

Part 511 Design

Subpart A - Procedures

UT511.7 Design Criteria

- B. Minimum design criteria established by policy are to be met.
- (1) Land leveling
 - (i) A properly operated and maintained Irrigation Land Leveling has an estimated life span of 15 years. The life of this practice can be assured and usually increased by developing and carrying out a good operation and maintenance program.
 - (ii) Irrigation Land Leveling projects must have a volume of soil removed greater than or equal to 100 cubic yards of soil cut per acre to be classified as land leveling. Cut volumes less than 100 cubic yards per acre shall be considered as maintenance or land smoothing.
 - (iii) The maximum volume of soil cut shall not exceed 400 cubic yards per acre unless a variance is granted by State Conservation Engineer.
 - (2) Pipeline Design
 - (i) Flexible conduits such as plastic pipe, aluminum pipe, corrugated metal pipe, or ductile iron pipe, shall be designed using NRCS National Engineering Handbook (NEH) Part 636 Chapter 52, *Structural Design of Flexible Conduits*.
 - (ii) Utah Conservation Practice Standard 430, Irrigation Pipeline and 516, Pipeline, states when operating at design capacity, the full-pipe flow “should not exceed 5 feet per second, and the working pressure at any point should not exceed 72 percent of the pressure rating of the pipe.” If either of these limits is exceeded, a surge analysis of the system shall be performed. If the combined surge pressure and the operating pressure does not exceed the pressure rating of the pipe then no additional consideration need be made. If the surge pressure plus operating pressure exceeds the pressure rating of the pipe, change to a higher pressure rated pipe or special design considerations must be given to the flow conditions, and measures must be taken to adequately protect the pipeline against transient pressures (surge). For situations where the pipeline is a single line with water flowing to a single outlet, the surge pressure is added to the static pressure not the operating pressure. See ENG-210-TECHNICAL NOTE UT210-15-04, *Simplified Procedure for Determining the Required Pressure Rating of PVC and HDPE Pipe*, for a simplified procedure for determining and accounting for surge pressures in PVC and HDPE pipe.
 - (iii) The static pressure in the pipe shall not exceed the pressure rating of the pipe.
 - (3) Depth of Cover on Pipelines
 - (i) National conservation practice standards state pipelines are to be placed in suitable soils where the bedding and back fill requirements can be fully met. Utah construction specifications state that plastic pipe will have the following cover:
 - 18 inches for pipe 1/2 inch through 2 1/2 inch in diameter
 - 24 inches for pipe 3 inch through 5 inch in diameter
 - 30 inches for pipe 6 inch diameter and larger

- (ii) A variance to this requirement may be granted by the Area Engineer provided the following requirements are met and documented:
- Manufacturer’s recommendations are satisfied.
 - Calculations show that deflection will not compromise the integrity of the pipe.
 - There must be an Operation and Maintenance plan that addresses how the pipeline will be protected from traffic loads, tillage, harvesting operations, etc. and the need to maintain cover over shallower pipes.
 - The variance request shall be documented and granted using ENG-210-FORM UT210-14-03 and ENG-210-DESIGN AID UT210-14-01.
 - The Area Engineer shall maintain a file of variance requests
- (4) Waste Storage Structures
- (i) NRCS Employees shall read the practice standards associated with the conservation practice they are planning or designing to ensure the practice standard is appropriate for the application.
- (ii) The following practice standards are not to be used for impounding waste water; Dike (356), Terrace (600) and Diversion (362).
- (iii) Any and all waste water must be contained in facilities designed in accordance with the Waste Storage Facility (313) practice standard liner tables. This includes but is not limited to the following: Waste Treatment Lagoon (359), Manure Transfer (634), and Anaerobic Digester (366). The designer shall determine which resource and operating conditions will exist and then use Tables 2a, 2b or 2c, located in the 313 standard, to determine facilities lining requirements.
- (iv) NRCS assisted agricultural waste facilities shall comply with the terms of the current MOU between NRCS and Utah Division of Environmental Quality (DEQ). A determination shall be made as to whether the facility will exceed the 1500 animal units and whether DEQ needs initial inclusion. When a facility exceeds the 1500 animal units NRCS shall assist the producer in obtaining the necessary construction and groundwater permits. If below 1500 animal units, NRCS shall inform DEQ in writing once the facility is completed and operating.
- (v) The NRCS employee (usually a Field Office Engineer or Area Engineer) with primary technical responsibility shall inform the District Conservationist (DC) when installation is complete and when certification to DEQ is necessary. The DC shall then prepare and send the notification letter to DEQ, along with a carbon copy to the landowner.

UT511.10 Exhibits

The Utah Engineering Form, Design Aid and Technical Note cited in this supplement are located as listed below:

ENG-210-TECHNICAL NOTE UT210-15-04, ENG-Simplified Procedure for Determining the Required Pressure Rating of PVC and HDPE Pipe

http://efotg.sc.egov.usda.gov/references/public/UT/Tech_Note_Pipe_Surge.pdf

ENG-210-FORM UT210-14-03, ENG-Pipe Burial Depth Variance Request

http://efotg.sc.egov.usda.gov/references/public/UT/ENG_210_FORM_UT210_12_03_Pipe_Burial_Depth_Variance_Requiest.docx

ENG-210-DESIGN AID UT210-14-01, ENG-Pipe Design

http://efotg.sc.egov.usda.gov/references/public/UT/ENG_210_DESIGN_AID_UT210_14_01_ENG_Pipe_Design.xls