DAM SAFETY

POLICY MEMORANDUM #10

TO: Dam Owners, Operators, and Engineers

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

DATE: July 29, 2019

SUBJECT: Utilities in Dam Embankments

Policy Statement

It is the policy of the Maryland Department of the Environment (the Department) that the design of dam embankments should consider potential failure modes and incorporate defensive design measures as appropriate. This policy supplements all other design requirements for construction of dams and impoundments.

Background

Existing pipelines, cables, and conduits of a wide variety of sizes, materials, and functions are frequently encountered at dam sites. These utilities are usually located at shallow depths in the flood plain or along the dam embankment. They constitute a hazard to the safety of the dam and every effort should be made to relocate the utility away from the dam site or to reconstruct or modify the utility to provide the durability, strength, and flexibility equal in all aspects to the principal spillway designed for the site, in accordance with service criteria and procedures. Overhead cables or power lines should also be relocated or raised as necessary to prevent damage or hazard to the public.

Where this Policy Applies

This policy applies to all dam embankments regardless of size or hazard classification. The design and construction requirements contained herein apply to utilities and any other conduits that run through a dam embankment; through the dam foundation; or that are located within a zone around the dam embankment, the extents of which shall extend outward from the toe and abutment contacts a distance equal to the height of the dam (Refer to Figure 1)

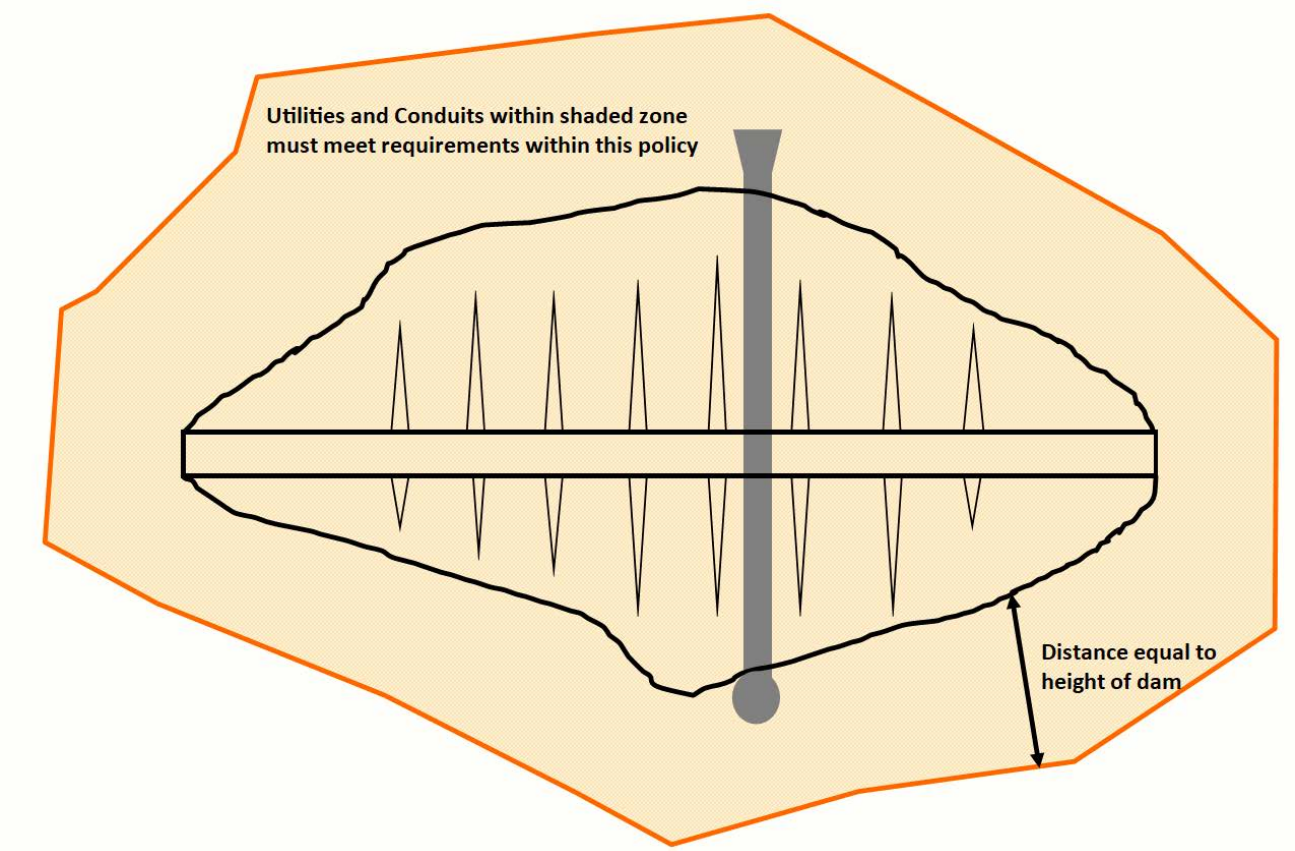

Figure 1: Illustration of zone around dam where utilities and conduits must meet requirements of this policy.

Design and Construction Requirements

- Utilities and other conduits that run through a dam (along the axis, perpendicular to the axis, or at a skew), through the dam foundation or that are located within a distance equal to the height of the dam should be avoided unless demonstrated that such utilities will not jeopardize the safety of the dam.

- If the utilities or pipes cannot be moved, then the conduit must meet the Departments design and construction requirements for spillway pipes (e.g., water tight joints, no gravel bedding, encasement in concrete or flowable fill, and restrained to prevent joint separation due to settlement). Seepage control shall be accomplished using a filter diaphragm for any utility that crosses through the dam perpendicular or at a skew to the axis.

- Manholes, inlets, field connections, junction boxes are not acceptable in dam embankments. If one of these structures is unavoidable, the structure must be designed and constructed to be watertight.

- The repair of a utility located within, below or adjacent to a dam embankment requires a permit issued by the Department's Dam Safety Division, or, where applicable, small pond approval by the approval authority.

- Vertical excavations or supported excavations to install or repair utilities or other conduits in dam embankments is not acceptable. Excavations shall be sloped to 2H:1V or flatter.

- Utilities or other conduits carrying liquid materials should have valves located at each end of the dam allowing for cutoff of flow if necessary.

- Enclosure of the conduit cable or pipeline within another conduit that meets the requirements provided in the memorandum and is positively sealed at the upstream end to prevent seepage into the enclosing conduit is acceptable. Such an enclosing conduit must extend the full distance through which the conduit, cable, or pipeline being enclosed is beneath the embankment.

Additional Information

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.

Dam owners, operators, and engineers should also become familiar with the FEMA Technical Manual: Conduits through Embankment Dams (September 2005).