

When the utility data is obtained under the consultant contract, the survey party will show all visible utility facilities (size and type) such as water meters, cutoff valves, poles, etc. All underground utilities and municipal utility services will be placed in the SU file for each project. ◊

Under no circumstances should the survey party do any digging when securing utility designation. Once others uncover a utility, the survey party's function is to read any elevations.

All data for utility designation will be secured through standard survey methods and procedures. VDOT Utility CADD File Standards are located in **Section 2**, of the CADD manual. ◊

Sec. 4.10 Leveling and Securing Elevations

All location survey leveling will be secured by the use of Total Survey Station methods and procedures. Elevations for all location surveys shall be based on GPS, U.S.G.S. or N.G.S. **U.S. Survey Feet** datum. This is important, and no departure from this rule is authorized unless so indicated in special instructions for the particular project. The kind and source of datum should always be included in the Survey Report.

When a survey is authorized, the Survey Supervisor will be furnished the location, description and elevation of any available government benchmarks.

Before running centerline or profile levels, a series of benchmarks must be established throughout the project at intervals of approximately one thousand feet (**1000 ft**). A benchmark should be established also near all future structures (bridges, box culverts) and at all road intersections. These benchmarks must be as permanent as possible, located on solid structure bases or in the bases of trees not likely to be disturbed by construction. **A benchmark will never be set in a utility pole.** A complete description, including station plus and distance from centerline as well as accurate description of the object on which the benchmark is located, must be given. In all cases, any benchmark established must be turned on, in order to be properly tied to the line of levels. Check levels must be run unless a permanent benchmark is convenient to both ends of the project. If a government benchmark is found near each end of the job and intermediate benchmarks are tied in by reason of turns, then a tie-in with the permanent benchmarks near each end of the project could serve as an adequate check. Elevations on *VDOT Control Monuments* should be read also when benchmark levels are being run.

The maximum error in differential leveling (benchmark levels) shall in no case be greater than plus or minus five-hundredths (**±0.05**) of a foot times the square root of the length of the level run in miles (**±0.05 ft X xM**), where **M** is the loop length in miles. For profile leveling, the maximum error of a benchmark elevation previously established shall be no greater than plus or minus two hundredths of a foot (**±0.02 ft**) times the square root of the distance in stations from the preceding benchmark.

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