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DATE: May 23, 2022

MEMORANDUM

To: All Regional Engineers and Staff

From: Josh Colley, PE – State Dam Safety Engineer

Subject: Dam Safety Guidance Regarding Trees on Dams

On February 4, 2020 a memorandum (memo) was issued revising the North Carolina Dam Safety Program's (Dam Safety) guidance with regards to the trees and other vegetation on dams. In general, this guidance redefined small and large trees as those with diameters at breast height of less than or greater than three inches, respectively. The purpose of this memo is to revise this guidance to define small and large trees as those with diameters at breast height of less than or greater than six inches, respectively. This new guidance aligns the Dam Safety's policy more closely with the state of the practice and generally accepted guidance from Federal agencies and other State Dam Safety Programs. Specifically, this will align our guidance with the Federal Emergency Management Agency (FEMA) 534 "Technical Manual for Dam Owners, Impacts of Plants on Earthen Dams" and the United States Army Corps of Engineers (USACE) EP 1110-2-18 "Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures".

The guidance provided in this memo shall apply to all cases, including projects which were previously approved under the earlier, more stringent guidance.

General Guidance

All trees, brush, and woody vegetation should be removed from all parts of the dam and appurtenant works and within 15 feet of any part thereof. This includes: the crest, slopes, abutments and groin areas of the dam, emergency spillway areas (including outlet channel), plunge pool and rip-rap areas. Regular mowing and maintenance should be performed to prevent trees and brush from becoming (re)established. Rip-rap areas may be kept clear using herbicides specific to woody vegetation and approved for use near open water.

Any trees and brush less than six inches in diameter at breast height may be removed (as maintenance) by cutting flush to the ground. Be sure to cut low enough that the remaining stump does not interfere with mowing activities. Apply a tree-specific herbicide to the stump



such as triclopyr to prevent regrowth. Reseed, mulch, and fertilize any bare areas as necessary to establish a good grass cover and prevent surface erosion. Maintenance activities do not require prior approval from Dam Safety.

All trees greater than six inches in diameter at breast height are considered large trees and must be completely removed by excavation (clearing & grubbing) including root removal. The resulting excavations must be properly backfilled with select fill, and all disturbed areas must be regraded and revegetated. Plans and specifications for the tree removal and site restoration must be prepared by a professional engineer (PE) licensed in the State of North Carolina and submitted to Dam Safety for review and approval before construction may proceed. In addition, the construction activities must be performed under the supervision of a PE. After the completion of construction, a PE must certify the construction and submit the as-built drawings to Dam Safety for final approval.

This guidance is intended only as a guide for safe design and should be used with reasonable and practical engineering judgment. For example, in cases where removal of the roots threatens the integrity of the dam or the structure, variances may be requested from Dam Safety on a case-by-case basis.

Depending on the size of the disturbed area, an Erosion and Sediment Control Plan approval may also be required for the land-disturbance associated with tree removal. The use of erosion and sediment control measures is recommended for all land-disturbing projects regardless of size. In any event, sediment must be prevented from entering other property or the waters of the State. Refer to the Division of Energy, Mineral and Land Resources Erosion and Sediment Control Planning and Design Manual (2013). After completion of the tree removal, all disturbed areas must be immediately stabilized, in accordance with the approved plans, with appropriate final cover (e.g. grass, riprap, turf reinforcement mats, etc.) adequate to prevent surface erosion. See 15A NCAC 02K .0205 for grass recommendations. Final approval may not be granted until adequate stabilization is in place.

Refer to FEMA 534 "Technical Manual for Dam Owners, Impacts of Plants on Earthen Dams" and the USACE EP 1110-2-18 "Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures" for further guidance.

Shell Documents

In general, applicable shell documents referring to trees or vegetation on dams should be updated accordingly:

All trees, brush, and woody vegetation must be removed from the slopes and crest of the dam embankments and the emergency spillway areas. All trees and/or brush less than six inches in diameter at breast height may be removed either by excavation or cutting flush to the ground. All trees greater than six inches in diameter at breast height must be completely removed by excavation, including roots, and the resulting excavations properly backfilled with select fill. All disturbed areas must be immediately stabilized, in accordance with the approved plans, with appropriate final cover (e.g. grass, riprap, turf reinforcement mats, etc.) adequate to prevent surface



erosion. The excavation and backfilling required for tree removal will require engineering plans, prepared by a professional engineer licensed in the State of North Carolina, to be submitted to the North Carolina Dam Safety Program for review and approval before removal may proceed. FEMA 534 "Technical Manual for Dam Owners, Impacts of Plants on Earthen Dams" and USACE EP 1110-2-18 "Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures" should be used as guidance.

Should there be any questions or comments regarding these changes, please contact me directly at 919-707-9214.



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