Common Pitfalls

The following is a list of problems that Division of Water staff have noted while reviewing design reports and construction plans. They are provided to expedite the design and review process and are not necessarily inclusive of all potential problems or applicable to every project.

- Not providing a design report (explanation of design, calculations, and assumptions).
- Not providing references for calculations.
- Providing model output but not providing model input and justification for chosen parameters.
- Choosing 300 feet of sheet flow at upper end of basin for TR-55 without verification.
- Using percentages of precipitation rather than percentages of runoff for design floods.
- Not investigating the impact of an elevated reservoir or spillway discharge on other properties.
- Not including a cross section of a pipe trench through an embankment.
- Showing on construction plans vertical side slopes for a trench through an embankment for which earth backfill is planned.
- Not specifying compaction or moisture content for soil placement.
- Allowing soil moisture content below –1% of optimum in embankment areas that need low permeability.
- Not specifying a frequency for soil compaction and moisture content tests (e.g., one test per volume of fill or lift).
- Specifying soil placement lift thickness in excess of 9 inches.
- Not specifying reduced lift thickness adjacent to pipes and structures and not specifying compaction equipment or method.
- Placing concrete spillway chutes directly on grade without adequate underdrainage or upstream and terminal cutoffs.
- Not including a concrete cradle for a concrete discharge pipe.
- Using filter fabric as a filter in a drainage system.
- Poor emergency spillway design including (1) allowing emergency spillway discharge to flow on embankment fill, (2) curving the outlet channel too close to the control section, (3) providing steep outlet channels, and (4) allowing the spillway to flow too frequently.
- Using Ohio Department of Transportation specifications without reviewing their applicability to dam design.
- Providing a drainage design that is susceptible to piping (not following piping criteria for soil/aggregate, aggregate/aggregate, and aggregate/pipe interfaces).
- Use of pipes with unacceptable joints or lifespans such as corrugated metal or N-12.
- Inadequate trashrack designs (excessive velocity through the trashrack or small openings).
- Not adequately addressing potential seepage paths through the abutments or foundation.
- Not using a proper reference to size slope and channel erosion protection or not including adequate bedding to protect the underlying fine-grained soils.

Important References:

Earth Dams and Reservoirs, TR-60, USDA Natural Resources Conservation Service (NRCS)

Gradation Design of Sand and Gravel Filters, Chapter 26, NEH Part 633, NRCS

Design of Small Dams, US Bureau of Reclamation

TR-60 and NEH Part 633 are available at http://www.info.usda.gov/CED/; *Design of Small Dams* is available at http://www.usbr.gov/pmts/hydraulics_lab/pubs/index.cfm