Check Dams BMP 32

Description

Check dams are small dams constructed in open channels, swales, or drainageways. Check dams may be temporary or permanent barriers made of logs and brush, straw bales, stone, or other materials. A triangular silt dike is a geotextile-encased check dam that consists of a urethane foam core encased in geotextile material. Check dams are used to reduce or prevent excessive bank and bottom erosion by reducing the gradient or runoff velocity.

Applications

Check dams are often used in natural or constructed channels or swales where adequate vegetation cannot be established promptly. They are used below small drainage structures (smaller than 36 in. pipe culverts) but may be used below large structures if a diversion ditch cannot be used. Log and brush check dams should be placed where they will not cause flooding and where they can be left in place.

An array of three-dimensional manufactured barriers is also available: triangular and burrito-shaped, prefilled and fillable on-site, reusable and disposable, and temporary and more-or-less permanent. Triangular silt dikes are temporary, reusable barriers consisting of a triangular urethane foam core covered by permeable, woven geotextile fabric. From 16 to 20 in. wide at the base and usually 8 to 10 in. high, the silt dike is typically used at the toe of a slope to contain sediment from runoff or perpendicular to the flow of water in a drainage ditch.

Limitations

Drainage area – 10 ac.
Minimum bedrock depth – 2 ft
NRCS soil type - ABCD
Drainage/flood control – yes
Maximum slope – 50%
Minimum water table - N/A
Freeze/thaw – good

Check dams should never be placed in live streams unless approved by appropriate local, state and/or federal authorities.

Targeted Pollutants

Sediment

Design Parameters

- The drainage area above the check dam should be between 1 and 4 acres.
- The dams should be spaced so that the toe of the upstream dam is never any higher than the top of the downstream dam. Excavating a sump immediately upstream from the check dam improves its effectiveness.
- Maximum height should be 2 ft. The center of the dam should be 16 to 10 in. lower than either edge, to form a weir for the outfall.
- The check dam should be as much as 20 in. wider than the banks of the

channel to prevent undercutting as overflow water re-enters the channel.

- Provide outlet stabilization below the lowest check dam (where the risk of erosion is greatest) and consider the use of channel linings or protection such as plastic sheeting or riprap where there may be significant erosion or prolonged submergence.
- Materials:
  - ✓ Stone 2 to 16 in. in diameter
  - ✓ Logs 6 to 8 in. in diameter
  - ✓ Sandbags filled with pea gravel
  - ✓ Filter fabric meeting the standard specifications (see BMP 36-Silt Fence)
- The logs should be driven into the ground a minimum of 28 in..

Construction Guidelines

Rock check dams: Place the stones on filter fabric either by hand or using appropriate machinery; do not simply dump them in place. Keep the side slopes 1:2 or flatter. Lining the upstream side of the dam with a layer of 0.8 to 1.1 in. gravel and 12 in. deep is a suggested option for additional channel protection.

Log check dams: Logs should be firmly embedded in the ground. Intermingled brush and logs or filter cloth may be attached to the upstream side of the dam to retard the flow and trap additional sediment. If a filter cloth is used, it should be securely stapled to the top of the dam and adequately anchored in the streambed.

Sandbag check dams: Be sure that all bags are securely sealed. Place the bags by hand or use appropriate machinery to place them in an interlocking pattern.

Gravel-filled burlap bags: Gravel-filled burlap bags may be used for temporary check dams in areas of concentrated flow. Fold the burlap bag flaps under the bags in a direction away from the water flow. Construct gravel bag check dams such that the crest of the downstream check dam is approximately level with the toe of the upstream check dam. Install check dams so the side end points are higher than the centerline crest. Erosion caused by high flows around the edges should be corrected immediately.

Triangular silt dike: The flexibility of the materials in triangular silt dikes allows them to conform to all channel configurations.

- They can be fastened to soil with staples or rock and pavement with adhesives.
- They have been used to build temporary sediment ponds, diversion ditches, concrete wash out facilities, curbing, water bars, level spreaders, and berms.

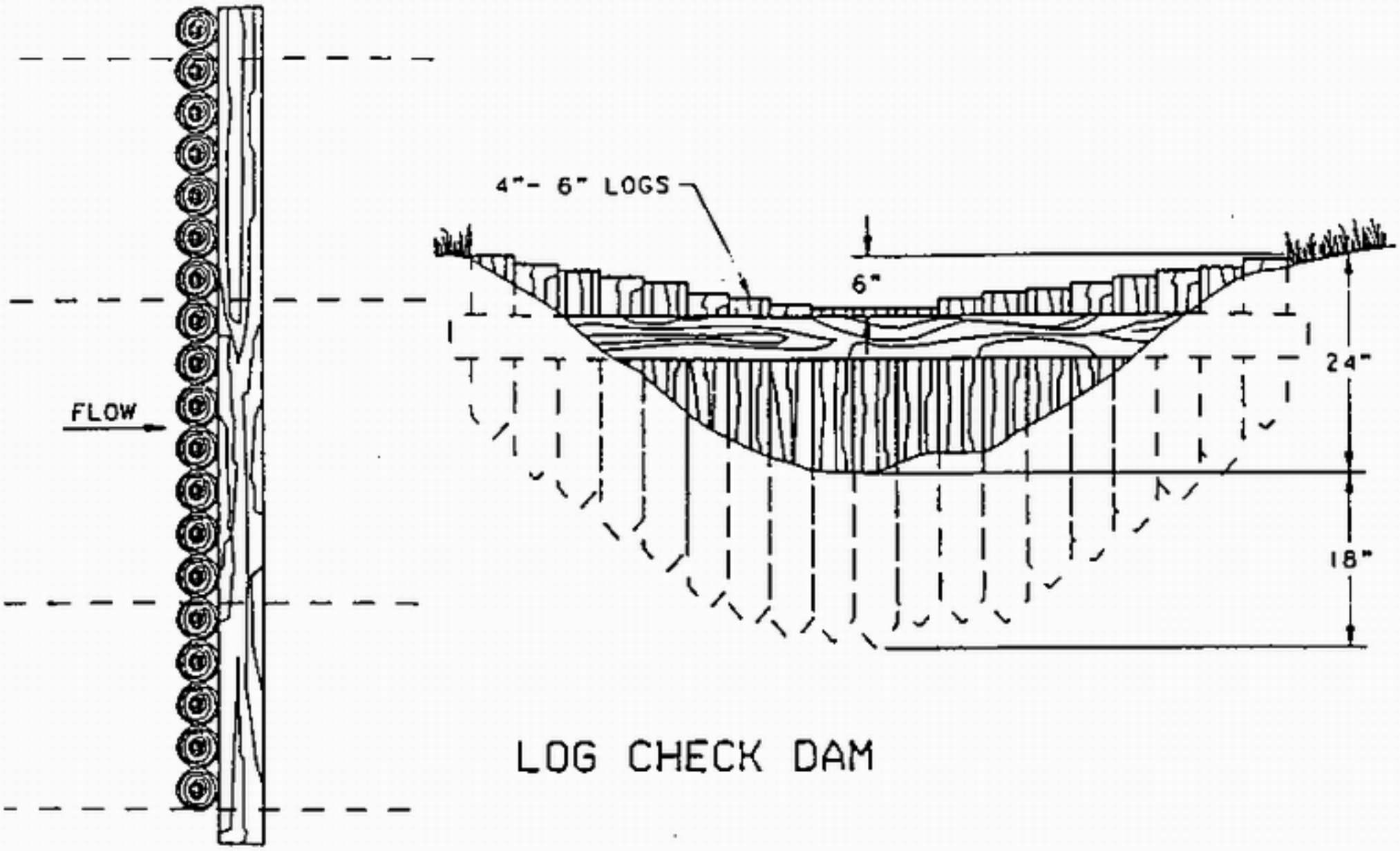
Riprap may be necessary on the downstream side of the dam to protect the streambed from scour.

Maintenance

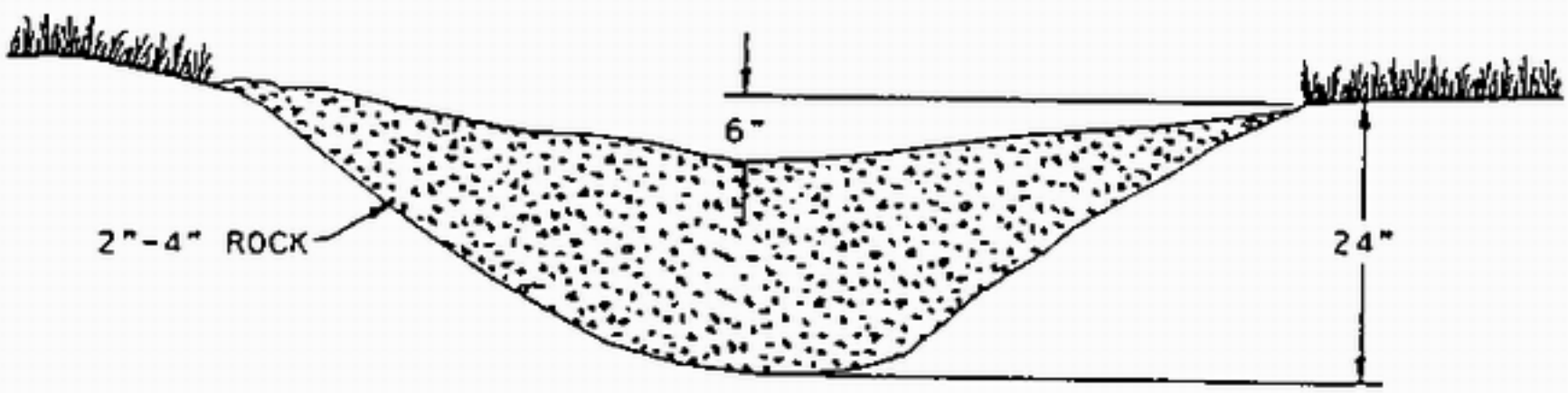
- Inspect the check dams regularly and after every runoff-producing storm. Make any repairs necessary to ensure the measure is in good working

order.

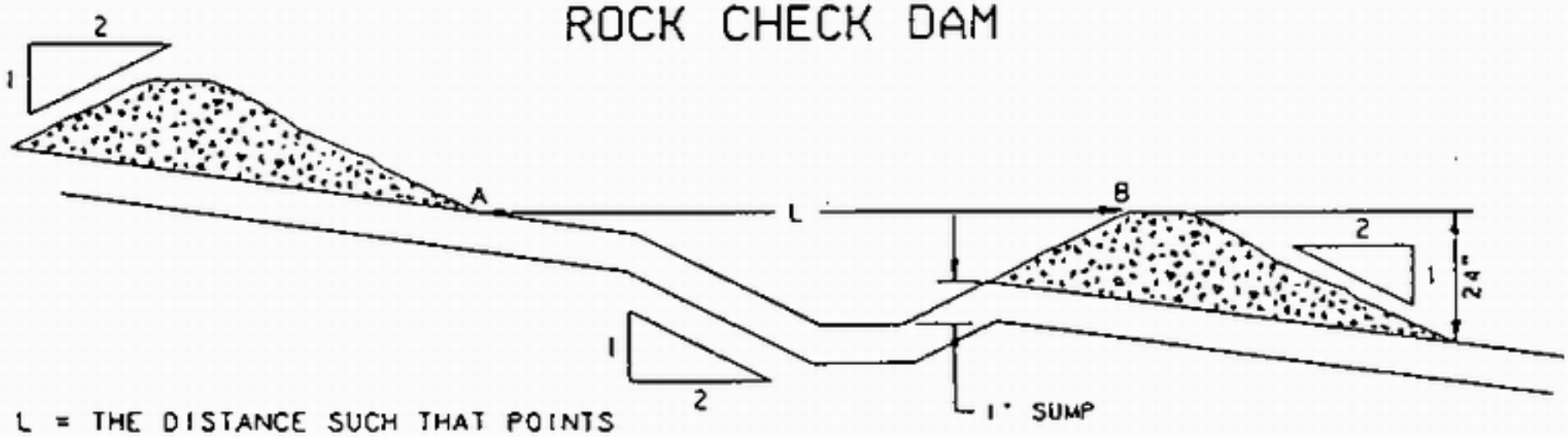
- Remove accumulated leaves and sediments from behind the dam when they reach a depth of one-half the original height of the dam. Dispose of all materials properly so they do not contribute to pollution problems at the disposal site.
- Restore stone as necessary for the dams to maintain their correct height.
- On sandbag dams, inspect the sandbag fabric for signs of deterioration.



LOG CHECK DAM



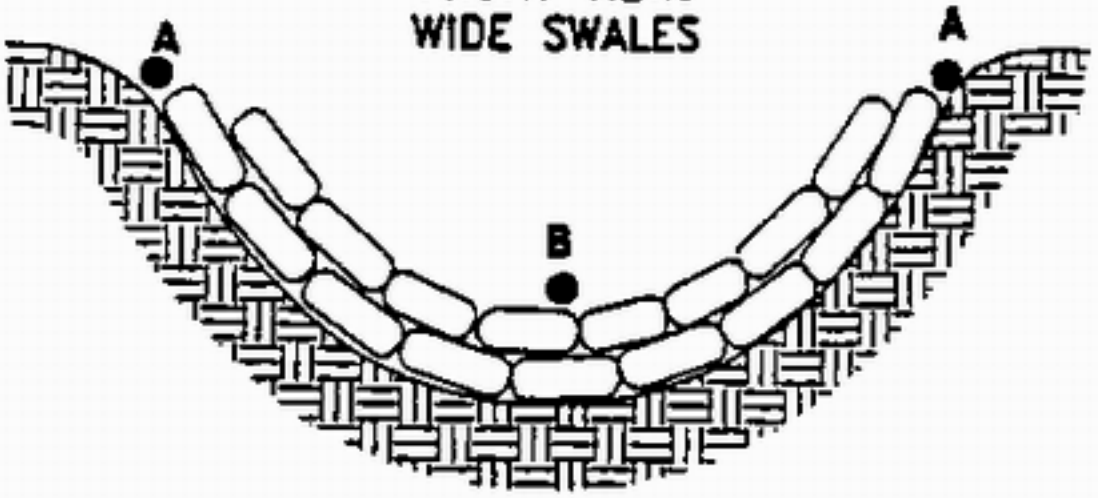
ROCK CHECK DAM



L = THE DISTANCE SUCH THAT POINTS A AND B ARE OF EQUAL ELEVATION

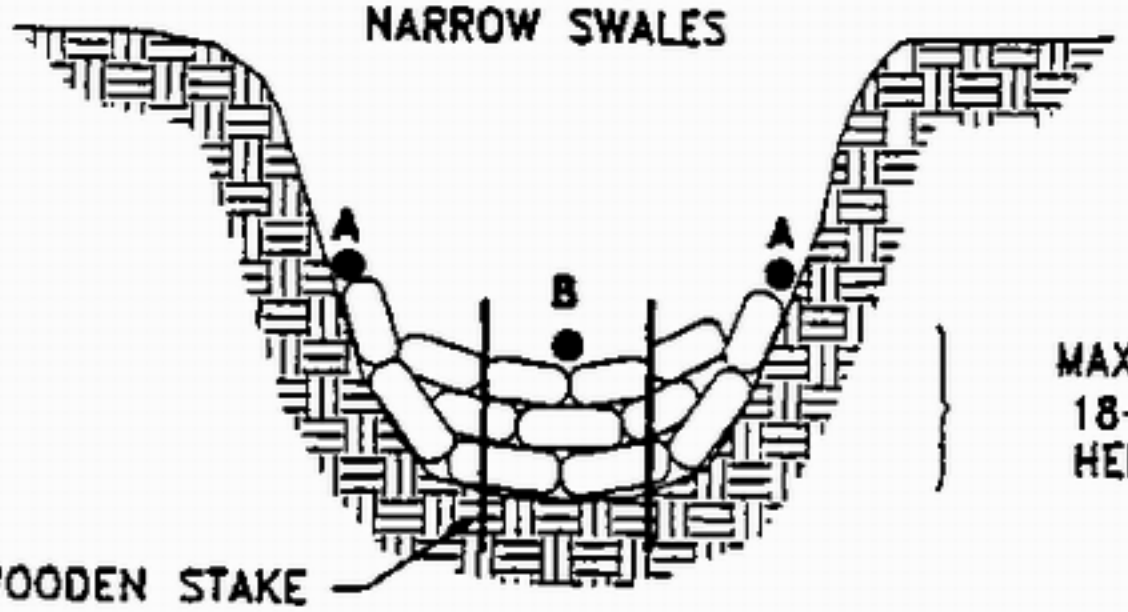
SPACING BETWEEN CHECK DAMS

FRONT VIEW:
WIDE SWALES



SIDE VIEW:
WIDE SWALES

FRONT VIEW:
NARROW SWALES



SIDE VIEW:
NARROW SWALES