

# CHAPTER 13

New January 1, 2013

## SUE

### Subsurface Utility

### Engineering

### Designation and Location

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### **Sec. 13.01 Introduction**

Subsurface Utility Engineering (SUE) involves managing risks associated with utility mapping at appropriate quality levels, utility coordination, and utility relocation design and coordination. These utility risks are managed by using designation and locating. Designation is defined as the process of using surface geophysical method or methods to interpret the presence of a subsurface utility and to mark its *approximate* horizontal location (designation) on the ground surface. Utility locating is defined as the process of exposing and recording the *precise* vertical and horizontal location of utilities (test-holes).

### **Sec. 13.02 Standards and Policy**

#### **Standards:**

The Department will follow the most current version of CI/ASCE 38-02 standard entitled “Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data” with the following requirements:

1. All submissions (designation or location) to the department shall contain the names and contact numbers for any utility shown thereon. Test-hole data sheets should contain the name and contact information for the each utility exposed.
2. All fiber optic (FO) lines shall be identified with the company name.
3. VDOT cell symbols and line styles will be used in lieu of the information shown in the ASCE guideline legend (see Figure 11-J in the Survey Manual, page 11-15).
4. Test-holes should not be returned to the Department as unknown. If the utility cannot be identified the department should be contacted immediately while mobilized on the project.
5. Designation and locations shall meet applicable APELSCIDLA minimum standards and regulations, procedures and practices outlined in the Department’s Survey Manual, and any other state codified regulations pertaining to land surveying in the Commonwealth.
6. Duct Banks shall be dimensioned in width and depth and located. Elevations shall be determined on all corners top and bottom.

In using this standard, it must be realized that this is not an all-inclusive set of rules and if situations are encountered, the department depends on the skill and initiative of all employees and consultants to resolve, or have these situations resolved efficiently and practically.

#### **Policy:**

All projects with buried utilities including water, gas, electric, telephone, television cables, or sanitary sewer force mains should be designated at quality level B unless a waiver is requested from the State Utility Manager or the State Survey Program Manager.

All projects shall be designated by a prequalified Consultant with SUE capabilities. The Department has contracts statewide with Subsurface Utility Engineering (SUE) consultants to designate and locate utilities on projects selected by the Department. These contracts also have GPR (ground penetrating radar) and CCTV available for use.

*Designation:*

The horizontal location of existing subsurface utilities will be by the consultant and the information will be returned to the department in the format requested on the task request. This includes showing all visible utility facilities such as water meters, cutoff valves, poles, etc. and all sanitary (except force mains) and storm sewers including top and invert elevations. The next structure (manhole, etc.) outside of the survey limits will be shown with elevations and inverts. Annotation, property data and any other information will be secured and plotted simultaneously with the designating of the subsurface utilities.

The Consultant/VDOT unit preparing the plan base shall submit MicroStation DGN files electronically via the FTP Server of the entire\_project (including title sheet and/or location map) for the designation of the horizontal location of subsurface utilities. If this is an extension of an existing project, the files should clearly show the survey line and control that was established in the field along with sufficient references to locate and retrace.

*Location (test-holes):*

Test-holes should be secured on all underground facilities, i.e., water and gas lines larger than 3" (75 mm), telecommunications (copper/fiber optics) and electric lines in conduit systems and sanitary sewer force mains when there are potential conflicts. Direct buried telephone or electric cables typically should not require test-holes. Service lines to properties should not be secured unless they are 6" (150 mm) or greater in size. ***Test-holes should not be requested for facilities where construction will require that the facility be relocated.*** Test-holes should not be requested for gravity sanitary sewer facilities, unless the inverts of the manholes are not obtainable because of physical obstructions. In addition to the potential conflict sites where the utilities are crossed by the proposed storm drainage, consideration should be given to requesting data in locations:

1. Where potential conflicts may exist with the project design (i.e., retaining walls, bridge footings, signal structures, ditches, entrance cuts, unsuitable material, etc.).
2. Where cut to the subgrade line is 18" (0.5 m) or less. (Test-holes should not be requested in cuts where the excavation would be expected to uncover the utility.)

**Sec. 13.03 Workflow Process**

**Designation:**

*Survey:*

1. PM-100 is used to establish the limits of mapping and authorize the topographical survey and the SUE designation. This also establishes begin and end dates for activity 31S. Additional requests are submitted on LD-261 if necessary.
2. Completed work is stored on the Falcon Document Management system.

### *Preliminary Road Plan Development*

1. Upon receipt of the underground utility designation (horizontal) data, preliminary road plans, including hydraulic design, will be developed. The Project Manager will request that the Structure and Bridge and Central Office Location and Design Traffic Engineering Design Program Area submit preliminary bridge, sign, signal and lighting plans, including estimates, for detailed plan development prior to the public hearing.
2. A review is to be made with these divisions by the Project Manager to determine if there are utility conflicts with bridges, signs, signals, etc. based on the horizontal location of the utilities.
3. The design of the project drainage facilities, walls and other features are to avoid horizontal utility conflicts where feasible.
4. An email outlining any changes made is to be resubmitted to Structure and Bridge and/or Central Office Location and Design Traffic Engineering Program Area and any other preliminary engineering sections, including the Regional Utility Coordinator if the design is altered during plan development affecting their preliminary plans.

### **Utility Location (Test-holes)**

#### *Scheduling*

1. The Project Manager should request the Underground Utility Location (Test-holes) approximately 6 months prior to the scheduled Field Inspection in order for the evaluation of test-hole data and necessary plan changes to be made before Field Inspection.
2. The Project Manager should minimize the request for test-holes to one order, or one mobilization by the SUE consultant.

#### *Determination*

1. It is expected that the request for test-holes will be based upon several factors one of which is hydraulic design. Additional test-holes may be required when the hydraulic design is finalized.
2. Potential vertical utility conflicts shall be determined after all feasible horizontal design adjustments have been incorporated into the design.
3. When other Divisions need test-holes, they are to submit their requests directly to the Project Manager for inclusion in his submission. Test-hole locations should be based on station and offset to the proposed construction centerline or by project coordinates.
4. The Project Designer with input from the project team shall clearly identify the location of test-holes to be secured on the plan sheets. Test-hole locations should be based on station and offset to the proposed construction centerline or by project coordinates.
5. The Project Manager shall request that the - Regional Utility Coordinator review the marked plans to assure that all necessary data will be secured with the initial request.
6. The Regional Utility Coordinator should advise the Project Manager of any known utility relocations that are proposed which will negate the need for any test-holes.
7. Determination is complete when the Project Manager and Regional Utility Coordinator are in concurrence with the requested test-holes.

### **Requesting Locating (Test-holes) Information (Project related)**

1. The Project Manager shall submit the test-hole scoping data in PDF format to the District Survey Manager. Scoping data will include:
  - a. The LD-261 form must be signed by the Regional Utility Coordinator and the Project Manager.
  - b. An appropriate and open activity charge code to be used at invoicing.
  - c. A list of each test-hole with station and offset or project coordinates.
  - d. If the project was designated previously, the names of the Prime and SUE consultant and the dates of the last designation must be provided.
  - e. Email address for submission of the test-hole data: submit directly to the Project Manager and cc the District Survey Manager and the State Survey Program Manager.
  - f. Due dates for the test-hole data.
2. The District Survey Manager will:
  - a. Contact and provide the scoping data to the State Survey Program Manager for a consultant. If a consultant has been on a project, the SOP should be to continue to use the same firm if available.
  - b. Provide the scoping data to the selected consultant for the task with the survey control data for the project.
  - c. Will Review the task request with the Project Manager and send NTP to the State Survey Program Manager.
3. The State Survey Program Manager will review the task request and give final NTP to the selected consultant.
4. District Survey Manager will track the consultant progress by email or phone communication protocols.

### **Requesting Locating (Test-holes) Information (Non-Project related)**

1. The Requestor shall submit the test-hole scoping data in PDF format to the District Survey Manager. Scoping data will include:
  - a. A request by memorandum made to the District Survey Manager stating the need.
  - b. A sketch showing the location with horizontal and vertical control.
  - c. An appropriate charge number
  - d. Email address for submission of the test-hole data: submit directly to the Requestor and cc the District Survey Manager and the State Survey Program Manager.
  - e. Due dates for the test-hole data.

2. The District Survey Manager will:
  - a. Contact and provide the scoping data to the State Survey Program Manager for a consultant. If a consultant has been on a project, the SOP should be to continue to use the same firm if available.
  - b. Provide the scoping data to the selected consultant for the task.
  - c. Will Review the task request with the Project Manager and send NTP to the State Survey Program Manager.
3. The State Survey Program Manager will review the task request and give final NTP to the selected consultant.
4. District Survey Manager will track the consultant progress by email or phone communication protocols.

**Sec. 13.04 Data Distribution**

When the test-hole data has been secured, it will be transmitted directly to the Project Manager or the Requestor for his evaluation and incorporation into the roadway plans and for distribution to others as requested.

The data should include:

- a. The test-hole data sheets.
- b. The Utility Test-hole Information Sheet in electronic format.
- c. An original copy of the underground utilities test-hole information sheet
- d. A plan sheet showing the location of the test-holes.
- e. The test-hole certification sheet should be provided to the Regional Utilities Coordinator.

**Sec. 13.05 Evaluation of Location (Test-hole) Data**

The Regional Utility Coordinator in conjunction with the Project Manager shall review the test-hole data secured, and make an evaluation as to whether the facility is vertically in conflict or not.

Should there be a conflict between the utility and the proposed structure, ditches, roadway or entrance cuts, etc., or wherever test-holes are dug, the Project Manager shall determine if changes can be made to eliminate the utility conflict.

If the design is changed, new test-hole data may be required. Should such changes significantly increase the cost of the construction items, the Project Manager shall advise the Right of Way Division Utilities Program Manager, the State Utilities Engineer and the Local Project Program Manager, if applicable, of the estimated cost for proper disposition.

If the Regional Utility Coordinator determines that a utility adjustment would be warranted rather than a storm sewer change or if a utility relocation is proposed, the Regional Utility Coordinator shall advise the designer so that the storm drainage design can be finalized.

**Sec. 13.06 Roadway and Utility Field Inspections**

*Distribution of Prints*

After Roadway P.F.I. and F.I. evaluation is complete and approval received, the appropriate changes must be incorporated into the plans.

The Project Manager shall distribute notification of where the plans are located in Falcon for the Utility F.I. in accordance with the Utility Field Inspection Form LD-428.

The computer plotted cross sections are located in Falcon along with the CADD plans.

The Project Manager/Consultant is to be notified of the Utility Field Inspection on all projects. Check the appropriate data on the Utility Field Inspection Form.

The Location and Design Division maintains the LD Forms and they are available for applicable projects at: <http://vdotforms.vdot.virginia.gov/>

*Construction Plans*

Required utility adjustments will be determined by the Regional Utility Coordinator.

The utility test-hole information will not be shown on the construction plan sheets, but shall be included on the detail drawings for retaining walls, bridge footings, signal structures, special design items, etc. Include any utility information that may be beneficial to the Contractor, (i.e., 17" (430 mm) between top of waterline and retaining wall footing, top of utility elevation, etc.). Caution must be exercised to ensure that the data being shown applies to facilities that will still be in place during the construction of the highway project.