NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

ROOF RUNOFF STRUCTURE

(No.)
Code 558

DEFINITION

Structures that collect, control, and transport precipitation from roofs.

PURPOSES

To improve water quality, reduce soil erosion, increase infiltration, protect structures, and/or increase water quantity.

CONDITIONS WHERE PRACTICE APPLIES

Where roof runoff from precipitation needs to be:

- diverted away from structures or contaminated areas;
- collected, controlled, and transported to a stable outlet; or
- collected and used for other purposes such as irrigation or animal watering facility.

CRITERIA

General Criteria Applicable To All Purposes

Laws and regulations. Plan work to comply with all Federal, state, and local laws, rules, and regulations.

Impact to cultural resources, wetlands and Federal and state protected species shall be evaluated and avoided or minimized to the extent practicable during planning, design and implementation of this conservation practice in accordance with established National and Florida policy, General Manual (GM) Title 420-Part 401; Title 450-Part401, Title 190-Parts 410.22 and 410.26, National Planning Procedures Handbook (NPPH) Florida Supplements to Parts 600.1 and 600.6, National Cultural Resources Procedures Handbook (NCRPH), National Food Security Act Manual (NFSAM), and the National Environmental Compliance Handbook (NECH).

Design Capacity. Design roof runoff structures to have a minimum capacity of a 10-year frequency, 5-minute rainfall precipitation event, except where excluding roof runoff from manure management systems. In that case, design roof runoff structures to handle a 25-year frequency, 5-minute precipitation event. Refer to National Engineering Handbook (NEH) Part 651, Agricultural Waste Management Field Handbook (AWMFH), Appendix 10B for rainfall intensity maps.

When gutters are used, design the capacity of the downspout(s) to equal or exceed the gutter flow rate.

The AWMFH, Chapter 10, provides procedures for sizing gutters and downspouts.

Outlets. Discharge the runoff into surface or underground outlets, or onto the ground surface. Size surface and underground outlets to ensure

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

adequate design capacity and provide clean-out for the outlets as appropriate.

When runoff is conveyed through a gutter and downspout system, place an elbow and energy dissipation device at the end of the downspout to provide a stable outlet and direct water away from the building.

When roof runoff empties onto the ground surface, provide a stable outlet. Use surface or ground outlets such as rock pads, rock filled trenches with subsurface drains, concrete and other erosion-resistant pads, or preformed channels.

Supports. Provide adequate supports for gutters and downspouts to ensure the structure will withstand the anticipated design load.

Materials. Use roof runoff structures made of durable materials with a minimum design life of ten years. Roof gutters and downspouts may be made of aluminum, galvanized steel, wood, or plastic. Design aluminum gutters and downspouts with a nominal thickness of 0.027 inches and 0.020 inches, respectively. If galvanized steel gutters and downspouts are used, select material with a minimum of 28 gauge. If plastics are used, select material containing ultraviolet stabilizers. Ensure that dissimilar metals are not in contact with each other.

If rocks are used to fill trenches and pads, select poorly graded rock (all rock fragments approximately the same size) and free of appreciable amounts of sand and/or soil particles. Do not use crushed limestone for backfill material unless it has been washed. Select subsurface drains or outlets to be used to meet the material requirements of the applicable Florida NRCS conservation practice standard Subsurface Drain, Code 606 and/or Underground Outlet, Code 620.

Select concrete appurtenances to be used to meet the requirements of NRCS NEH Part 642, Specifications for Construction Contracts Chapter 2, Construction Specification 32, Structure Concrete.

Protection. Protect roof runoff structures from damage by livestock and equipment.

Additional Criteria to Increase Infiltration

Route runoff onto pervious landscaped areas (e.g. lawns, mass planting areas, infiltration trenches and natural areas) to increase infiltration of runoff. Select these areas to infiltrate the runoff in such a way that replenishes soil moisture without adversely affecting the desired plant species.

Additional Criteria to Protect Structures

Direct roof runoff away from structure foundations to avoid wetness and hydraulic loading on the foundation.

On expansive soils or bedrock, discharge runoff a minimum of five (5) feet from the structure by using downspout extensions.

Slope the discharge area for runoff away from the protected structure.

Additional Criteria to Increase Water Quantity

Design storage structures for non-potable purposes such as irrigation water in accordance with Florida NRCS conservation practice standards, as appropriate.

Construct potable water storage structures of materials and in a manner that will not increase the contamination of the stored water. Treat roof runoff collected and stored for potable uses prior to consumption and test periodically to assure that adequate quality is maintained for human consumption.

CONSIDERATIONS

Avoid discharging outlets near wells, and sinkholes, or into structures that discharge directly into surface waters.

Some designs may provide secondary benefits (e.g. rock pads may also reduce rodent problems around livestock and poultry farms).

PLANS AND SPECIFICATIONS

Describe the requirements for applying the practice to achieve its intended purpose in the plans and specifications. As a minimum the plans and specifications shall include:

- Location of all gutters, downspouts, and outlets.
- Spacing and size of all gutters, downspouts and outlets.
- Slope of gutters.

- Type, quality, and quantity of all materials used.
- Other practices essential to the proper functioning of the roof runoff structure, such as underground outlets.
- Location of utilities and notification requirements.

OPERATION AND MAINTENANCE

Develop an operation and maintenance (O&M) plan that is consistent with the purposes of the practice, intended life, safety requirements, and the criteria for the design. The O&M plan shall contain, but not limited to the following provisions:

- Keep roof runoff structures clean and free of obstructions that reduce flow.
- Make regular inspections and perform repair maintenance as needed to ensure proper functioning of the roof runoff structures.
- Inspect roof runoff structures after each storm event.

REFERENCES

Florida NRCS Conservation Practice Standards
Subsurface Drain, Code 606
Underground Outlet, Code 620
General Manual
Title 420-Part 401
Title 450-Part401
Title 190-Parts410.22 and 410.26
National Cultural Resources Procedures Handbook
National Engineering Handbook Part 642, Specifications for Construction Contracts, Chapter 2, Construction Specification 32, Structure Concrete
National Engineering Handbook Part 651, Agricultural Waste Management Field Handbook, Chapter 10
National Engineering Handbook Part 651, Agricultural Waste Management Field Handbook, Appendix 10B
National Environmental Compliance Handbook
National Food Security Act Manual
National Planning Procedures Handbook
Florida Supplements to Parts 600.1 and 600.6