**ROCK DAM**

**Purpose**
To trap sediment on the construction site and prevent off-site sedimentation. Useful where earth fill material is not readily available (Figure 6.63a).

Figure 6.63a
Wide spillway keeps discharge velocity low.

**Minimum Requirements**
- **Drainage area**: limited to 50 acres.
- **Design life**: limited to 3 yrs.
- **Sediment storage**: 1800 ft³/acre disturbed minimum, measured 1 ft below spillway crest.
- **Dam crest height**: limited to 8 ft.
- **Basin area and shape**: the largest surface area gives the greatest trapping efficiency. Basin length-to-width ratio should be 2:1 minimum.
- **Spillway capacity**: 10-yr peak runoff, at maximum flow depth of 1 ft and minimum freeboard of 1 ft. Entire length of dam between rock abutments may serve as spillway.
Rock embankment (Figure 6.63b):
  Top width—5 ft minimum
  Side slopes—upstream, 2:1 or flatter
  —downstream, 3:1 or flatter

Earth abutments: smooth, stable slopes, 2:1 or flatter.

Rock abutments: must protect earth abutments and extend along downstream face to toe of dam. Abutments must be at least 1 ft higher than the spillway face at all points.
  Height—2 ft minimum above spillway crest
  Width—2 ft thick, minimum
  Side slopes—2:1 or flatter

Outlet protection: rock apron, 1.5 ft thick, minimum, zero grade, length equal to height of dam or extended to stable grade, whichever is greater.

Rock material: well graded, hard, angular, weather-resistant stone with a d50 of 9 inches minimum.

Protection from piping: extra-strength filter fabric covers entire foundation including earth abutments and apron (Figure 6.63b).

Basin dewatering: through 1 ft thick minimum layer of 1/2- to 3/4-inch aggregate on upstream face of dam (NC DOT #57 or #5 washed stone).

Installation

Divert runoff from undisturbed areas away from the basin (reference Practice 6.20, Temporary Diversions). Delay clearing pond area until dam is in place.

Excavate foundation for apron and use it as a temporary sediment basin during construction of dam.

Clear and grub area under dam, removing all root mat and other objectionable material. Grade earth abutments no steeper than 1:1. Dispose of material in approved location.

If cutoff trench is required, excavate at center line of dam, extending all the way up earth abutments.
Protection from Piping

The entire foundation including both earth abutments must be covered by filter fabric. Overlap 1 ft at all joints, upstream strip over downstream strip (Figure 6.63b).

Smooth the foundation area before placing filter fabric. Be careful placing rock on fabric. It may be helpful to place a 4-inch layer of sand over fabric before placing rock.

Embarkment and Pool

Construct embarkment to dimensions shown on plans. Use well-graded, hard, angular, weather-resistant rock. Rock abutments must be at least 2 ft higher than the spillway crest and at least 1 ft higher than the downstream face of dam at all points (Figure 6.63c).

Figure 6.63b Rock dam cross section.

Divert sediment-laden flow to upper end of basin.

Set marker stake to indicate clean out elevation where sediment pool is 50% full.

Stabilize all disturbed areas except the lower one-half of sediment pool as shown in the vegetation plan.
Safety  Sediment basins that impound water are hazardous. Basin should be dewatered between storms. Avoid steep side slopes. Fences with warning signs may be necessary if trespassing is likely. State and local requirements must be followed.

Spillway Detail

Figure 6.63c Plan view of rock dam with spillway detail.
Common Trouble Points

- Failure from piping along abutments—filter material not properly installed, or earth abutments too steep.
- Stone displaced from face of dam—stone size too small and/or face too steep.
- Erosion below dam—apron not extended to stable grade.
- Erosion of abutments during spillway flow—rock abutment height inadequate.
- Sediment carried through spillway—drainage area too large. Divert runoff from undisturbed area away from basin.
- Sediment loss through dam—inadequate layer of aggregate on inside face or aggregate too coarse to restrict flow through dam.

Maintenance

Inspect rock dam and pool after each rainfall event.

Remove sediment when it accumulates to one-half design volume (marked by stakes).

Check structure and abutments for erosion, piping, or rock displacement. Repair immediately.

Replace aggregate on inside face of structure when sediment pool does not drain between storms.

Add fine gravel to upstream face of dam if sediment pool drains too rapidly (less than 6 hrs) following a storm.

Remove rock dam after the contributing drainage area has been permanently stabilized, inspected, and approved. Remove all water and sediment prior to removing dam. Dispose of waste materials in designated disposal areas. Smooth site to blend with surrounding area and stabilize according to vegetation plan.