NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD
ARIZONA

ACCESS ROAD

(Ft.)

CODE 560

DEFINITION

An access road is an established route for equipment and vehicles.

PURPOSE

An access road is used to provide a fixed route for vehicular travel for resource activities involving the management of timber, livestock, agriculture, wildlife habitat, and other conservation enterprises.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where access is needed from a private or public road or highway to a land use enterprise or conservation measure, or where access is needed in a planned land use area.

Access roads range from single purpose, seasonal use roads, designed for low speed and rough driving conditions, to all-purpose, all-weather roads. Single purpose roads provide access to areas such as forest fire lines, forest management activities, remote recreation areas, or for maintenance of facilities.

This practice does not apply to temporary or infrequently used trails used for logging. Use NRCS Conservation Practice Standard (CPS) *Forest Trails and Landings (Code 655)*. Trails and walkways used for animals, pedestrians, or off-road vehicles are addressed in NRCS CPS *Trails and Walkways (Code 575).*

CRITERIA

Design the access road to serve the enterprise or planned use with the expected vehicular or equipment traffic. Factors in the design include the type of vehicle or equipment and the speed, loads, soils, climate, and other conditions under which vehicles and equipment are expected to operate.

Conservation Practices shall be designed on an individual basis to meet site conditions and functional requirements. They shall be part of an approved and overall engineering plan for irrigation, drainage, wildlife, recreation, channel improvement, or similar purposes. Design and implementation of subsidiary components and/or structures shall meet all applicable Natural Resource Conservation Service (NRCS) conservation practice standards. The criteria for the design of any components not specifically addressed in NRCS practice standards or specifications shall be consistent with sound engineering principles and/or manufacturer recommendations.

Laws and Regulations. *Plan, design, and construct access roads to comply with all federal, state, tribal and local laws, rules, and regulations. Laws and regulations of particular concern include those involving water rights, land use, pollution control, property easements, wetlands, preservation of cultural resources, and endangered species.*

The owner is responsible for securing necessary permits and water rights, complying with all laws and regulations, and meeting legal requirements applicable to the installation, operation, and maintenance of this practice and associated structures.

Location. Locate the access road to serve the purpose intended, to facilitate the control and disposal of surface and subsurface water, to control or reduce erosion, and to make the best use of topographic features. Design the layout of the road to follow natural contours and slopes to minimize disturbance of drainage patterns. Locate the access road where it can be maintained and where water management problems are not created. To reduce potential pollution, position the road as

far as possible from water bodies and watercourses. To the extent possible, do not impede overland flow.

Alignment. Adapt the gradient and horizontal alignment to the intensity of use, the mode of travel, the type of equipment and load weights, and the level of development.

Grades normally should not exceed 10 percent except for short lengths. A maximum grade of 15 percent should only be exceeded if necessary for special uses such as field access roads or fire protection roads.

Width. The minimum width of the roadbed for an all-purpose road is 14 feet for one-way traffic and 20 feet for two-way traffic. The roadbed width includes a tread-width of 10 feet for one-way traffic or 16 feet for two-way traffic and 2 feet of shoulder width on each side. Increase the two-way traffic width by a minimum of 4 feet for trailer traffic. Single purpose roads will have a minimum width of 10 feet with greater widths at curves and turnouts. Use vegetation or other measures to protect the shoulders from erosion.

Use turnouts on single lane roads where vehicles travel in both directions on a limited basis. Design the turnout to accommodate the anticipated vehicle use.

Provide a turnaround at the end of dead end roads. Size the turnaround for the anticipated vehicle type that will be using the road.

Provide parking space as needed to keep vehicles from parking on the shoulder or other undesirable locations.

Side Slopes. Design all cuts and fills to have stable slopes that are a minimum of 2 horizontal to 1 vertical. For short lengths, rock areas, or very steep hillsides, steeper slopes may be permitted if soil conditions warrant and special stabilization measures are installed.

Where possible, avoid areas with geological conditions and soils that are subject to slides. When the area cannot be avoided, treat the area to prevent slides.

Drainage. The type of drainage structures used will depend on the intended use and runoff conditions. Provide a culvert, bridge, ford, or surface cross drain for water management at every natural drainage way. The capacity and design of the drainage feature must be consistent with sound engineering principles and must be adequate for the class of vehicle, road type, land use in the watershed, and intensity of use.

When a culvert or bridge is installed in a drainage way, it must have a minimum capacity that is sufficient to convey the design storm runoff without causing erosion or road overtopping. Table 1 lists minimum design storm frequencies for various road types.

Table 1

Road Intensity & Usage	Storm Frequency
Intermittent; single purpose or farm use	2 year - 24 Hour
Frequent; farm headquarters, livestock access, isolated recreation areas	10 year - 24 Hour
High intensity; residential or public access	25 year - 24 Hour

Use NRCS CPS *Stream Crossing (Code 578)* to design stream crossings.

An erosion-resistant low point or overflow area may be constructed across the access road to supplement the culvert capacity on non-public use roads.

Surface cross drains, such as broad-based or rolling dips, may be used to control and direct water flow off the road surface on low-intensity use forest, ranch or similar roads. Protect the outlets of drainage measures to limit erosion. On steep grades where water could run down the road, use a broad-based dip or other similar feature to divert runoff. The surface cross drain must be constructed of materials that are compatible with the use and maintenance of the road surface. The discharge area for a surface cross drain must be well-vegetated or have other erosion resistant materials. See Figure 1 - Recommended Spacing of Surface Cross Drains Based on Soil Type. Reduce separation distances as needed to account for local hydrologic conditions.

Crown the road surface to direct precipitation off of the road.

Provide ditches, as needed, to move water away from the road. Maintain unobstructed flow into the ditches to prevent flows from causing roadside erosion. The capacity of a roadside ditch must be adequate to carry the

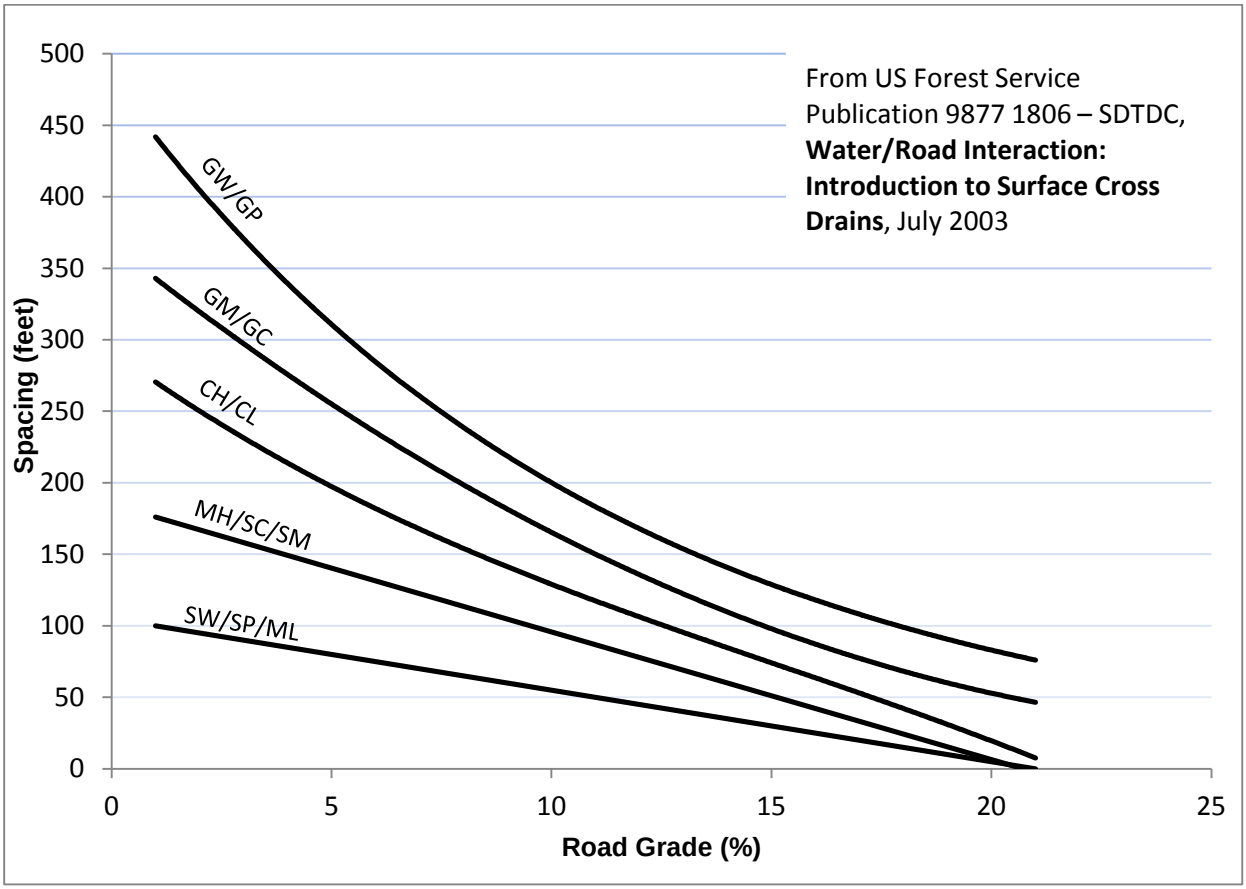
drainage from the road surface. Design ditch channels to have stable grades and side slopes. Provide a stable outlet for the ditch. Protection may include riprap or other similar *materials. Use NRCS CPSs such as Structure for Water Control (Code 587); Lined Waterway or Outlet (Code 468); or Grade Stabilization Structure (Code 410), if needed.*

Surfacing. Install a wearing course or surface treatment on the access road if required by traffic needs, soil, climate, erosion control, particulate matter emission control, or other site condition. If none of these factors apply, no special treatment of the surface is required.

When a treatment is used, the type of treatment will depend on local conditions, available materials, and the existing road base. On roads made of soils with weak bearing capacity, such as silts, organics, and clays, or where it is necessary to separate the surfacing material from the foundation material, place a geotextile material specifically designed for road stabilization applications under the surface treatment. Use the criteria in NRCS CPS *Heavy Use Area Protection (Code 561)* to design the surface treatment. Do not use toxic and acid-forming materials to build the road.

If dust control is needed, use NRCS CPS *Dust Control on Unpaved Roads and Surfaces (Code 373)*.

Figure 1. Recommended Spacing of Surface Cross Drains Based on Soil Types



Safety. Provide passing lanes, turnouts, guardrails, signs, and other facilities as needed for safe traffic flow. Design an intersection to a public highway to meet applicable federal, state and local criteria.

Erosion Control. Use the criteria in NRCS CPS *Critical Area Planting (Code 342)* or the NRCS State-approved seeding specification to *v*egetate road banks and disturbed areas as soon soil and climatic conditions are favorable. If permanent vegetation cannot be

established in a timely manner, use appropriate temporary measures to control erosion. If the use of vegetation is precluded and protection against erosion is needed, use the criteria in NRCS CPS *Mulching (Code 484)* to provide surface protection.

During and after construction, use erosion and sediment control measures to minimize off-site damages.

CONSIDERATIONS

Consider visual resources and environmental values during planning and design of the road system.

Limiting the number of vehicles and vehicle speed will reduce the potential for generation of particulate matter and decrease safety and air quality concerns.

Consider using additional conservation practices to reduce the potential for generation and transport of particulate matter emissions such as NRCS CPSs *Dust Control on Unpaved Roads and Surfaces (Code 373)* or *Windbreak/Shelterbelt Establishment (Code 380)*.

During adverse weather, some roads may become unsafe or may be damaged by use. Consider restricting access to the road at that time.

Consideration should be given to the following:

- Effects on downstream flows, wetlands or aquifers that would affect other water uses or users.
- Effects on wildlife habitats that would be associated with the practice.
- Utilizing buffers where possible to protect surface water.
- Short-term and construction-related effects of this practice.

PLANS AND SPECIFICATIONS

Provide plans and specifications *for access road that are guided by the National Engineering Handbook, Part 650, in accordance with the National Engineering Manual, Parts 541 and 542*, in keeping with this standard and that describe the requirements for applying the practice to achieve its intended purpose. As a minimum, include:

- *Project location map, including section, township and range, North arrow, cooperator/owner acknowledgement and certification signature blocks, engineering job class (cover sheet);*
- *References that the owner/cooperator are responsible for all permits, rights-of-way, easements and the contact, coordination and location determination of any existing utilities or clearances (buried utility disclaimer);*
- *If applicable, a map showing the location of the practice(s) or system in reference to a known or established benchmark or reference point with the location, description and elevation clearly shown. Topographical features and/or controls shall be shown, showing tie in with existing or other planned practices;*
- *Field surveys and notes, soil investigations or geologic soil boring locations and soil classifications, earthwork or material estimates/quantities (backfill material);*
- A plan *or system over*view of the proposed road that shows water features, known utilities, and other features that affect the design*; as well as construction and installation criteria, including State and Federal [OSHA] safety requirements;*.
- Road width and length with profile and typical cross section(s) including turnouts, parking, and turnarounds*;*
- Design road grades or maximum grades when applicable*;*
- Soils investigation. Location of soil borings and plot of the soil/geologic boring showing the USCS, as needed*;*
- Type and thickness of surface treatment including any subbase preparation*;*
- Grading plan*;*
- Cut and fill slopes where applicable.
- Planned drainage features*;*
- Location, size, type, length and invert elevations of all required water control structures*;*
- Vegetative requirements that include vegetation materials to be used, establishment rates, and season of planting, *if applicable;*
- Erosion and sediment control measures, as needed*;*

- Safety features*;* and
- *Use Arizona* Construction and material specifications *for each item of work and material, as applicable and available. Additional specifications may need to be written to provide full material and installation instructions. Fill in blanks and add items to the specifications to make them fit the job as needed*

All designs completed by non-NRCS personal shall meet minimum State licensing board requirements and NRCS requirements and criteria as outlined in the General Manual, the National Engineering Manual (including Arizona Supplements), and the National Engineering Handbook.

OPERATION AND MAINTENANCE

Prepare a written Operation and Maintenance Plan for the access road. As a minimum, include the following activities:

- Inspect culverts, roadside ditches, water bars and outlets after each major runoff event and restore flow capacity as needed. Ensure proper cross section is available and outlets are stable.
- Maintain vegetated areas in adequate cover to meet the intended purpose(s).
- Fill low areas in travel treads and re-grade, as needed, to maintain road cross section. Repair or replace surfacing materials as needed.
- Selection of chemical treatment(s) for surface treatment or snow/ice removal, as needed. Select the chemicals used for surface treatment or snow and ice removal to minimize adverse effects on stabilizing vegetation.
- Selection of dust control measures, as needed.
- *If fences are installed, they shall be maintained to provide warning and/or prevent unauthorized human or livestock entry.*
- *Immediately repair any damage resulting from vandalism, vehicles, livestock, wildlife, or wind/water erosion.*

REFERENCES

United States Forest Service. July 2003. *Water/Road Interaction: Introduction to Surface Cross Drains* (Publication 9877 1806 – SDTDC).