NATURAL RESOURCES CONSERVATION SERVICE

VIRGINIA 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

To provide a stable, non-eroding surface for areas frequently used by animals, people or vehicles.

To protect and improve water quality.

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 (HUA) 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.

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 gravel, crushed stone, or other suitable material, and geotextile, as necessary, on all sites that need increased load bearing strength, drainage, separation of material and/or soil reinforcement.

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.

Concrete. Design the thickness and compressive strength of concrete according to the expected loading and use. For installations where it is necessary to limit the permeability of the concrete, refer to Virginia NRCS Conservation Practice Standard *Waste Storage Facility (Code 313)* and ACI 360R-10, *Guide to Design of Slabs-on-Ground*, for design criteria for slabs on grade. Concrete slabs will have a minimum thickness of 5 inches underlain by a subgrade of 4 inches of gravel.

Bituminous Concrete Pavement. Refer to *AASHTO Guide for Design of Pavement Structures* or the applicable Virginia Department of Transportation's specification for design criteria for bituminous concrete paving. 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 concrete over a subgrade of at least 4 inches of well compacted gravel. Use bituminous concrete mixtures commonly used

for road paving in the area. Compact the surface with a heavy steel wheel roller until the bituminous concrete 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 fine or coarse aggregate surfaces at least 4-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 4 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 Virginia NRCS Conservation Practice Standard *Roofs and Covers (Code 367)*.

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. To the extent possible, prevent runoff from entering the heavy use area.

Vegetative Measures. Where appropriate, stabilize all areas disturbed by construction with vegetation as soon as possible after construction. Refer to Virginia NRCS Conservation Practice Standard *Critical Area Planting (Code 342)*. If vegetation is not appropriate for the site, use other measures, such as Virginia NRCS Conservation Practice Standard *Mulching (Code 484)*, to stabilize the area.

Fencing. As necessary, install fencing to control animal, pedestrian, and vehicle traffic. Fencing shall be built in accordance with Virginia NRCS Conservation Practice Standard *Fence (Code 382)*. Alternative fencing procedures which provide permanent and positive control may be approved on a case-by-case basis.

Additional Criteria for Livestock Heavy Use Areas

The treated area can include all areas where livestock congregate and cause surface stability problems. This includes feeding areas, portable hay rings, watering facilities, feeding troughs, mineral boxes, and other facilities where livestock concentrations cause resource concerns. Virginia Engineering Design Note 2 – Separation Distances For Animal Waste Facilities will be used where animal waste is concentrated.

Use Virginia NRCS Conservation Practice Standards *Waste Storage Facility (Code 313)*, *Waste Transfer (Code 634)*, *Critical Area Planting (Code 342), Fence (Code 382)*, *Prescribed Grazing (Code 528)*, *Filter Strip (Code 393), Vegetated Treatment Area (Code 635)*, *Access Control (Code 472)*, or other similar standards as companion practices, when needed to meet the intended purpose of the heavy use area protection.

Include provisions in the design of the heavy use area to collect, store, utilize, and/or treat manure and contaminated runoff in accordance with the operation's Agricultural Waste Management System Plan.

Virginia Technical Note – Water Quality #1, Risk Assessment of Water Impairment from Heavy Use Areas/Animal Concentration Areas, will be used to evaluate the site for water quality concerns prior to the construction of an HUA.

The HUAP will be designed in accordance with Virginia Engineering Design Note 561 – Heavy Use Area Protection.

Animal waste storage facilities built in conjunction with an HUA will meet the minimum separation distances listed in Virginia Engineering Design Note 2 – Separation Distances for Animal Waste Facilities. Heavy Use Areas with animal waste storage on the HUA will also meet the noted separation distances.

Loafing Lot Management. A loafing lot management system will consist of a HUA (sacrifice lot) and three or more grassed paddocks. All of the resource concerns associated with the HUA will be addressed. All denuded areas will be treated or vegetated.

Design the grass paddocks and sacrifice area in accordance with Virginia Engineering Design Note 561 – Heavy Use Area Protection.

Additional Criteria for Recreation Areas

Heavy use area protection in recreation areas that are accessible to the public must meet the requirements of the Americans with Disabilities Act.

CONSIDERATIONS

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.

By its very nature, a heavy use area will be subject to intensive use. If vegetation will be part of the stabilization technique, consider the durability of the vegetation. Choose plant species that can withstand the expected use. 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 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.

The recommended thickness of surfacing material such as limestone screenings, cinders, tanbark, bark mulch, brick chips, shredded rubber, and/or sawdust is 6 inches for surfaces used by animals.

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 area protection often involves paving or otherwise reducing the permeability of the heavily used area. This can reduce infiltration and increase surface runoff. Depending on the size of the heavy use area, this can have an impact on the water budget of the surrounding area. During the planning and design, consider the effects to ground and surface water.

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.

To reduce the negative water quality impact of heavy use areas, consider locating them as far as possible from waterbodies or water courses. In some cases, this may require relocating the heavily used area rather than just armoring an area that is already in use.

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.

To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Virginia NRCS Conservation Practice Standards

Windbreak/Shelterbelt Establishment (Code 380), Herbaceous Wind Barriers (Code 603) or the use of palliative treatments such as lignosulfonate, synthetic polymers, organic oils, or chloride compounds to control dust from bare heavy use areas.

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. 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.

For areas that will need to be cleaned frequently by scraping, loose aggregate or other non-cementitious materials may not be the best choice. Consider a more durable surface such as concrete.

Byproducts from coal fired power plants such as fly ash and sludge from scrubbers can vary significantly. Therefore, their toxicity and cementation characteristics should be known to ensure they are compatible with the intended use.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for Heavy Use Area Protection that describe the requirements for installing the practice according to this standard.

Record all required information in an engineer field book, on a plan sheet or design computation sheet, or in another appropriate location.

DESIGN DATA

1. Completed Environmental Evaluation and subsequent requirements.
2. Completed Virginia Technical Note – Water Quality #1, Risk Assessment of Water Impairment from Heavy Use Areas/Animal Concentration Areas, as appropriate.
3. Soils investigation.
4. Survey and plot data: profile, cross-sections, topography, as needed.
5. Design computations, including purpose of practice and references used. Include:
    a. Type and number of animals, people, and/or vehicles the Heavy Use Area will serve.
    b. Where appropriate, plans for required structural details.
    c. Design of *Waste Storage Facility (Code 313)* and other components if required by Agricultural Waste Management System Plan.
    d. Description of surface treatment (with material description). Include references to plans or components supplied by others.
    e. Runoff treatment design.
6. Plan view of site with the location and extent of the practice. Show existing and planned features, including dimensions, distances, drainage structures, erosion control measures, etc.
7. Profiles and /or cross-sections of the area disturbed showing grades and thickness of the base course and surface treatment as appropriate.
8. Standard Cover Sheet (VA-SO-100).
9. Agricultural Waste Management System Plan describing type of treatment planned for waste storage and/or disposal if waste will be collected, stored, utilized, or treated.
10. Materials and quantities needed. Identify borrow material and/or spoil area, as needed.
11. Vegetation and/or ground cover requirements.
12. Identification of needed Erosion & Sediment Control measures.
13. Supplemental practices required.
14. Virginia Conservation Practice Specifications (700 Series).
15. Operation and Maintenance Plan.

CHECK DATA

1. As-built survey.

2. As-built plans including dimensions, types and quantities of materials installed, and variations from design. Include justification for variations.
3. Locations of appurtenant practices.
4. Adequacy of vegetation and/or ground cover.
5. Complete as-built section of Cover Sheet.

OPERATION AND MAINTENANCE

Prepare an operation and maintenance (O&M) plan for the operator. The minimum requirements to be addressed in the O&M plan are:

Periodic inspections, especially immediately following significant rainfall events.

Prompt repair or replacement of damaged components especially surfaces that are subjected to wear or erosion.

For livestock heavy use areas, include requirements for the regular removal and management of manure.

Where vegetation is specified, include periodic mowing, fertilization and control of vegetation. Reseed or overseed as needed to maintain dense vegetation.

REFERENCES

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