

## 620. UNDERGROUND OUTLET

### DESIGN AND CHECK DATA REQUIREMENTS

The following items must be addressed for an Underground Outlet.

#### Survey Data

1. Freehand sketch of layout showing stations at outlets, lateral, and inlets.
2. Profile along the proposed centerline(s).

#### Design Data

The following items must be addressed in the design folder for the Underground Outlet:

- (1) Table of Contents
- (2) Operation and Maintenance Plan
- (3) Soils and Foundation Data
- (4) Design Calculations
- (5) Construction Specifications
- (6) Engineering Drawings
- (7) Erosion & Sediment Control Plan
- (8) Quality Assurance Plan

Listed below are specific items that are required in the design:

#### Table of Contents

This organizes the design folder

#### Operation and Maintenance Plan

Check and clean outlets

Check for blowouts

Check for reduced flows from what is expected

#### Soils and Foundation Data

Soil type being drained

Documentation of any rock excavation or water from an unknown source

#### Design Calculations

Plot of profile of ground surface and proposed grade line (if needed)

Required capacity vs. available capacity for sub-mains and mains

#### Construction Specifications

Enclose the applicable specification(s) PA342 and PA606.

Include any "additional conditions" or items that are site specific or must be defined to supplement the standard specification. (See instructions for use of Specifications.)

Add any special or "by-others" specifications.

#### Engineering Drawings

On each drawing sheet, the title block should show the operator's name, type of operation, county and the people involved in drawing and designing the subsurface drain.

Include any standard drawings made by NRCS or designed by others and concurred in by NRCS that are needed, and include them in the drawing index on the cover sheet.

Listed are items that should be included:

**Plan View Sheet(s)**

North Arrow

Utilities/roads

Benchmark(s)

Scale

Legend

Existing Structure

Existing trees

Profile locations

Construction limits

Drainage & outlet locations

Transfer line locations

Outlet location

Set backs (if applicable)

**Cross Section Sheet(s)**

Pipe profile

Reference to detail drawings

Original ground location

Any inlet & outlet elevations

Additional items to be included:

- Measurements to show that the subsurface was installed as planned
- Length of subsurface drain by size and kind of drain material
- Length, kind and size of outlet pipe

- Vertical distance between invert of outlet pipe and normal water level in outlet ditch or stream
- Filter or envelope thickness and kind of material (if filter is required by design)
- Method of blinding and covering joints
- Location sketch of lines installed
- Minimum cover required
- Installation of animal guard
- PA One-Call serial number

The following statement on trench safety shall also be placed on the drawings:

“The Contractor must comply with OSHA requirements Part 1926, subpart P for the protection of workers in trenches.”

Erosion & Sediment Control Plan

See DEP’s Erosion and Sediment Pollution Control Program manual and the Conservation District requirements.

Quality Assurance Plan

What specific items need inspection and when?

Who will do the actual inspection?

Were the as-builts completed?

Construction Check Data

1. Measurements to show conduit and appurtenances were installed as design or as otherwise modified by the authorized personnel in the field.
2. Name of pipe or tubing manufacturer, product name, material and applicable code (ASTM, AWWA).
3. Length of each size of tubing or pipe.
4. Length, kind and size of outlet pipe.
5. Vertical distance between invert of conduit and normal water level in the receiving ditch or stream.
6. Method of blinding or otherwise securing the conduit.
7. Location sketch of lines installed.
8. Minimum cover.
9. Grade of lines.
10. Details of trash and/or animal guards, if installed.