



DAM SAFETY
POLICY MEMORANDUM #1

TO: Dam Owners, Operators, and Engineers

FROM: Sediment, Stormwater, and Dam Safety Program
Water and Science Administration

DATE: February 25, 2019

SUBJECT: Maintenance and Repair: Trees and Woody Vegetation

Policy Statement

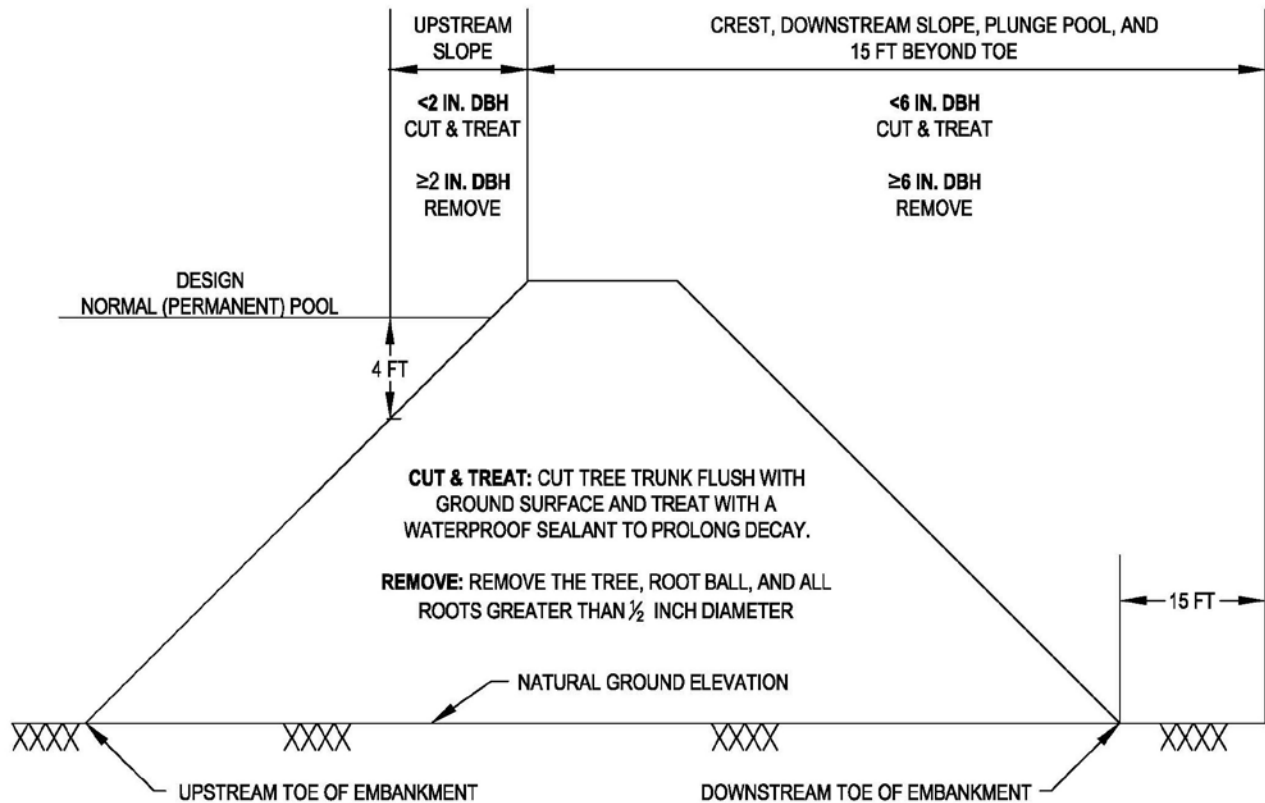
It is the policy of the Maryland Department of the Environment (the Department) that trees and other woody vegetation shall not be permitted to grow on or near dams or their appurtenant works. Prompt removal of woody vegetation in accordance with this policy is required of all dam owners in the State of Maryland.

Background

The growth of trees and woody vegetation negatively affects the integrity of the dam structure. Extensive root systems can weaken and loosen the soil matrix and provide seepage pathways for water. Trees that blow down or fall over can leave large holes in the embankment that can lead to increased erosion, loss of freeboard, and even failure of the dam. Brush obscures the surface and limits visual inspection, provides a haven for burrowing animals, and retards growth of non-woody vegetation. Tree and brush growth adjacent to concrete walls and structures may eventually cause damage and must be removed.

Removal of Trees and Woody Vegetation

Dam owners must maintain all areas of the dam free from trees and woody vegetation. These include areas within 15 feet of the upstream and downstream toe of embankment; within a 25-foot radius of the control structure; and within 15 feet of the abutment contacts, outlet, spillway area, and plunge pool. In emergency/auxiliary spillway channels, trees and woody vegetation must be removed in the zone extending 15 feet (horizontal) from the bottom edge of the spillway channel, or to a point two (2) feet above the water surface elevation in the channel during the design storm, whichever is greater. Where trees and woody vegetation exist in these areas, the extent of remedial activities (flush cut or full removal) will depend on the location and size of the tree, as presented in Figure 1. Removal of the stump and root ball and placement of controlled embankment fill material must be performed in accordance with detail TR-1 "Removal of Woody Vegetation on Dams".



Notes:

1. Diameter at breast height (DBH) refers to the tree trunk diameter measured at 4.5 feet above the ground.
2. For dams with no permanent pool, tree cutting and root removal shall extend 15 feet beyond the toe of the upstream slope.
3. Trees within the 25-foot “no-tree” zone around spillways, but greater than 15 feet from the upstream slope shall be removed or cut flush to the ground and treated regardless of DBH.

Figure 1: Tree Cutting and Removal Zones

Removal of the stump and roots of a tree and placement of embankment fill may require a permit from the Department’s Dam Safety Division for any dam listed on the Maryland Dam Inventory. For low hazard dams not on the Dam Inventory, approval may be required from the appropriate approval authority (the local Soil Conservation District, the Department’s Plan Review Division, or other delegated entity). It is important to note that in many cases wet pool elevations will need to be drawn down prior to vegetation removal. Where a significant portion of the embankment will be disturbed due to the removal of a large number of trees, or where the removal of the trees may impact the spillway, internal drains and filters, the impervious core, or other dam appurtenances, special details must be provided by a Maryland registered professional engineer for review by the appropriate approval authority.

Restoration of Disturbed Areas

Following tree removal activities, a dense cover of low-growing grassy vegetation must be established where the earth has been disturbed or in areas of sparse ground cover. Grassy vegetation is recommended because it will provide protection from surface erosion, but its root structure does not penetrate the embankment so deeply as to weaken the dam structure. Deeper-rooted grasses should be planted in vegetated earth spillways. Seeding should be accomplished between optimum planting dates. Seeding late in the year may result in winterkill of young seedlings. The following spring an inspection of the seeded area should be made to determine if plant survival is satisfactory.

Before seeding, topsoil, fertilizer, and lime must be applied. Application rates will vary with soil type and condition, and can be determined by having the soil tested. The fertilizer and lime should be raked, disked or harrowed into the soil to a depth of not less than four (4) inches. Periodic fertilization is necessary to maintain vigorous vegetation. Immediately following seeding, the area should be mulched.

Recommended seeding mixtures, planting dates, and fertilizer application rates for dams are provided in Appendix B-4-5, "Standards and Specifications for Permanent Stabilization" in the *2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control*.

Plantings on Roadway Dams

The Department allows a limited exception to this policy for planting of certain trees or similar woody vegetation along the crest of roadway embankments used as dry stormwater management structures (i.e., those structures that act as dams, rather than culverts). While planting trees on roadway embankments is discouraged, the following conditions must be met to allow limited woody vegetation plantings:

1. The structure shall have no permanent wet pool.
2. The dam shall be classified as low hazard only.
3. The structure shall have a minimum of three (3) feet of freeboard between the peak 100-year water surface elevation (WSEL) and the lowest point on the crest of the dam.
4. The width of the dam embankment measured three (3) feet above the peak 100-year WSEL shall be no less than 50 feet.
5. Woody vegetation planting is acceptable only on the top of the dam along the edge of the roadway.
6. Woody vegetation planting shall not be permitted on the side slopes.
7. Woody vegetation planting is not permitted within 15 feet from the spillway, toe, or abutments of the dam.
8. Planting may consist only of trees or shrubs with a shallow root system (less than three (3) feet depth) when mature. A landscape plan showing the type and location of plantings shall be submitted for review and approval by the appropriate authority. The plan shall be prepared by a Maryland registered landscape architect with a note certifying that the proposed plantings have a shallow root system.

Figure 2 illustrates acceptable and unacceptable applications of this policy exemption.

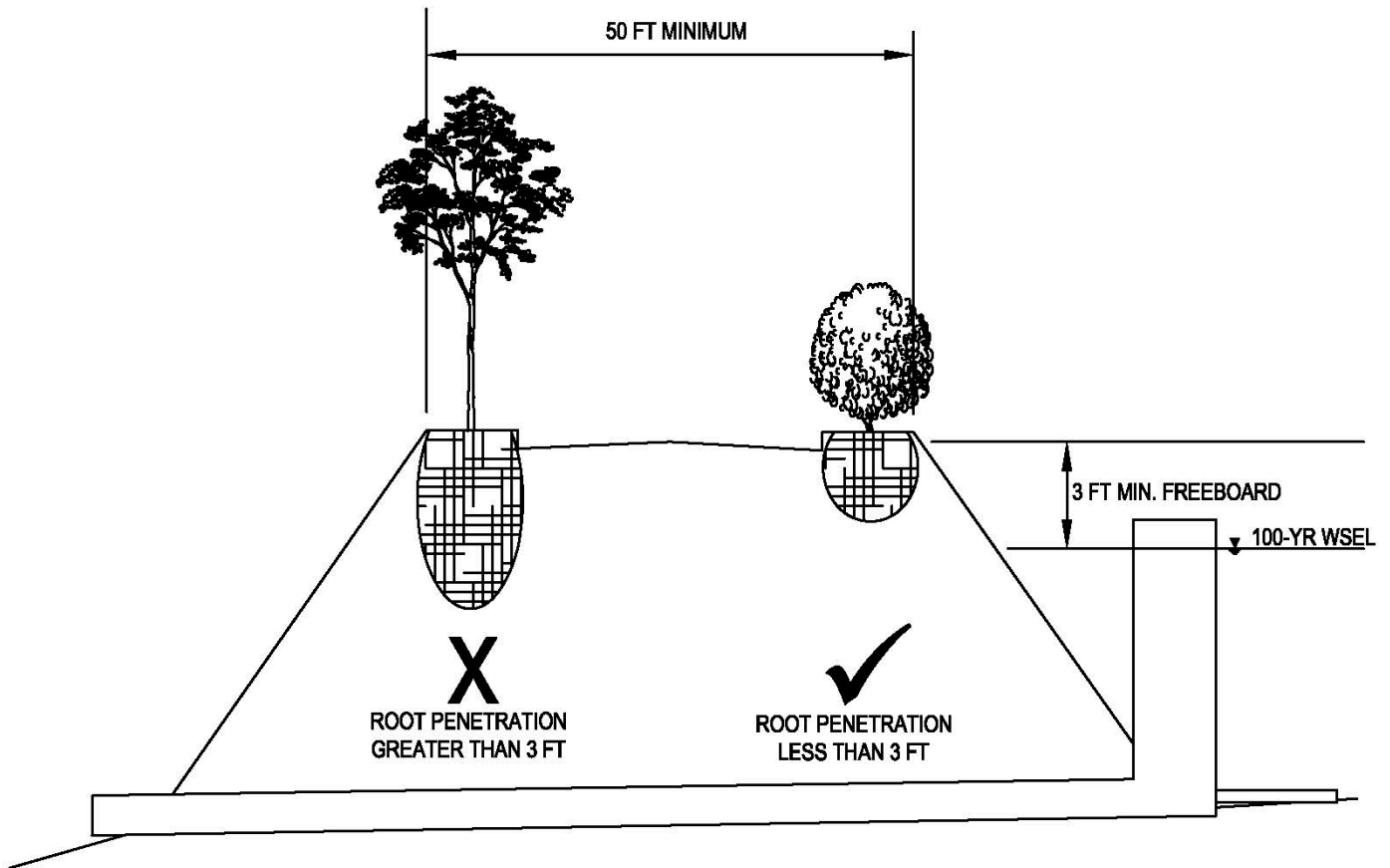
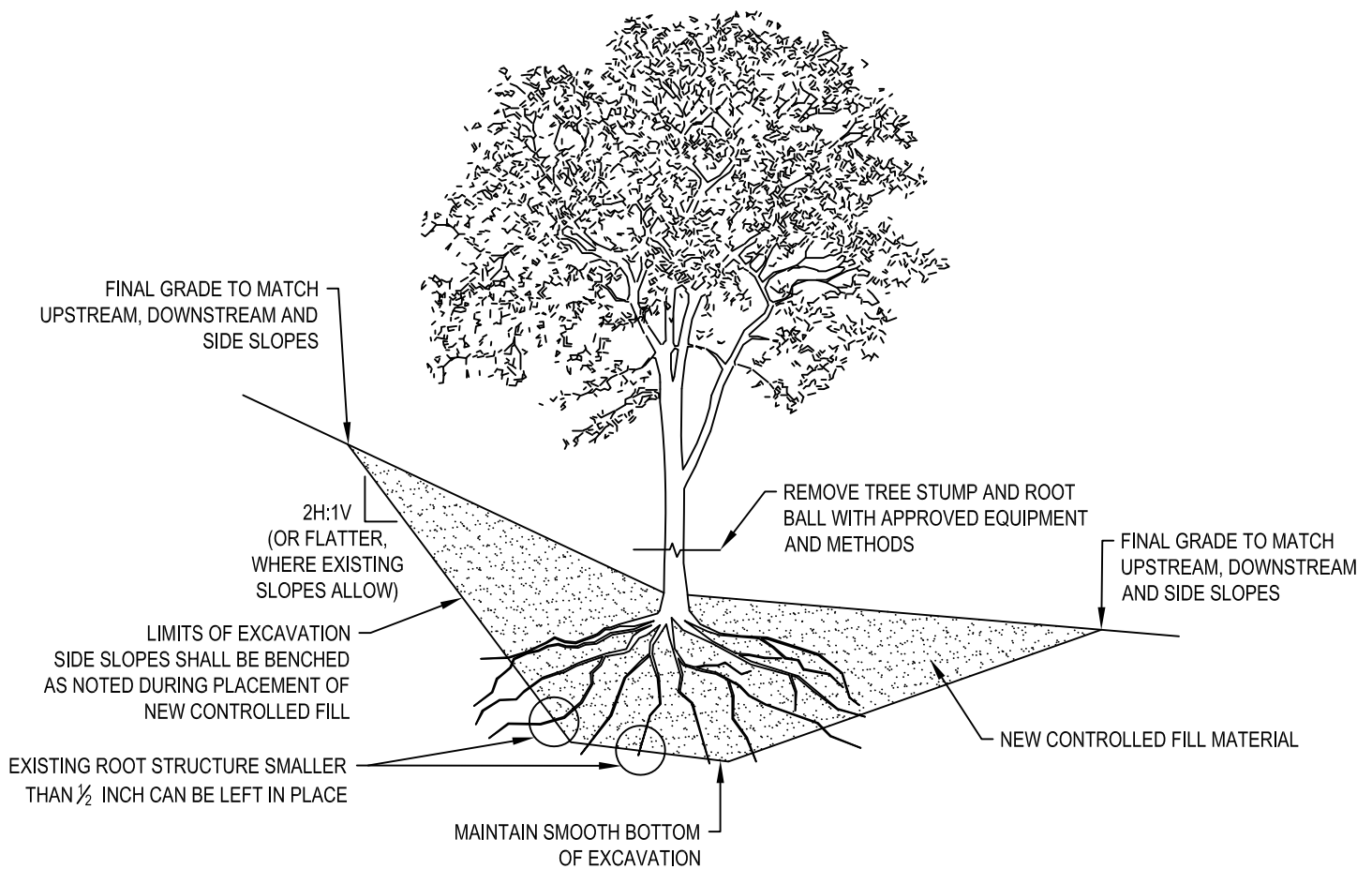


Figure 2: Plantings on Dams Used as Roadway

Additional Information

For additional information on this subject, refer to “Technical Manual for Dam Owners – Impacts of Plants on Earthen Dams”, Chapter 5 – Controlling Tree and Woody Vegetation Growth (FEMA 534/September 2005).

Questions about this policy or other items relating to ponds and dams can be directed to the Chief of the Dam Safety Division at 410-537-3538.



NOTES:

1. TREE STUMP REMOVAL ON OR WITHIN 15 FEET OF A DAM SHALL BE COMPLETED IN STRICT ACCORDANCE WITH THE DETAIL AND UNDER THE SUPERVISION OF A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF MARYLAND EXPERIENCED IN DAM DESIGN AND CONSTRUCTION.
2. POOL LEVELS SHALL BE DRAWN DOWN AND MAINTAINED TO AN ELEVATION EQUAL TO OR LOWER THAN THE ANTICIPATED ELEVATION AT THE BOTTOM OF EXCAVATION OR TO THE BOTTOM OF THE POND PRIOR TO MAKING ANY EXCAVATIONS TO REMOVE STUMPS AND ROOTS.
3. A QUALIFIED PROFESSIONAL ENGINEER, OR THEIR REPRESENTATIVE, MUST BE ON-SITE FULL-TIME DURING STUMP REMOVAL. TREE STUMP EXCAVATIONS SHALL BE BACKFILLED AND APPROVED PRIOR TO BEGINNING ADDITIONAL REMOVALS AND EXCAVATIONS.
4. TREE STUMPS SHALL BE REMOVED TO A DEPTH SUCH THAT NO ROOT STRUCTURE LARGER THAN 1/2 INCH DIAMETER IS LEFT IN PLACE. THE ENGINEER SUPERVISING THE WORK MAY EXERCISE JUDGEMENT WHERE TAP ROOTS EXTEND TO SIGNIFICANT DEPTHS BELOW EXISTING GRADES.
5. THE EXCAVATION SHALL EXTEND TO THE DEPTH WHERE SUITABLE AND STABLE SOILS ARE ENCOUNTERED. THE EXCAVATION SHALL BE AS SMALL AS POSSIBLE. THE BOTTOM OF THE EXCAVATION SHALL BE AS FLAT AS POSSIBLE. ALL LOOSE SOIL SHALL BE REMOVED FROM THE EXCAVATION.
6. EXCAVATIONS SHALL NOT EXTEND TO DEPTHS GREATER THAN FOUR (4) FEET BELOW EXISTING GRADES, MEASURED FROM THE HIGHEST UPSTREAM POINT OF THE EXCAVATION, UNLESS APPROVED BY THE ENGINEER. EXCAVATIONS SHALL BE MADE IN ACCORDANCE WITH ALL APPLICABLE OSHA EXCAVATION AND TRENCHING SAFETY REQUIREMENTS.
7. ALL NEW CONTROLLED FILL SHALL BE FREE OF ROOTS, STUMPS, WOOD, RUBBISH, STONES GREATER THAN SIX (6) INCHES, FROZEN OR OTHER OBJECTIONABLE MATERIALS. FILL SHALL CONFORM TO UNIFIED SOIL CLASSIFICATION GC, SC, CH OR CL AND SHALL HAVE AT LEAST 30% PASSING THE #200 SIEVE. FILL SHALL BE PLACED IN LIFTS NO GREATER THAN EIGHT (8) INCHES LOOSE THICKNESS AND COMPACTED TO A MINIMUM OF 95% MAXIMUM DRY DENSITY (ASTM D698, STANDARD PROCTOR) WITH A MOISTURE CONTENT WITHIN +/- 2% OF THE OPTIMUM .
8. IN GENERAL, ALL SLOPING EXCAVATIONS CREATED FROM THE REMOVAL AND EXCAVATION PROCESS SHOULD BE NO STEEPER THAN 2 HORIZONTAL TO 1 VERTICAL (2:1), WHERE PRACTICABLE, AND SHALL BE BENCHED OR NOTCHED SO THAT A SMOOTH SLOPING INTERFACE BETWEEN EXISTING GROUND AND NEW FILL IS NOT PRESENT.
9. NO DEBRIS GENERATED FROM THE STUMP REMOVAL SHALL REMAIN ON, OR WITHIN 15 FEET OF THE DAM EMBANKMENT FOLLOWING THE COMPLETION OF WORK. DEBRIS MUST BE DISPOSED OF IN A MANNER CONSISTENT WITH ALL LOCAL AND STATE REGULATIONS.
10. IF WATER IS ENCOUNTERED IN THE TREE STUMP CAVITY AND/OR EXCAVATION, A PERMANENT FILTER DRAIN MAY BE REQUIRED TO CONTROL SEEPAGE. IMMEDIATELY BACKFILL THE EXCAVATION WITH FINE AGGREGATE MEETING THE REQUIREMENTS OF SECTION 901, AGGREGATES OF THE MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION, 2017 STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, THEN CONTACT THE MDE DAM SAFETY DIVISION FOR FURTHER GUIDANCE.
11. THIS DETAIL DOES NOT APPLY WHERE EXCAVATIONS TO REMOVE TREE STUMPS MAY INTERCEPT OR DAMAGE EXISTING FILTERS, INTERNAL DRAINS, IMPERVIOUS CORES, SPILLWAY CONDUITS OR SIMILAR DAM ELEMENTS, FOR WHICH PROJECT SPECIFIC DETAILS SHALL BE DEVELOPED FOR REVIEW BY THE APPROPRIATE APPROVAL AUTHORITY.