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## **MN6-2 Conduit Spillways**

### **6-2.1 Design Procedure**

This procedure establishes the design procedure for conduit spillways for structures not required to be designed according to Technical Release No. 60.

A conduit spillway is a closed pipe structure incorporated into a water control system to safely convey the water from one level to a lower level by the use of a closed conduit.

All conduit spillways will be composed of an inlet, barrel and outlet. These structures will be designed for full (pressure) flow whenever practical; giving recognition to friction losses due to bends, roughness, etc. When full (pressure) flow cannot or is not being designed for, means shall be taken to assure that open channel flow conditions continue throughout the barrel section.

The design procedure for each portion will be presented separately, that is, the barrel, inlet and outlet.

Table 6-2.1 lists references that should be consulted for further information on the design of conduit spillways.

Table 6-2.1 Listing of Technical References on Conduit Design

**NRCS Design Notes**

- Design Note 2 – Required 3-Edge Bearing Strength for Rigid Pipe
- Design Note 6 – Riprap Lined Plunge Pool for Cantilever Outlet
- Design Note 7 – Variation in Joint Extensibility
- Design Note 9 - Use of AWWA C302 Pipe for Principal Spillway Conduits
- Design Note 12 - Control of Underground Corrosion
- Design Note 15 - Submerged Weir Flow

**NRCS Engineering Field Handbook**

- Engineering Field Handbook Chapter 3- Hydraulics
- Engineering Field Handbook Chapter 11- Ponds and Reservoirs

**NRCS National Engineering Handbook**

- National Engineering Handbook, Section 5 – Hydraulics
- National Engineering Handbook, Section 6 – Structural Design
- National Engineering Handbook, Section 14 – Chute Spillways
- National Engineering Handbook, Part 628, Chapter 45 – Filter Diaphragms
- National Engineering Handbook, Part 633, Chapter 26 – Gradation Design of Sand and Gravel Filters
- National Engineering Handbook, Part 636, Chapter 52 – Structural Design of Flexible Conduits
- National Engineering Handbook, Part 642, Chapter 2 – National Standard Construction Specifications
- National Engineering Handbook, Part 642, Chapter 3 – National Standard Material Specifications

**NRCS National Engineering Manual**

- National Engineering Manual, Part 501 – Authorizations
- National Engineering Manual, Part 503 – Safety
- National Engineering Manual, Part 520 – Soil and Water Resource Development
- National Engineering Manual, Part 536 – Structural Engineering
- National Engineering Manual, Part 543 – Materials

**NRCS Technical Releases**

- Technical Release 3 – Hood Inlets for Culvert Spillways
- Technical Release 4 –Height of Water Column Supported by Atmospheric Pressure
- Technical Release 5 –Structural Design of Underground Conduits
- Technical Release 18 –Computation of Joint Extensibility Requirements
- Technical Release 29 –Hydraulics of Two-Way Covered Risers
- Technical Release 30 –Structural Design of Standard Covered Risers
- Technical Release 31 –Structural Analysis and Design at Low Stage Inlets
- Technical Release 37 –Structural Analysis and Design at Base of Riser With Conduit Openings in Both Endwalls
- Technical Release 42 –Single Cell Rectangular Conduits Criteria and Procedures for Structural Design
- Technical Release 45 –Twin Cell Rectangular Conduits-Criteria and Procedures for Structural Design
- Technical Release 46 –Gated Outlet Appurtenances, Earth Dams
- Technical Release 54 –Structural Design of SAF Stilling Basins
- Technical Release 60 –Earth Dams and Reservoirs