

The Department analyzes topographic information by using a Digital Terrain Model (DTM), or a triangulated network of 3-Dimensional points for representing existing terrain. Volumetric computations are performed accurately and more cost-effectively using a DTM than by the traditional field cross-section methods. DTMs are acceptable to VDOT for determining volumetric information.

There have been occasions when ground elevations have changed in certain areas on construction projects. In preparation for slope staking, sufficient checks should be made throughout the project to verify original ground elevations. If any areas are found that have appreciable variations in ground elevations within the project limits then the project inspector should be notified and DTM's should be secured in those areas to provide for computations of accurate quantities. If DTM's are to be used then the District Survey Manager should be contacted by the project inspector to make sure that the electronic format that the surveyor uses in securing this information is compatible with the Department software. DTM's will be based on plan elevations and coordinate values or electronic DTM file shall be given to the project inspector so he can give this information to the Design Section so new quantities can be computed.

Cross Sections are no longer used in construction surveys. **In lieu of securing cross-section information, a DTM surface is the accepted VDOT format for determining volumetric and grading information. In case of emergency or a special situation, cross sections can be requested. ([Figures 8-A & 8-E](#)).**

After centerline elevations have been secured and checked where necessary, DTM's shall be secured at all stations, intermediate intervals and at all appreciable breaks in the ground. In all cases, the DTM's shall be based on the plan construction centerline.

DTM surfaces have made cross sections on multiple alignments obsolete. An adequate DTM surface with points and break lines will suffice.

Sec. 8.05 **Borrow Pits**

Borrow pits will be surveyed by VDOT survey crews, but the Survey Party Manager (Land Surveyor) should encourage the contractor to have his personnel or hire a survey crew to check behind the Department. Discrepancy in borrow quantities will not be considered unless supporting survey data was obtained by contractor to substantiate the claim.

If borrow material is shown on the plans, the Project Inspector should contact the District Survey Manager when the borrow pit location has been approved and properly prepared. All borrow pits shall have DTM's collected using the elevation of a benchmark shown on the plans if possible, if not, then a minimum of two benchmarks should be set and assumed elevations may be used. A diagram of all borrow pits shall be shown in the borrow pit notebooks or digital file giving the number of each pit, property owner's name, property lines, the definite location, distance from centerline of the road and a tie-in with definite stations, if possible. If the quantities are to be run through the computer, the number of baselines and their intervals can be set up solely for the convenience of the survey party in taking DTM's.