11.10 EARTHWORK FOR STRUCTURES

11.11 EXCAVATION

Excavation line shown on the plans is a "normal" water table. This is subject to change from year to year, and possibly month to month. The bridge sounding sheet will show what is considered "normal" water table elevation. Variations from this elevation will not be reason to adjust contract pay quantities.

11.12 BACKFILLING STRUCTURES

When granular backfill material is specified for backfilling of structures, backfill material shall meet requirements of Article 4133 of the Standard Specifications. When granular backfill is used, under flowable mortar or flooding applications, it is important to note that the material shall not exceed 4% passing the #200 sieve and that the granular backfill material shall meet the requirements of Article 4134. The reason for the limitation on the fines is to ensure that the backfill material is drainable.

Culverts

When backfilling culverts, the material used must have sufficient moisture to permit required compaction. Loose layers must not exceed 200 mm (8 inches). Backfilling of culverts must be done simultaneously on both sides. This is to ensure that loading from the backfilling materials does not displace the culvert due to unequal side pressures.

Rollers may be used, but pneumatic tampers must be used to secure proper compaction in the area immediately adjacent to the culvert which the roller cannot reach. Good compaction, especially immediately adjacent to the culvert, is critical to prevent future settlement of the backfilling material. Poor compaction can result in settlement of the roadway embankment and pavement.

On some contracts, granular backfill is specified when the old box is replaced through an existing grade. It is intended that granular material replace all removed excavation through the roadway cut. If more fill is removed than required, it will have to be replaced with granular material at the contractor's expense.

Bridge Abutments

On bridge abutments, all loose material must be removed prior to backfilling. The entire excavation behind the abutment, after removal of loose material, must be backfilled using approved granular material. It may not be necessary to excavate to the lines shown as the limit for granular backfill if the embankment is undisturbed since originally compacted.

Backfill should be brought up evenly to the elevation shown on the plans. A new abutment backfilling process was implemented in 2007. This backfilling process was developed following research into the factors associated with settlement of bridge approach pavement. The process involves installation of a low permeability geotextile to act as a ‘bath tub’ to control drainage flow and retain the backfill material and prevent material loss due to erosion. A subdrain is installed to drain the backfill zone and layers of porous backfill and granular backfill are placed. The granular backfill is specified to have a gradation with no more than 4 percent passing the #200 sieve to ensure good drainage and the granular is consolidated by flooding each 2 foot lift placement.
Detail sheets for the modified backfill details for backfilling bridge abutments have been developed and are being included in future bridge plans. In the interim, the modified backfill process should be added to any current bridge project where possible.

Modified backfill details are available at the following web site addresses under "Structures":

http://www.dot.state.ia.us/construction/index.htm or
http://dotnet/construct/construct_body_index2.asp.

Measurement and Payment

Since payment for granular backfill material is on a contract quantity basis, no weight tickets or other measurements are necessary. A note in the field book is required indicating that approved granular material was properly placed as required by the specifications and plans.