improve livestock health

CONDITIONS WHERE PRACTICE APPLIES

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

CRITERIA

General Criteria Applicable to All Purposes

Plan and design heavy use areas to comply with federal, state, and local laws and regulations.

Design Load. Base the design load on the type and frequency 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. Evaluate all site foundations for soil moisture, permeability, texture and bearing strength based on the design load and planned frequency of use.

Where necessary, prepare the foundation by removal and disposal of materials that are not adequate to support the design loads.

Use a base course of crushed stone, other suitable material and/or geotextile on all sites that need increased load bearing strength, drainage, separation of material and soil reinforcement. Refer to Natural Resources Conservation Service, National Engineering Handbook, Part 642 (formerly, NEH, Section 20) and National Engineering Handbook, Part 643 (formerly Design Note 24, Guide for Use of Geotextiles), for guidance in quality specification and geotextile selection.

On sites with porous foundations (high permeability rate), with a need to protect ground water from contamination, provide an impervious barrier.

Surface Treatment. Select a surface treatment that is stable and appropriate to the purpose of the heavy use area. Surface treatments must meet the following requirements according to the material used.

A geotextile fabric shall be installed under the treatment area when needed to protect the integrity of the treatment materials. When a geotextile fabric is used it shall meet the minimum requirements for Class IV geotextile as shown in Table 1 "Requirements for Woven Geotextiles" or Table 2 "Requirements for Nonwoven Geotextiles" of NRCS Material Specification 592, "Geotextile" found in NEH Part 642.

The geotextile fabric shall be placed and anchored according to manufacture recommendation.

Concrete. The quality and thickness of concrete and the spacing and size of reinforcing steel shall be appropriate for the expected loading. The minimum compressive strength of the concrete shall be 4,000 psi at 28 days and shall be reinforced with steel as required by NEH Part 636, "Structural Engineering" and American Concrete Institute, ACI 360R-06, Design of Slabs-on-Ground, for design criteria for slabs on grade.

Bituminous Pavement. The thickness and kind of base course, 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 Louisiana Department of Transportation criteria for the expected loading.

In lieu of a site specific design, for areas that will be subject to light use, pave with a minimum of 4 inches of compacted bituminous pavement over a subgrade of at least 4 inches of well compacted crushed stone. Use bituminous pavement mixtures commonly used for road paving in the area. Compact the surface with a heavy steel wheel roller until the bituminous pavement is thoroughly compacted and roller marks are eliminated.

Other Cementitious Materials. Other cementitious materials such as soil cement, roller compacted concrete, and coal combustion by-products (flue gas desulphurization sludge and fly ash) can be used to provide a durable, stable surfacing material. Develop site specific mix designs based on the properties of the material with compressive strengths necessary for the expected use and loading on the heavy use area.

Aggregate. Design surface coarse aggregate surfaces at least 6-inches thick. If the surface will be compacted, choose a well graded aggregate.

Sprays and Artificial Mulches. When utilizing sprays of asphalt, oil, plastic, manufactured mulches, and similar materials, follow the

manufacturer's recommendations for design requirements.

Other. Surfacing materials, such as limestone screenings, cinders, tanbark, bark mulch, brick chips, shredded rubber and/or sawdust, shall have a minimum layer thickness of 6 inches.

Structures. Design any structures associated with the heavy use area including roofs, according to appropriate NRCS standards. Where NRCS standards do not exist, design structures according to the requirements of the particular construction material and accepted engineering practice. Base environmental design loads for buildings associated with heavy use areas on criteria in ASCE 7 - Minimum Design Loads for Buildings and Other Structures: ASCE/SEI 7-05.

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

Disturbed areas shall be established with vegetation or otherwise stabilized as soon as practical after construction. Seedbed preparation, seeding, fertilizing, and mulching shall conform to NRCS Conservation Practice Standard "Critical Area Planting" (342).

Vegetative Measures. Stabilization of areas with vegetative cover alone shall only be used on areas where traffic can be managed to maintain vegetative cover. Vegetative materials shall be grass species or other plant materials that are wear resistant and have fast recovery from heavy use and are suitable to the site. Liming, fertilizing, soil preparation, seeding, mulching, sodding and vegetation management shall be according to the planned use and appropriate NRCS Conservation Practice Standard. If vegetation is not appropriate for the site, use other measures to stabilize the area.

Additional Criteria Applicable to Areas Utilized by Livestock

General. NRCS Conservation Practice Standards “Critical Area Planting” Code 342, “Fencing” Code 382, “Prescribed Grazing” Code 528A, “Filter Strip” Code 393, or “Use Exclusion” Code 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 NRCS Conservation Practice Standard “Waste Utilization” Code 633.

Treatment Area. The treated area shall include, and extend out, in all direction, from facilities such as portable hay rings, water troughs, feeding troughs, mineral boxes, and other facilities where livestock concentrations and traffic cause resource concerns. The drawings in the Engineering Field Handbook, Chapter 6 – Structures, Louisiana Supplement, Figures S-6-49 thru S-6-52, S-6-59 and S-6-60 provide the acceptable specifications for most applications. These drawings shall be utilized when planning and installing this practice.

The treated area for gateways shall extend the distance needed to treat the resource concerns out from each side of the gate and for the entire width of the gate. The treated area should extend away from the gate and along the fences as needed to address the resource concerns. If vehicles or equipment will also utilize the gateway, their weight must be considered in the design load.

The minimum treatment width for livestock lanes shall be 10 feet. A width of 15 feet is generally used for livestock/vehicle type lanes. For livestock/vehicle lanes the design load will include the weight of the vehicle that will utilize the lane. All lanes shall be fenced in accordance with NRCS Conservation Practice Standard “Fence” Code 382.

Crushed Stone Treatment. Stone used for surface treatment shall be crushed run stone, or graded stone as conditions warrant. The minimum depth of crush run stone, as well as the minimum dimensions and other design

parameters are on the afore mentioned Figures in the EFH. All material shall be smoothed uniformly and compacted. The finished surface shall be sloped to prevent the ponding of water.

Concrete Treatment. If the subgrade is uniform and dense and equipment will not utilize the treatment area the minimum slab thickness shall be 4 inches. When equipment will utilize the slab for cleaning the slab or delivering food, then the minimum thickness shall be 5”. When the surface area of a slab exceed 750 sf., then construction joints will be planned by the engineer utilizing the design in the Figures in the EFH. All other aspects of the slab construction (footings, reinforcing steel, etc.) are covered on the Figures as well. The concrete surface shall have a rough tne finish and sloped to prevent the ponding of water.

Maintenance. The Heavy Use Area (HUA) winter feeding area shall be maintained to achieve the intended purpose. Manure and wasted hay/feed shall be scraped from the HUA when accumulation of the manure and wasted hay/feed is 6 inches or greater.

Location. Heavy Use Area (HUA) winter feeding areas shall be located outside of floodplains. If site restrictions require location within the floodplain, heavy use areas shall be protected from inundation or damage from a 25-year, 24-hour storm event.

Sensitive Areas. Any part of a HUA located upslope and within 300 feet of a sensitive area (water body or channel) shall have one or both of the following installed:

- A minimum 35 foot filter strip established and maintained adjacent to the water body or channel. The filter strip shall be established and maintained in permanent vegetation in accordance with Filter Strip (393) or Riparian Forest Buffer (391); and/or
- A fence constructed in such a way that livestock must travel a minimum of 50 feet from the edge of the HUA across the slope before being able to turn down the slope toward the sensitive area(s). The fence must be located within 2 feet of the HUA and a minimum of 70 feet from the

sensitive area(s). The area below the fence shall be maintained in permanent vegetation. The fence shall be installed in accordance with Fence (382).

Additional Criteria for Recreation Areas

General. 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

This practice may adversely affect cultural resources and must comply with NRCS General Manual 420, Part 401.

Heavy use areas can have a significant impact on adjoining land uses. These impacts can be environmental, visual and cultural. Care should be taken when selecting the type of treatment to ensure that it is compatible with adjoining areas. Consider such things as proximity to neighbors, utilities, cultural resources, environmentally sensitive areas and the land use where the stabilization will take place. Stabilization techniques used in a cattle feeding area may not be appropriate for a recreation area.

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. Additional techniques such as geogrids, other reinforcing techniques or planned periods of rest and recovery may need to be employed to ensure that vegetative stabilization will succeed.

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.

Heavy use areas are places where animals, people or vehicles are concentrated. The resulting manure, sediments, bacteria, petroleum products and trash that might accumulate on the heavy use area can result in degraded runoff water quality. During planning and design consider how these pollutants will be handled to reduce offsite impacts.

If the purpose of the heavy use area protection is improvement of water quality, the heavy use area should be (re) located 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.

Heavy use areas will be intensely used by animals, people or both. Consider the safety of the users both human and animal during the design. Avoid slippery surfaces, sharp corners or surfaces and structures that might entrap users. For heavy use areas used by livestock avoid the use of sharp aggregates that might injure livestock hooves.

For livestock heavy use areas, provide positive drainage to prevent ponding of water. Such wet areas can have adverse affects on animal health and comfort.

Heavy use areas for livestock can vary widely in size depending on how the operator manages his livestock. Because heavy use areas can be expensive to construct and maintain, a significant consideration should be to reduce the size of the heavy use area as much as possible. Heavy use protection areas should be kept as small as practicable. This may require changes in how the livestock are managed but in the long run may result in less maintenance and a more efficient operation.

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.

Consideration should be given to locating the winter feeding HUA adjacent to all-weather access roads.

Consideration should be given to the use of concrete around livestock watering troughs or tanks in lieu of crushed stone.

For urban and recreation areas, traffic control plants, landscaping timbers, wooden walkways, etc., should be evaluated for effectiveness and aesthetics.

Surface erosion can be a problem on large heavy use areas that do not use a hard surface such as concrete. In these cases the designer may need to include measures on the area that reduce the flow length of runoff to reduce erosion problems.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for Heavy Use Area Protection that describe the requirements for installing the practice according to this standard. The drawings and specifications for most applications are located in the Engineering Field Handbook, Chapter 6 – Structures, Louisiana Supplement, Figures S-6-49 thru S-6-52, S-6-59 and S-6-60. As a minimum the plans and specifications shall include:

1. A plan map showing the location and extent of the practice.
2. Where appropriate, cross-sections showing any earthwork required and the type and required thickness of paving or stabilization materials.
3. Where appropriate, plans for required structural details.
4. Where appropriate, vegetation establishment requirements.
5. Construction specifications that describe in writing site specific installation requirements for the heavy use area protection.

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 contain the operational requirements for managing the heavy use area. Planned scrapping intervals, replacement of surface materials, storage, treatment, and/or utilization methods will also be described. Provisions for re-establishment of vegetated areas will be included.

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

REFERENCES

American Association of State Highway and Transportation Officials. 2006. Standard Specification for Geotextiles Used for Highway Applications. AASHTO Standard M288.

American Association of State Highway and Transportation Officials. 1998. Guide for Design of Pavement Structures with 1998 Supplements.

American Concrete Institute. 2006. Design of Slabs-on-Ground. ACI Standard 360R-06.

USDA-Natural Resources Conservation Service. 2008. National Engineering Handbook, Part 642.

USDA-Natural Resources Conservation Service. 1991. National Engineering Handbook, Part 643. (Guide for the Use of Geotextiles, Design Note Number 24).

NRCS General Manual 420, Part 401

NRCS National Engineering Manual, Parts 541 and 542

NRCS National Engineering Field Handbook, Part 650, Chapter 5