

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

HEAVY USE AREA PROTECTION

(Square Feet)

CODE 561

DEFINITION

Heavy Use Area Protection is used to stabilize a ground surface that is frequently and intensively used by people, animals, or vehicles.

PURPOSES

Heavy Use Area Protection is used:

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

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all land uses where a frequently or intensively used area requires treatment to address one or more resource concerns.

This practice does not apply to roads, lanes, or other linear practices. Refer to Indiana (IN) Field Office Technical Guide (FOTG) Standards (560) Access Road and (655) Forest Trails and Landings for linear practices.

CRITERIA

General Criteria Applicable to All Purposes

Use of this standard requires compliance with all applicable 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 is a wheel load of 4000 pounds.

Foundation. Evaluate the site foundation to ensure that the presumptive bearing capacity of

the soil meets the intended design load and 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, other suitable material, geotextile, or a combination of materials on all sites that need increased load bearing strength, drainage, separation of material and soil reinforcement. Refer to Natural Resources Conservation Service (NRCS), National Engineering Handbook, Part 642; Design Note 24, Guide for Use of Geotextiles; or other State-approved reference for geotextile selection.

If there is the potential for ground water contamination from the heavy use area, select another site or provide an impervious barrier. Make provisions to treat contaminated surface runoff from the impervious area.

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 slabs-on-ground subject to distributed stationary loads, light vehicular traffic, or infrequent use by heavy trucks or agricultural equipment in accordance with American Concrete Institute (ACI) *Guide for the Design and Construction of Concrete Parking Lots (ACI 330R)*. Design slabs-on-ground subject to regular or frequent heavy truck or heavy agricultural equipment traffic in accordance with *ACI Guide to Design of Slabs-on-Ground (ACI 360R)*. Design liquid-tight slabs in accordance

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service State Office, or download it from the Field Office Technical Guide for your State.

with *ACI Code Requirements for Environmental Concrete Structures, Slabs-on-Soil (ACI 350, Appendix H)*. Concrete will be placed over a minimum 5 inch layer of gravel, crushed stone, or other suitable material.

Design concrete structures in accordance with NRCS National Engineering Manual (NEM), Part 536, *Structural Engineering*.

Bituminous Concrete Pavement. Refer to AASHTO Guide for Design of Pavement Structures or the applicable State highway department'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.

Other Cementitious Materials. Cementitious materials, such as soil cement, agricultural lime, 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. Based on the properties of the surface material, develop a site-specific mix design with compressive strengths necessary for the expected use and loading on the heavy use area. Select materials that are non-toxic and that have chemical properties that are compatible with the intended use.

Aggregate. Design aggregate surfaces for expected wear and intended use. In lieu of a site-specific design for areas that will be subject to light non-vehicular use, install a minimum combined thickness for aggregate surfacing and base course of 6 inches for livestock and 4 inches for other applications.

For other applications, use Agricultural Engineering Note 4, *Earth and Aggregate Surfacing Design Guide*, or other appropriate methodology to design aggregate thickness.

Mulches. Use a minimum layer thickness of 6 inches for materials such as limestone screenings, cinders, tanbark, bark mulch, brick chips, or shredded rubber. Mulches are not recommended for livestock or vehicular applications.

Vegetation. Select vegetation that can withstand the intended use. Establish the vegetation in accordance with the criteria in IN FOTG Standard (342) Critical Area Planting.

Other. Other materials can be used if they will serve the intended purpose and design life.

Structures. When a roof is needed to address the resource concern, use IN FOTG Standard (367) Roofs and Covers. For non-waste applications, design structures according to the accepted engineering practice.

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 surface water from entering the heavy use area. Shape all treatment areas to prevent ponding of water.

Stabilize all areas disturbed by construction as soon as possible after construction. Refer to the criteria in IN FOTG Standard (342) Critical Area Planting for establishment of vegetation. If vegetation is not appropriate for the site, use the criteria in IN FOTG Standard (4854) Mulching to stabilize the disturbed area.

Additional Criteria for Livestock Heavy Use Areas

Include other practices to collect, store, utilize, or treat manure and contaminated runoff where contaminated runoff will cause a resource concern.

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, animal trails and walkways requiring surface stabilization, and other facilities where livestock concentrations cause resource concerns.

Siting Requirements. Heavy use areas for the purpose of feeding must have an all-weather access road to get the feed to them, or the impact of feeding equipment will be very minimal due to the soil type (sands) that the equipment will be going across, and managed to prevent erosion and rutting. Heavy use winter feeding areas will be located outside of floodplains and concentrated water flow areas. Heavy use areas will be located on sites with as little erosion potential as possible. Site the heavy use area as far away from sensitive areas (open water, ditches, sinkholes, wetlands, or other identified sensitive areas) as possible.

Heavy Use Areas located in long-term or sacrificial winter feeding areas will have the

following additional requirements: Heavy use areas and any portion of the winter sacrifice lot area located within 200 feet of sensitive areas will have a permanent grass buffer of 30 feet or more that is not accessed by livestock, except to flash graze during the growing season according to an approved prescribed grazing plan.

The treated area will extend a minimum distance of 8 feet from all feed and watering facilities for large animals and 6 feet for small animals. Only packable aggregate will be used on heavily used livestock areas for feeding for ease of operation and maintenance.

Install a geotextile fabric under all treatment areas used by livestock unless the foundation is on bedrock, or concrete is used as a surface treatment. Geotextile material will meet minimum specifications and will be installed as stated in the Indiana Construction Specification – Geotextile. A minimum overlap of 24 inches will be used at all joints.

Use IN FOTG Standards (634) Waste Transfer; (342) Critical Area Planting; (382) Fence; (528) Prescribed Grazing; (393) Filter Strip; (635) Vegetated Treatment Area; (472) Access Control; 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, use, and/or treat manure and contaminated runoff. Manure and feed waste will not be stockpiled adjacent to heavy use areas unless protected from weather and runoff elements.

Where manure is frequently scraped and concrete is used, all areas will be curbed and surface runoff directed to a waste storage facility.

Watering access ramps with multi-uses will be constructed with a minimum width of 10 feet and a maximum width of 20 feet in the upstream-downstream direction. "Livestock only" access ramps may be as narrow as 6 feet wide. Width is defined as the access surface and does not include the side slopes.

All cuts and fills for the access ramp will have side slopes that are stable for the soil or soil material involved. Side slopes of earth fills will be no steeper than 2.5 horizontal (H) to 1 vertical (V). Rock fills will be no steeper than 1.5 (H) to 1 (V). Cut slopes will be no steeper than 2.0 (H) to 1 (V).

Entrance and exit approaches to the access ramp will blend with the existing site conditions where possible, but will not be steeper than 5 (H) to 1 (V). The entrance and exit approach will be stable for the expected use. The same surfacing provided for the bottom may be needed.

Surface runoff will be diverted around the entrance and exit travel way to prevent runoff from entering the water supply.

Cutoff walls are needed at the beginning and end of the access ramp to protect against undercutting. The cutoff will extend into stable material.

Additional Criteria for Recreation Areas

The Americans with Disabilities Act of 1990 (ADA) requires recreation areas that are used by the public to be accessible to people with disabilities. Address accessibility requirements for new construction and when existing facilities are being altered.

CONSIDERATIONS

Heavy use areas can have a significant impact on adjoining land uses. These impacts can be environmental, visual and cultural. Select a treatment that is compatible with adjoining areas. Consider such things as proximity to neighbors and the land use where the stabilization will take place.

A prescribed grazing plan should be followed for all fields associated with the heavy use areas used for feeding to manage the vegetation to reduce runoff of nutrients.

Extending the grazing season by utilizing annuals, crop residue, and or stockpiled forages should be considered to reduce the number of days of hay/feed required.

Ideally, heavy use areas for livestock feeding should be kept to a maximum use time frame of 90 days.

Strategies to stringently unroll hay, rotate hay rings placed in the field, or feed in remote field locations when conditions permit for field access by equipment and where nutrients and organic matter are beneficial, will be considered before installing and or using heavy use areas for feeding.

Provide flexibility for future changes in pasture rotations and traffic routing.

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 practical, 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 or other reinforcing techniques may need to be employed to ensure that vegetation stabilization will succeed.

Consider the safety of the users 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.

Paving or otherwise reducing the permeability of the heavily used area 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. Consider the effects to ground and surface water.

Installation of heavy use area protection on muddy sites can improve animal health. Mud transmits bacterial and fungal diseases and provides a breeding ground for flies. Hoof suction makes it difficult for cattle to move around in muddy areas. In addition, mud negates the insulation value of hair coat and the animals must use more energy to keep warm. As temperatures fall, animal bunching may occur, which can reduce or eliminate vegetative cover and lead to erosion and water quality concerns.

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.

To the extent possible, maintain a 2 foot separation distance between the bottom of the surface material and the seasonal high water table or bedrock.

To reduce the potential for air quality problems from particulate matter associated with a heavy use area, consider the use of IN FOTG Standard (380) Windbreak/Shelterbelt Establishment, or national NRCS standards (603) Herbaceous Wind Barriers, (375) Dust Control from Animal Activity on Open Lot Surfaces, or (373) Dust

Control on Unpaved Roads and Surfaces to control dust from heavy use areas.

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

The size of heavy use areas used by livestock is dependent on the landowner's operation including type and animal number of animal, confinement periods, and/or the intended use.

Animal	Maximum recommended treatment area per animal (ft ²)
Dairy Cattle	200
Beef Cattle & Horses	100
Sheep & Goats	10

Heavy use protection areas should be kept as small as practical.

Consider ways 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. Two to three inches of agricultural lime also cleans easily and will reduce the amount of larger stone being spread with animal waste.

Consider using a fine aggregate surface a minimum of 2 inches thick for animal comfort.

When Ag lime is used as the aggregate, pack lime with adequate moisture and let dry before initial use to achieve the desired structure.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for Heavy Use Area Protection that describe the requirements for installing the practice according to this standard. As a minimum the plans and specifications will include:

1. A plan view showing the location and extent of the practice. Include the location and distances to adjacent features and known utilities.

2. Typical section(s) showing the type and required thickness of paving or stabilization materials.
3. A grading plan, as needed.
4. Where appropriate, plans for required structural details.
5. Method and materials used to stabilize areas disturbed by construction.

Construction specifications with site specific installation requirements.

OPERATION AND MAINTENANCE

Prepare an operation and maintenance (O&M) plan and review with the operator prior to practice installation. The minimum requirements to be addressed in the O&M plan are:

1. Periodic inspections – annually and immediately following significant rainfall events.
2. Prompt repair or replacement of damaged components especially surfaces that are subjected to wear or erosion.
3. For livestock heavy use areas, include requirements for the regular removal and management of manure, as needed.

For vegetated heavy use areas, restrict use as needed to protect the stand and to allow vegetative recovery.

REFERENCES

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

Korcak, R. F. 1998. Agricultural Uses of Coal Combustion Byproducts. P. 103-119. *In* Wright, R. J., et al (eds.) Agricultural Uses of Municipal, Animal and Industrial Byproducts. USDA-ARS, Conservation Research Report 44.

USDA-Natural Resources Conservation Service. 2014. Agricultural Engineering Note 4, *Earth and Aggregate Surfacing Design Guide*, Washington, DC.

Alberta Agriculture and Rural Development. 2001. Cattle Wintering Sites: Managing for Good Stewardship. Agdex #420/580-2.

CEAP Science Note: Livestock Concentration Areas on Intensively Managed Pastures. September 2014.