

Levels on alternate lines will be based on the same datum as on the main survey.

Centerline elevations shall be determined at even stations, plus fifty (+50) stations, all equalities, and elsewhere as required to define the profile of centerline. When centerline crosses a different surface (i.e., soil to pavement), a reading is to be obtained at that point and noted. Each benchmark established as heretofore described shall be tied into as reached.

Elevations on all surveys shall be tied into the elevations of any adjacent surveys and surveys on intersecting roads. When a location survey parallels an existing road, the two 3d surfaces will be combined to ensure proper drainage calculations.

Elevation of high, normal, and low water shall be obtained where the location crosses or parallels a stream. In tidal areas, mean low water and mean high water shall be obtained. In the case of a parallel stream, the elevation of normal and high water is required at frequent intervals. Where bridges are in place, the profile of the bridge floor as well as the streambed should be secured. The date and source of information is to be noted for all high water readings. Elevation data shall cover all alignments beyond the beginning and end of the project so suitable grades can be worked out at these points.

Elevations are required where the centerline intersects railroad rails and all other points that will influence or govern the final grade of the proposed highway. Where the utilization of an existing bridge is contemplated, the elevations of the bridge seats, top of footings, piers, and the bridge deck are to be obtained.

On some urban surveys, it will be necessary to obtain elevations on floors, porches, steps, etc. to determine the impact of the proposed design.

#### *Sec. 4.11 DTMs*

DTMs (Digital Terrain Models) are to be secured by the use of Total Survey Station, Photogrammetry, or LIDAR methods in the required file formats. DTMs shall be taken at normal intervals (**50 ft. intervals along tangents, 25 ft. along curves**), and everywhere necessary for volume computations.

DTM readings are to be collected in a manner as to define all existing ground breaks. The ground breaks shall be taken as either a line string or curve string readings. All other readings can be secured as spot readings. VDOT CADD DTM File Standards, and GEOPAK .tin file standards are included in this manual in **Chapter 2** of the CADD Manual. <sup>◊</sup>

DTM readings shall be taken on all existing drainage ditches to show the profile of the ditch. The collection of data should begin at a centerline plus and extend beyond the inlet end of the structure a minimum of fifty feet (**50 ft**) upstream and extend beyond the outlet end (depending on the highway system), far enough to cover the area requiring an outlet ditch. The section shall follow along the flow line of the ditch regardless of its direction from centerline.

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<sup>◊</sup> March 3, 2014