

# Dam Repairs and Hiring a Dam Engineer

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**Maryland**  
Department of  
the Environment

# Responsibility for Maintaining a Safe Dam Rests With the Owner

- Dam owner is liable for damage from uncontrolled release of reservoir
- Proper operation, maintenance, and repair are key elements in preventing failure and limiting liability
- One of the most important procedures for ensuring proper operation of dams is procuring the services of a qualified professional engineer
- ASDSO <https://damsafety.org/dam-owners/procuring-an-engineer>



## DAM OWNERSHIP FACT SHEET

TOPIC: HOW TO PROCURE THE SERVICES OF A PROFESSIONAL ENGINEER

### DAM MAINTENANCE & OWNER RESPONSIBILITY

The responsibility for maintaining a safe dam rests with its owner. The owner must understand the laws and regulations associated with proper dam maintenance and the procedures for keeping these structures safe. Dam owners are also responsible for maintaining safety at and around their dam. It is important to limit trespassing including fencing alternatives along high spillway walls and reducing access around dangerous water hydraulics. Proper operation, maintenance, repair and rehabilitation of a dam are key elements in preventing a failure, limiting your liability and maintaining your water resource. One of the most important procedures for ensuring proper maintenance of the dam is procuring the services of a Professional Engineer. A Professional Engineer is one who has been certified by the state and the industry according to their tested ability, schooling and experience.

### WHY DO I NEED AN ENGINEER?

All dams meeting government regulatory definitions – no matter what their size or level of engineering – will deteriorate with time. Periodic inspection, proper maintenance and occasional repair and rehabilitation are inevitable. An owner needs the expertise of an



engineer to perform inspections or evaluate and undertake corrective measures at a dam. An engineer can investigate the problem and recommend a course of action which may include the design of corrective measures and the preparation of construction plans and specifications. The engineer also can assist in selecting a contractor and will provide valuable construction inspection services.

### QUESTIONS TO ASK WHEN HIRING

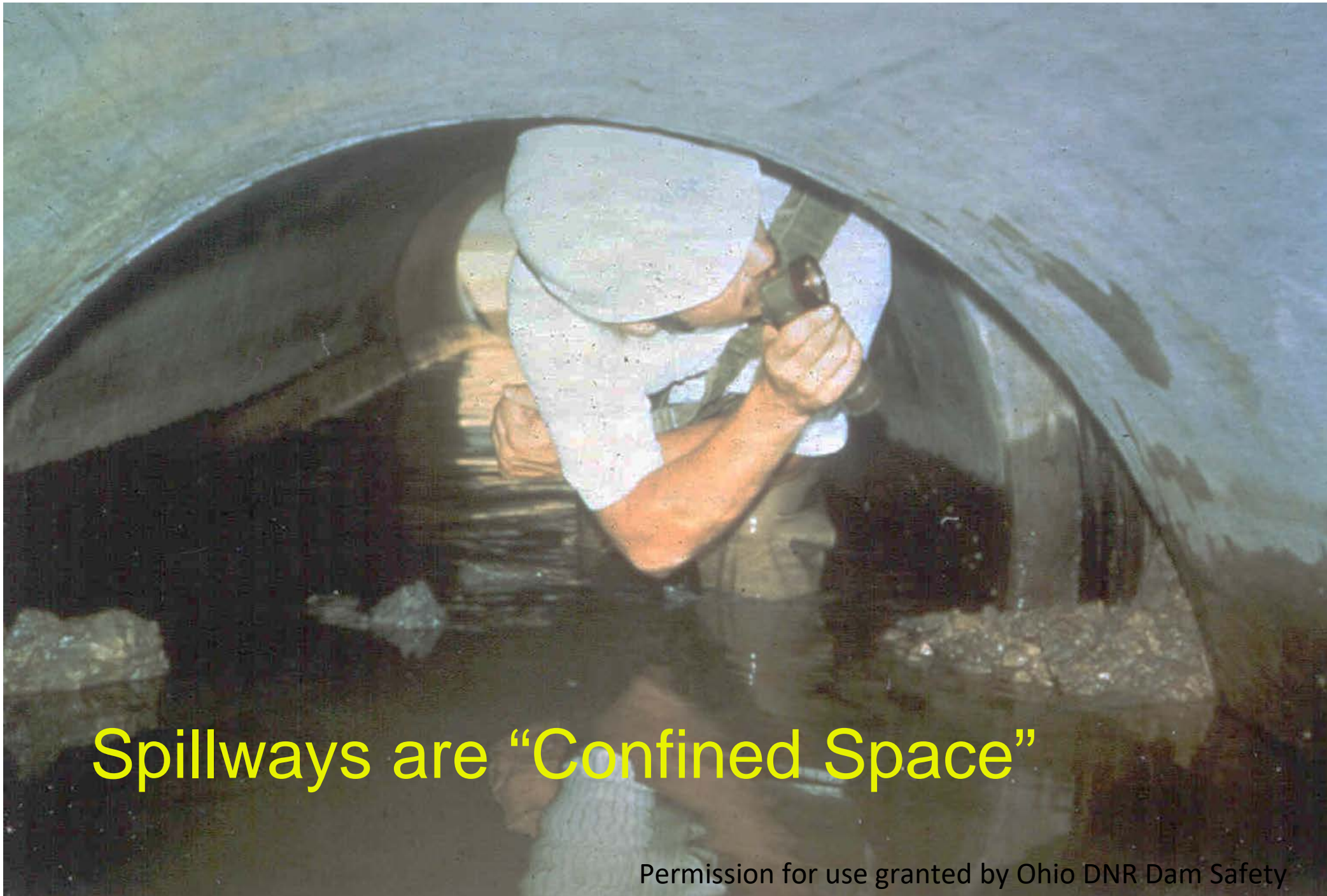
It is essential to select someone with a Professional Engineer (P.E.) license, with a background in civil engineering, who is competent and experienced in the field of dam safety.

# Ordinary Maintenance not Needing Permit/Engineer

- Removing debris from spillways
- Removal of accumulated sediment from forebays and low flow orifices
- Replacement of elastomeric sealant in construction joints
- Maintenance of existing internal drain systems and repairing or installing seepage measurement devices
- Exercising and maintenance of gates and valves
- Replacing up to 10 square yards of missing riprap
- Filling animal burrows
- [MDE Policy Memorandum #11](#)





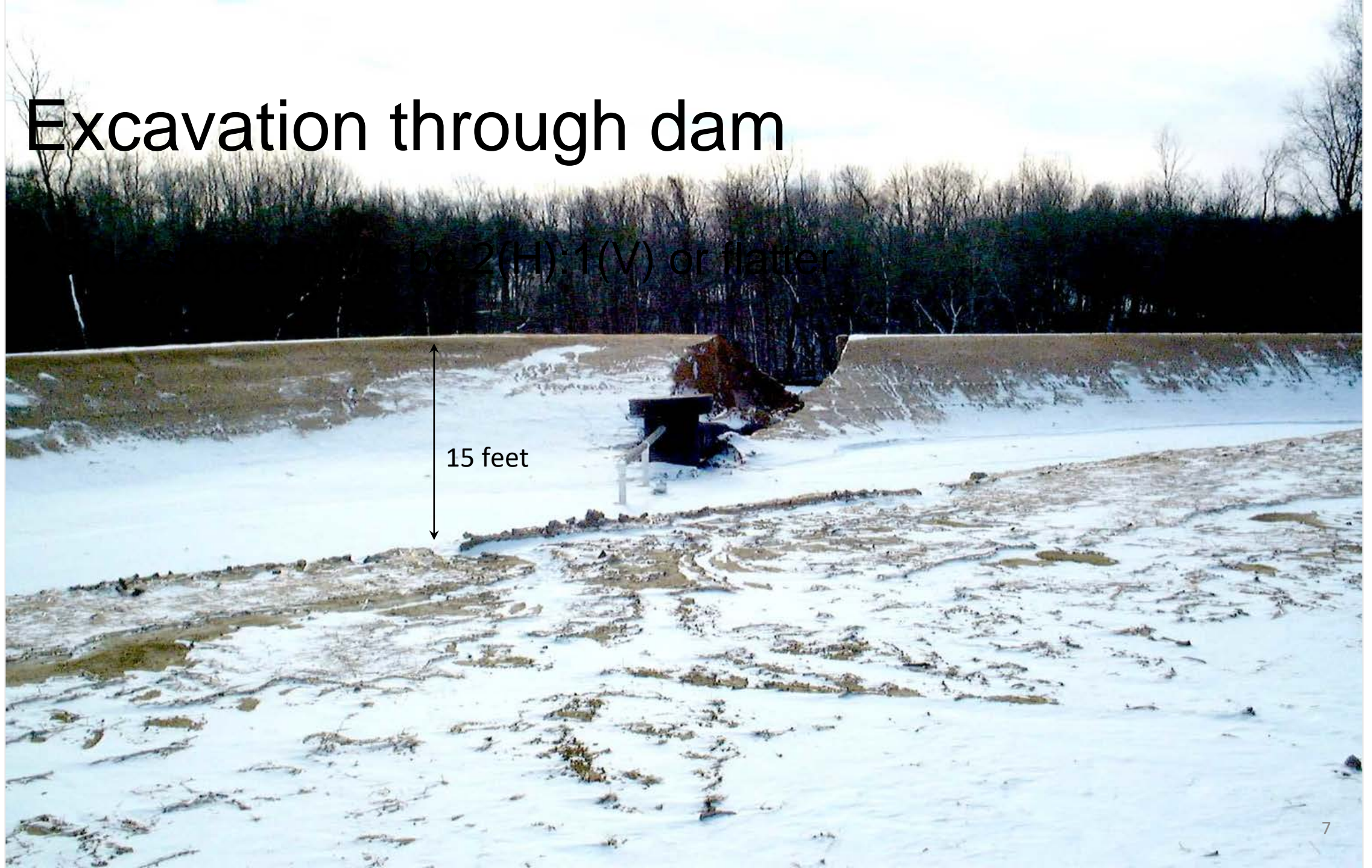


Spillways are “Confined Space”

# Excavation through dam

by 2(H):1(V) or flatter

15 feet











# Typical problems that require an engineer

- Inadequate spillway capacity
  - Could be due to hazard classification changes, or “hazard creep”
  - Erodibility of earthen auxiliary (or emergency) spillways
  - Installation of overtopping protection
- Any changes to control structures, including water quality retrofits and installation of CMAC devices
- Evaluation and repair of severe spillway deterioration
  - Severely corroded CMP conduits
  - Concrete spillway deterioration
  - Sliplining
- Embankment Slope Failure, Seepage, Erosion, Sinkholes
  - Wave erosion at water level
  - Downstream slope excessive erosion
  - Toe drain/filter installation to intercept and control seepage
  - Repair of sinkholes, cracks, unusual depressions
  - Removal of large trees and roots
- Drilling borings into or near a dam

# Slipliner impact on seepage

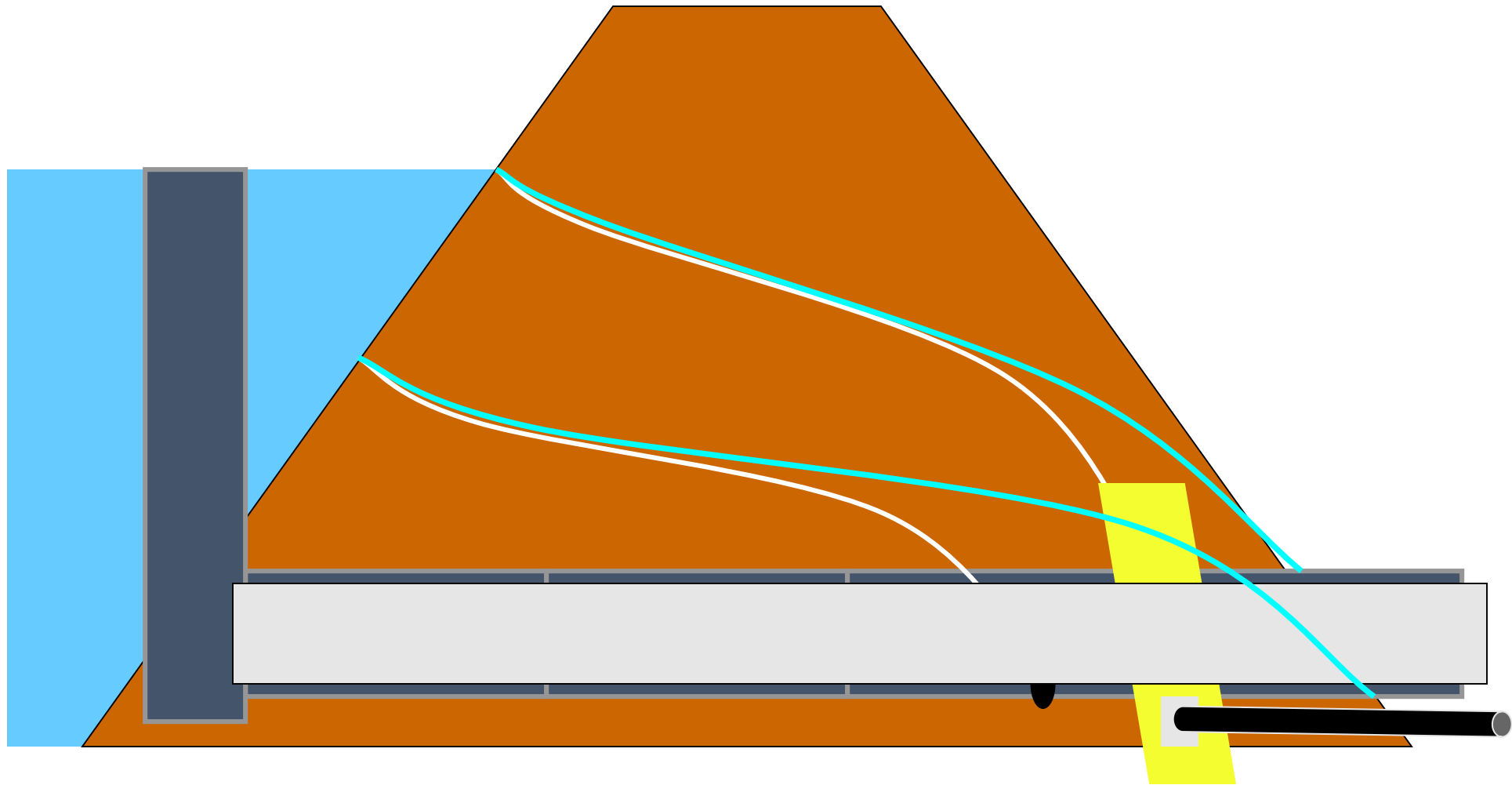




Photo courtesy North Carolina Dam Safety



# More than applying hydraulic cement





Alpine Lake Dam diversion pipe photos  
used with permission of Missouri Dam  
Safety



# MDE Permit requirements for Dam Construction, Alteration, or Repair

- A dam safety (waterway construction) permit from MDE is required for construction or alteration of a dam unless plans are approved by local Soil Conservation District
- A dam safety permit is required to drill borings in or near a dam
- COMAR requires that one engineer, called the Engineer-In-Charge (EIC), be responsible for entire project, from design through construction
- The EIC must be a registered (licensed) professional engineer, experienced in dam design and construction
- A team of engineers with various specialties can be involved in the design and construction, but one engineer must be designated as the EIC
- EIC must submit an 'Affidavit' asserting that they are experienced in dam design, attach resumes of all persons to be involved in design and construction
- During construction the EIC must also submit periodic progress reports to MDE to ensure that work is completed in accordance with the permit and approved plans

# How to Procure the Services of an Engineer

- Why do I need an Engineer?
- How Do I Choose an Engineer Who Is Best For My Needs?
- Questions to Ask When Hiring

# How Do I Choose an Engineer Who is Best for My Needs?

- Qualification-Based
  - This is recommended. The knowledge, experience, and ingenuity of the engineer are the determining factors in making the selection. This strategy is advantageous when the owner is uncertain about the exact problem or the best solution to the problem
- Fee-Based
  - Not recommended. The engineer's fee is the only determining factor in making the selection. It is only advantageous when the owner, in conjunction with the Maryland Dam Safety Program, knows exactly what is needed and can clearly define the scope of work before meeting with an engineer. In this case, the engineer is requested to prepare the designs and bid documents or conduct investigations as the owner specifies. If the bidding is open to anyone and/or the scope of work is poorly defined this could mean that the engineer selected may not be qualified to do the work, especially
- Carefully consider your selection of an engineer
  - A little work on your part in selecting the engineer may save you money in the future.

# Criteria to Look for in a Prospective Engineer

- A licensed Professional Engineer registered in Maryland
- Suggested minimum of 10 years of experience in dam design, maintenance, safety and construction
- Knowledge of the MD Laws rules and COMAR governing dam design and construction
- Specific experience in areas of hydrology, hydraulics, structural, soils, seismic, seepage, geotechnical engineering, and typical deficiencies common to dams

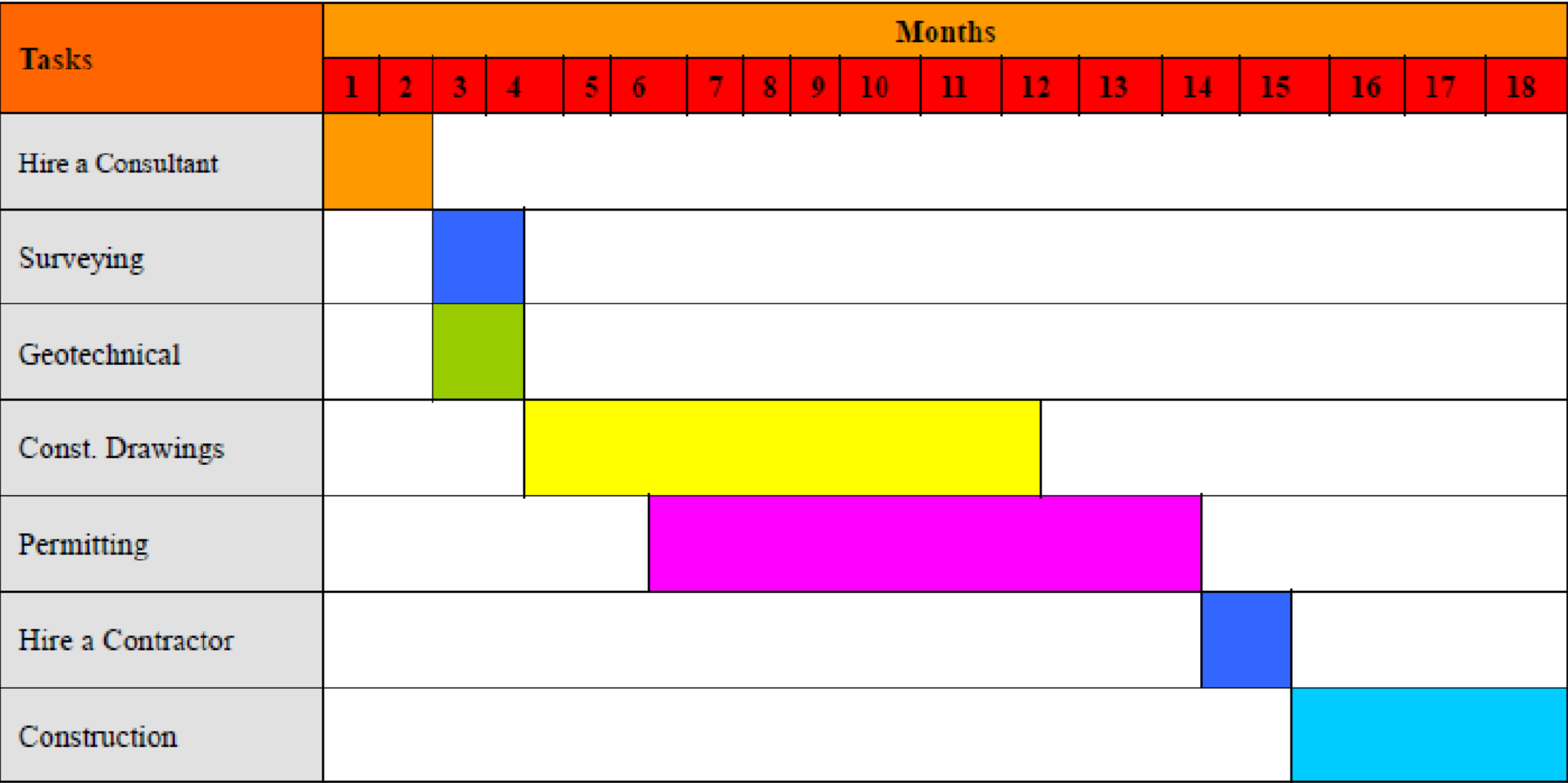
# The Process of Getting the Job Done

- Step 1: Meet with potential consultants and receive proposals (three recommended)
  - Should include detailed scope of work
- Step 2: Pick consultant (contracting)
- Step 3: Consultant begins design process
  - Surveying
  - Geotechnical Investigations
  - Preliminary Plans and Review of Plans
  - Initial Permitting discussions with MDE
  - Final Plans
  - Issue permit to Owner, designating specific Engineer

# The Process of Getting the Job Done (cont)

- Step 4: Final Permitting (local, state and/or federal)
- Step 5: Consultant gets construction bids (three recommended)
- Step 6: Owner hires contractor upon recommendation of consultant
- Step 7: Construction

# Timeline



# For Consideration

- Request references and a portfolio from the engineer
- Contact the references of owners and contractors to discuss the engineer's performance
- Look at projects that have been completed under the engineer's leadership
- Note experience with MD-378 stormwater ponds might not qualify them for work on high hazard dams
- Discuss with Maryland Dam Safety program before selecting an engineer
- MDE is unable to recommend one engineer over another but could give an assessment of their previous work on other projects
- Discuss an engineer's recommended course of action to verify that regulatory requirements will be satisfied
- Educate yourself in the basics of dam safety and be knowledgeable regarding the laws with which you must comply



# Other Activities that Require an Engineer

- Annual dam inspections
- Evaluation of spillway conduits and internal drains
- Preparation of dam breach inundation maps
- Preparation of emergency action plans, especially 'trigger' elevations for action levels

# NRCS “PL-566” Dams

- NRCS Technical Assistance
- 16 dams in Maryland
- Some funds available for addressing safety deficiencies
- Need to coordinate with NRCS state engineer

# Reference Materials

- ASDSO tools, videos, and more information for dam owners go to [DamOwner.Org](http://DamOwner.Org)
- ASCE Manual of Practice No. 45 “Consulting Engineering: A Guide for the Engagement of Engineering Services” (not free)
- ACEC Brochure: “Why Value Outweighs Cost in the Selection of Engineering Services” <http://docs.acec.org/pub/9db55828-d318-6b46-51ad-9d21472b29a7>
- FEMA “Dam Safety, An Owner’s Guidance Manual”
- Training Aids for Dam Safety (TADS) Modules on DVD from FEMA
- NRCS

# Thank You and Goodbye

Send questions to  
**John.Roche@Maryland.gov**

**410-537-3552**

[mde.maryland.gov/DamSafety](http://mde.maryland.gov/DamSafety)



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