SECTION 207
EXCAVATION AND EMBANKMENT

207.1-DESCRIPTION:

This work shall consist of excavation for the roadway and channel changes including the removal and hauling of all material, of whatever character encountered, not being removed under some other item; preparing areas upon which embankments are to be placed, and constructing embankments with excavated material; disposing of unsuitable and surplus material; preparing the subgrade; finishing shoulders, slopes, ditches and drains; constructing benches and removing slides as may be required by the Plans or as directed by the Engineer; all in accordance with these Specifications and in reasonably close conformity with the lines, grades, thicknesses and cross sections shown on the Plans or established by the Engineer.

The compaction of embankments and subgrades will be accepted in accordance with these Specifications and the applicable requirements of 105, 106, and 109.

207.2-MATERIALS:

Materials shall meet the requirements specified in 715.11 and 716.

207.2.1-Quality Control Testing: Quality control of the embankment and subgrade material is the responsibility of the Contractor as specified in 106.1. The Contractor's personnel shall include at least one qualified technician who shall be responsible for all field sampling and testing necessary to determine the magnitude of the various properties of the embankment and the subgrade governed by the Specifications and shall maintain these properties within the limits of this Specification.

The Contractor shall notify the Engineer prior to construction of the test strip as set forth in MP 700.00.24. Further, the Contractor shall record the data for all compaction testing on the forms as set forth in MP 700.00.24 and maintain records of the equipment used to compact the material in accordance with 716.3.2.3. Completed test data forms shall be provided to the Engineer at or immediately after the time of testing.

The Contractor shall design a quality control plan detailing the methods, including sampling and testing, by which the quality control program will be conducted. The plan, prepared in accordance with the guidelines set forth in MP 717.04.21, shall be submitted to the Engineer at the pre-construction conference. The work shall not begin until the plan is reviewed for conformance with the contract documents.

CONSTRUCTION METHODS

207.3-ROADWAY EXCAVATION:

207.3.1-Slopes: Slope lines shall conform to the lines and grades shown on

the Plans or established by the Engineer within the following tolerances: For all slopes back of the ditch line a construction tolerance of plus or minus 1 ft. (300 mm), measured in a horizontal plane, will be permitted. No change will be permitted in the width, grade or dimensions of the roadway ditch due to the tolerance. The slope may be varied only by permission of the Engineer. Slopes shall be trimmed neatly to present a uniform surface, free from hollows or protrusions and loose or overhanging rocks. Slopes shall not be undercut. The tops of all slopes, except where the material is of solid rock, shall be rounded as shown on the Plans.

The Contractor shall take precautions by benching or other methods, as directed by the Engineer, to prevent slides and slipouts.

In all roadway cuts, including areas where ledges of rock or hard shale, boulders, coal or other solid formations are encountered at or near subgrade elevation, the excavation shall be carried to a minimum depth of 6 inches (150 mm) below the surface of the subgrade for the full cross section width of the roadway between the ditches. The surface of all areas excavated below subgrade elevation shall be graded in such a manner that undrained pockets are eliminated before placing subgrade material. Excavation to the 6 in. (150 mm) limit will be paid for at the contract unit price bid for "Unclassified Excavation". Excavation made below this 6 in. (150 mm) limit will not be paid for.

207.3.2-Use of Explosives: The provisions of 107.11 will be enforced. The Contractor shall not employ any method of blasting which will result in breakage beyond the slope line, or which is dangerous to the public or destructive to property. Excessive blasting or "over-shooting" will not be tolerated. Any material outside the authorized cross section which becomes shattered or loosened by blasting shall be removed without compensation if so ordered by the Engineer.

207.3.3-ROCK EXCAVATION:

207.3.3.1-Presplitting Technique: When explosives are used in excavation, the presplit technique shall be used except for fill bench construction and where slopes flatter than 1 to 1 are designed. This involves a single row of holes drilled along the neat excavation line and the blasting charge fired before any adjoining main excavation area is blasted. Depending on the type of rock, the drill holes for the presplitting shall be on centers from 2 ft. to 5 ft. (0.6 to 1.5 meters) as determined by field demonstration.

The holes to be loaded for presplitting shall be string loaded as recommended by the manufacturer of the explosives. The presplitting may be accomplished during the primary blast by delaying the primary holes so the presplitting holes will fire ahead of them. The end result is intended to yield a minimum of breakage outside the neat line of the plan cross sections. The Contractor shall make available upon request a record of the spacing and the amount and type of explosives used in the presplit operation.

207.3.4-Archeological and Historical Findings: Should the Contractor's

excavation operations encounter remains of prehistoric people's dwelling sites or artifacts of historical or archeological significance, the operation in that locality shall be temporarily discontinued. The Engineer will contact appropriate authorities to determine the disposition thereof. When directed by the Engineer, the Contractor shall excavate the site in such manner as to preserve the artifacts encountered and shall remove them for delivery to the custody of the proper State authorities. Such excavation will be considered and paid for as "Extra Work".

207.4-BENCHES:

Benches to be constructed either above or below the profile grade shall conform to the dimensions shown on the Plans or as directed by the Engineer. Necessary drainage shall be placed as directed before backfilling. The Contractor shall arrange benching operations to allow sufficient time for the Engineer to complete all cross sections before placing embankment material.

207.5-DITCHES:

Ditches, drains, channels, and stream changes, including inlet and outlet ditches for culverts, shall be constructed where shown on the Plans or as directed by the Engineer. Diversion ditches, where specified, shall be cut beyond the rounded edges of slopes. Ditch slopes shall be rounded and trimmed neatly to line, and flow lines shall be trimmed of irregularities in thegrade which might cause surface water pockets.

207.6-DISPOSAL OF MATERIAL:

207.6.1-Suitable Material: All suitable material excavated as above provided shall be used for forming embankments for the roadways, connecting roads, ramps and approaches; for constructing subgrade and shoulders; around structures and buildings; or for any other purpose necessary for the completion of the project as shown on the Plans or directed by the Engineer.

Random material, hard shale and rock, as defined in 716, are suitable for use in embankments Within soil groups, preference shall be given to the more granular soils which have greater dry weights, greater percentages of coarse and fine aggregate, and lower liquid limits.

Where the quantity of suitable material for certain work is limited, such material shall be reserved for the purpose as directed by the Engineer. Should the Contractor fail to reserve such available material when so directed, replacement shall be made by the Contractor at no additional cost to the Division.

207.6.2-Unsuitable Material: Materials which cannot be satisfactorily placed and compacted to a stable and durable condition may be designated as unsuitable by the Engineer. Sod, trash, organic substances, and muck are considered unfit for use in embankments.

Soil to be excavated, or being excavated, that contains excessive moisture

shall also be considered unsuitable for use in embankments. However, the Contractor may at their option dry the material and use it in the construction of embankments. Aeration, or other drying method, shall be at the expense of the Contractor. If the Contractor elects to waste rather than dry, suitable replacement material, if needed to complete embankments or otherwise fulfill the intent of the Plans, shall be furnished and placed by the Contractor at their expense. Any material borrowed to obtain necessary replacement material shall be accomplished in accordance with the provisions of 211.

207.6.3-Waste: The Contractor shall locate and furnish all sites for disposition of waste and surplus material, except those sites shown on the Plans. When directed by the Engineer, surplus material shall be used in uniform flattening of embankment slopes or widening of shoulders within the right-of-way limits. Steepening of slopes will not be permitted.

Before any waste will be permitted, the Contractor shall prepare a plan showing the limits and details of the proposed waste site, except as provided. Such plans shall be submitted to the Engineer for review and approval before disposition of waste material is begun. Upon completion of work, all waste sites shall be neatly trimmed and drained and all debris and spoil disposed of in accordance with the approved plan. No material shall be wasted at places other than those approved, except as provided, nor shall any material be wasted above established grades of any road unless authorized by the Engineer in writing. Waste areas shall be graded, fertilized, seeded and mulched by the Contractor in accordance with 652 of these Specifications.

For small quantities, not to exceed 300 cu yd, of waste outside the right-of-way limits, the Contractor need not prepare a plan showing the limits and details of the proposed waste site, and need not secure approval of the Engineer. For such small quantities of waste outside the right-of-way limits, the Contractor shall comply with existing laws and save the State harmless from any claims for damages which may result from the waste. In addition, the Contractor shall also comply with the provisions stated above with regard to trimming, draining, fertilizing, seeding and mulching.

The Contractor shall conduct all wasting operations so as to minimize pollution or sedimentation of rivers, streams, lakes, ponds, or other bodies of water.

Construction/Demolition Waste Material as defined in Section 207.6.5 will not be permitted in a site provided by the Contractor for disposal of surplus material except as follows:

Portland cement concrete and hot-mix asphalt removed from a project may be disposed of in a waste site provided the following requirements are met:

1) Placement shall be in accordance with Section 207.7.3.2.3-Rock.

2) All Portland cement concrete and hot-mix asphalt in the waste site shall be covered with 2 ft. (600 mm) of soil.

3) The plan approved by the Engineer for the waste site shall show the location of any Portland cement concrete and hot-mix asphalt to be wasted and/or the original plan supplemented as required.

4) The area of disposal for hot-mix asphalt shall be limited to two acres (.8 Ha) and may be located within a waste site covering more than two acres (.8 Ha).

5) Portland cement concrete or other masonry type products will not count against the two acre (.8 Ha) maximum size if all the reinforcing steel and/or wire mesh have been removed or cut off flush at the outer edges.

6) The area of disposal of Portland cement concrete and hot-mix asphalt shall be completed and covered within 180 days.

7) The disposal area of Portland cement concrete and hot-mix asphalt shall not be within 300 feet (91m) of a wetland, within a perennial stream, or within a 100-year floodplain.

8) The requirements as set forth in Section 207.6.5 Construction/Demolition Waste Material are to be followed.

207.6.4-Conduit: Conduit designated to be relaid shall be removed with care and stored where it can be protected from damage until reused. The Contractor shall replace sections lost from storage, damaged by negligence, or used in an improper manner.

207.6.5 - Construction/Demolition Waste Material: Disposal of Construction/Demolition waste material outside of the Division's right-of-way is controlled by the West Virginia Division of Environmental Protection (DEP), Office of Waste Management, Solid Waste Management Section in accordance with West Virginia Code, Chapter 22, Article 15 and West Virginia Administrative Regulations, 33 CSR 1 and is defined as follows: "... means waste building materials, packing, and grubbing waste, resulting from construction, remodeling, repair and demolition operations on houses, commercial and industrial buildings, pavements, including, but not limited to, wood, plaster, metals, asphaltic substances, bricks, blocks and concrete, other masonry materials, but does not include asbestos waste." Hazardous Waste will be disposed of in an approved area for that particular material.

Construction/Demolition waste material cannot be disposed of outside of the Division's right-of-way unless it is taken to a DEP approved commercial landfill or a permit from DEP is obtained by the land owner or Contractor in accordance with the above cited statute and regulations.

Construction/Demolition waste material consisting of concrete, asphalt, crushed stone, bricks and blocks may be disposed of within the Division's

right-of-way with approval of the Engineer. The waste material shall be covered with a minimum of 2 feet (600 mm) of soil, drained, and seeded.

The landowner or Contractor must apply for and receive approval for all Construction/Demolition waste areas outside of the Division's right-of-way from the DEP prior to use. The disposal of trees, stumps, woodchips, and yard waste generated from land clearing when generation and disposal occur on the same property is exempt from the requirements of DEP approval. A landowner using Construction/Demolition waste material to improve the grade of the land and if the area of that land does not exceed one-half acre (.2 Ha) is exempt from the requirements of DEP approval provided that the landowner or contractor does not fill wetlands, adheres to best management practices for construction and maintains cover over the material. The Construction/Demolition waste material exemption for landowners does not apply to multiple one-half acre (.2 Ha) sites on the same parcel of land.

The Contractor shall not create any temporary disposal sites on the right--of-way but must dispose of all Construction/Demolition waste in accordance with this section.

207.7-FORMING AND COMPACTING EMBANKMENT:

Slope lines for all embankments shall conform to the lines shown on the Plans or established by the Engineer, except that a construction tolerance of plus or minus 1 ft. (300 mm), measured in a horizontal plane, will be permitted, except further that the roadbed width due to the tolerance shall not be less than plan width. The slopes may be varied only by permission of the Engineer. Slopes shall be trimmed to present a neat and uniform surface, free from hollows or protrusions. The tops of all slopes shall be rounded as shown on the Plans.

207.7.1-Preparation: When fills are 5 ft. (1.5 meters) or less in depth, the top soil and sod shall be stripped to the depth specified by the Engineer, and the top 8 inches (200 mm) of the embankment foundation shall be scarified and compacted to the density requirements specified.

If the required density is unobtainable due to excessive moisture, organic substances, or other causes, the Contractor may be required, as directed by the Engineer, to remove and waste the in-place material to a depth prescribed by the Engineer before starting embankment; or to place an initial layer of rock, hard shale, or granular material, thickness to be prescribed by the Engineer; or both.

When embankments of less than 3 ft. (1 meter) in depth are to be placed upon old concrete pavements or pavements with concrete base, the pavements or base shall be removed and disposed of unless otherwise directed by the Engineer. When embankments of 3 ft. (1 meter) or more in depth are to be placed on old concrete pavements, the pavements shall be broken up in pieces not to exceed one square foot (90000 square mm) and may be left under the new embankments, unless otherwise directed by the Engineer. When embankments are to be placed upon other than rigid types of pavement, the

pavements, shall first be scarified to their full depth andrecompacted.

All existing slopes, other than rock, against which embankments are to be placed shall be plowed or deeply scarified so as to allow blending of the in-place material with the embankment material. When specified in the Contract or directed by the Engineer, the slopes shall be benches before the embankment is placed.

Prior to the commencement of excavation and embankment, when called for in the Contract, top soil shall be salvaged and stockpiled at the locations designated by the Engineer. Construction and payment procedures shall be in accordance with 651.

207.7.2-Materials for Formation and Compaction of Embankments: Embankment materials, test methods and the Contractor's quality control requirements shall conform to be applicable provisions of 716.

207.7.3-Placing Embankment:

207.7.3.1-General: No embankment shall by placed on frozen material. During the process of excavation and embankment construction, the roadway shall be maintained in such a condition that it will be well drained at all times. Depositing and compacting embankment in layers shall be started at the lowest point of the fill below grade, at the bottom of ravines, and at the foot of slopes on side hills. Unconsolidated soil or random material, unless removed under other provisions of the Specifications, shall be removed as directed by the Engineer, replaced and compacted as specified before placing embankment thereon. The layers shall be constructed approximately parallel with finished grade. Each layer, before starting the next, shall be leveled and smoothed by means of power driven graders, dozers or other suitable equipment with adequate weight, capacity and power to do the work. Layers shall be extended across the entire fill at the level of deposition unless otherwise authorized by the Engineer. Each layer, before starting the next, shall be compacted.

Materials to be used in any area of an embankment shall be free from stumps and spongy or frozen soil. The amount of organic material shall be no greater than that specified in the applicable provisions of 716.

Soil having organic material greater than that specified in 716 shall be disposed of as directed in 207.6.3. Embankments at bridge abutments shall be free of rock in the area where piles are to be driven, unless otherwise specified. Where rock is required for the entire embankment at bridge abutments, the piles will require predrilling. Predrilling may be required for other embankments where the depth, density of material, or negative skin friction require it. When embankment is being formed around structures, the material shall be deposited on both sides of the structure in approximately level layers and in accordance with 212.10.

The plan and sequence of operations shall make use of all the rock obtained from the excavation or borrow in accordance with the following provisions.

Rock occurring in the excavation shall be placed to form the base for

embankments, to form select embankment layers, to form drainage systems, to form the outer edges of embankments under construction or to widen previously constructed embankments. In all rock slopes, the large rocks shall be placed at the outer face and the smaller rocks andspalls near the center. The rock shall not be dumped in place but shall be distributed and placed the full width of the lift being formed by blading or dozing in a manner to assure proper placement in the final position in the embankment. The larger rock shall be well distributed and the voids, pockets, and bridging reduced to insure minimum deformation and still permit drainage where required. When there is insufficient material, other than rock, encountered in the excavation to permit the other material being properly compacted in layers, the other materialwill be reserved to be placed as directed by the Engineer. Material that is too wet to be properly compacted shall not be used to fill the voids of previously placed rock. Random material that meets moisture requirements may be blended with rock and shall be placed in the embankment in lift thickness as prescribed.

To the extent that it is available and needed, sufficient suitable material shall be reserved from the unclassified excavation for use in filling voids in the top of the rock fill.

Where rock is placed on an embankment of other material, the top of the other material shall be sloped from the center to the sides at a rate of approximately four percent.

207.7.3.2-Lift Thickness: The Contractor shall record material type and the lift thickness for all types of embankment.

When embankments are to be constructed across low swampy grounds which will not support the weight of trucks or hauling equipment, the lower part of the fill may be constructed by dumping successive vehicle loads of rock, hard shale or granular material in a uniformly distributed layer. The thickness of a layer shall not be greater than that necessary to support the vehicle placing subsequent layers, after which the remainder of the embankment shall be constructed in layers and compacted as specified.

In places inaccessible to a roller, such as adjacent to culverts, retaining walls and other structures, the fill material shall be placed in 4 in. (150 mm) compacted layers, uniformly compacted with approved tampers.

207.7.3.2.1-Random Material (Soil, Granular Material and Soft Shale): Random material as defined in 716 shall be placed in embankments in successive layers not to exceed 6 inches (150 mm) in thickness after compaction.

207.7.3.2.2-Hard Shale: This material is defined in the applicable provisions of 716. When suitable random material is to be mixed with hard shale, this mixture shall be placed in the embankment in lift thicknesses prescribed. Mixtures which contain 66 percent or more of suitable random material shall be placed in lifts not to exceed 6 inches (150 mm) in thickness after compaction. Mixtures which contain 35 to 65 percent (by visual

inspection) of suitable random material shall be placed in lifts not to exceed 12 in. (300 mm) before compaction. Mixtures which contain from zero to 35 percent (by visual inspection of suitable random material shall be placed in lifts not to exceed 24 in. (600 mm). The lift thickness shall be as thin as the excavated material will permit.

207.7.3.2.3-Rock: This material, as defined in 716, shall be placed in the embankment in layers of thickness as prescribed.

Mixtures which contain 66 percent or more (by visual inspection) of suitable random material shall be placed in lifts not to exceed 6 inches (150 mm) after compaction. Mixtures which contain 35 to 65 percent (by visual inspection) of suitable random material shall be placed in lifts not to exceed 12 in (300 mm) before compaction. Mixtures which contain zero to 35 percent (by visual inspection) of suitable random material shall be placed in lifts not to exceed 36 in (900 mm). The lift thickness shall be as thin as the excavated material will permit.

Rock lifts that are designated as Select Embankment shall contain no more than 15 percent of other suitable embankment material (by visual inspection). The dominant rock size shall be 6 inches, (150 mm) and greater. During excavation and handling, the Contractor shall avoid contaminating the Select Embankment with other embankment materials. Rock for Select Embankment shall be reserved from the excavation up to the plan quantity required. If Select Embankment from the excavation is wasted prior to meeting the plan quantities, the Contractor shall be responsible, and bear the expense, for replacing the material wasted up to the plan quantity. Rock lifts in embankment shall be placed in approximately level layers of uniform thickness. The size of the rock lifts shall not exceed 36 inches (900 mm). The rock shall not be greater in any dimension than 36 inches (900 mm).

When rock is used as a lining for drainage channels, it shall be placed to the thickness called for on the plans or cross sections. The dimensions of the rock may be as large as the thickness of the blanket will permit.

207.7.4-Compaction of Embankments: Embankment material consisting of random material and hard shale as described in 716, which does not contain sufficient moisture to be compacted to the requirements specified, shall receive applications of water necessary for compaction. Water shall be applied with suitable sprinkling devices and shall be thoroughly incorporated into the material which is to be compacted. Embankment and subgrade materials which contain excess moisture shall be dried, prior to or during compaction, as necessary to obtain satisfactory compaction.

Layers of soil shall be moistened or dried to the tolerance specified in 716.3.1 at the time compactive effort is applied. Water shall be added to or excess moisture removed from soils by the use of plows, discs, or other methods.

Each layer of embankment shall be uniformly compacted to the applicable requirements specified in 716.

Hard shale shall be broken down in placing by manipulating with tractors, bulldozers, power graders, rollers, or other approved devices until voids between particles are substantially filled. This material shall be compacted and shall be at a moisture content that will provide proper compaction.

Rock shall be placed as required under 207.7.3 and compacted, using the equipment specified in 207.7.5, to the satisfaction of the Engineer.

207.7.5-Compaction Equipment: Sufficient leveling and compacting equipment shall be provided to do the work of leveling and compacting without delay after the material has been deposited. When the equipment is inadequate for the rate of depositing, the rate of excavation and placement of fill shall be reduced to a rate not to exceed the capacity of the leveling and compacting equipment, with particular attention to the loss of moisture during the delay. When two or more fills are being constructed and are so isolated from one another that one roller cannot compact the fills satisfactorily, additional rollers shall be provided as ordered by the Engineer.

Vibratory compactors, grid, paddle-foot, or vibratory rollers, or other compacting equipment approved by the Engineer, shall be used for fills constructed of materials which are predominately rock or hard shale.

Approved pneumatic or power driven backfill tampers shall be used in areas inaccessible to rollers.

Three-wheel rollers shall weigh not less than 10 tons (9 Mg). They shall be of sturdy construction and especially designed for heavy work. They shall be in good mechanical condition and have sufficient power to travel over rough surfaces and steep grades.

Pneumatic tired rollers shall operate on two axles in such manner that the rear group of tires will not follow in the tracks of the forward group. They shall be mounted on a rigid frame and have a loading platform or body suitable for ballast loading. The pneumatic tired rollers, under working conditions, shall have a minimum rolling width of 60 in. (1.5 meters) and shall give a minimum compression of 325 lb. per in. (2.24 KN/mm) of width of tire tread.

Single axle pneumatic rollers of an approved type may be used, providing the requirements as to width and compression per inch (mm) of width of tire tread are met.

Tamping rollers shall consist of metal rollers, drums, or shells surmounted by metal studs with self-cleaning tamping feet. The cross sectional area and spacing of tamping feet and the weight of the roller shall be such that the compaction or density for the particular material shall be obtained as specified. Each tamping roller shall consist of at least two sections not rigidly joined.

Grid rollers shall consist of drums at least 5 ft. (1.5 meters) in diameter whose cylindrical faces present the appearance of an open woven bar mesh. Each drum shall be at least 2 ½ ft. (750 mm) long and they shall be independently mounted close together on the same axle. The complete roller, when operating without ballast, shall weigh not less than six tons or 200 lb. per in (5.4 Mg or 1.38 KN/mm) of length of roller drum.

Arrangements shall be provided for adding ballast, as directed by the

Engineer, to such an extent that the total weight of the unit can be increased to at least 15 tons and 500 lb. per in. (13.5 Mg and 3.45 KN/mm) of length of roller drum. Grid rollers shall make at least three completecoverages of each layer or until the required density is obtained.

The use of trucks, carryalls, scrapers, tractors, tractor wagons, or other haulage equipment shall not be considered in lieu of compacting equipment prescribed, but the traffic of such hauling equipment shall be distributed over the fill in such a manner as to make use of the compaction afforded as an addition to compaction by rolling or vibrating.

207.8-FINISHING EARTH ROADS:

When no pavement or surfacing is included in the Contract, the roadway shall be finished as a graded earth road. The roadway, shoulders, and superelevated curves shall be constructed simultaneously to the required cross section and grade. Unsatisfactory or unsuitable material shall be removed and replaced as specified in 207.9. The entire surface shall be brought to a smooth condition by repeated use of an approved power grader and continuously maintained in a condition suitable for traffic until final completion and acceptance of the work. When grading work is being done simultaneously on more than one section of a Contract, an approved grader shall be furnished on each section if so required by the Engineer.

207.9-SUBGRADE:

The subgrade shall be constructed in accordance with these Specifications, in substantial conformity with lines, grades , and cross sections shown on the Plans or established by the Engineer.

The subgrade shall be 6 inches (150 mm) compacted thickness for all embankment and excavation sections and shall be constructed out of suitable material free of particles larger than 3 inches (75 mm) and consisting of granular material, conforming to the requirements of 716.1.1.2, that can be satisfactorily compacted to a stable condition. The tolerance set forth in 314.6 shall apply. Excavation to the 6 in. (150 mm) limit in cut sections will be paid for at the contract unit price bid for "Unclassified Excavation". Excavation made below this 6 in. (150 mm) limit in cut sections will not be paid for, except, when unsuitable material is removed as specified below, payment will be made for removal to an additional depth of 12 inches (300 mm) of this unsuitable material with the actual locations and depth of removal established by or acceptable to the Engineer.

The subgrade layer or layers shall be moistened or dried to a uniform moisture content suitable for maximum compaction and brought to a firm unyielding condition by compaction. The subgrade shall be uniformly compacted to the applicable requirements specified in 716.

The surface of the subgrade shall be maintained in such condition that it will drain at all times.

When trenching is done for narrow base widening, ditches of an adequate depth shall be constructed across the shoulders at sufficient intervals to permit

a free outlet of water. Equipment or vehicles shall not be allowed to travel in a single track and form ruts in the subgrade. Any ruts or irregularities formed in the subgrade shall be scarified and recompacted.

When the construction of a base, pavement, or surface is included in the Contract, or is so provided on the Plans, the profile grade of the subgrade shall be such that the specified thickness of the base course, pavement and surface will be obtained within limits of final surface grade. Any grade revision necessitated shall be called to the attention of the Engineer.

When unsuitable material is encountered at the subgrade elevation, it shall be removed to a depth of 12 in. (300 mm) and replaced with suitable material.

When so designated, engineering fabric for subgrade stabilization, conforming to 715.11, shall be installed over the area which shall be relatively smooth, free of sharp protrusion, depressions or debris. The fabric shall be placed with the machine direction of the fabric parallel with the alignment and shall be relatively smooth and free from creases. The joining of fabrics shall be accomplished by sewing (either in the field by portable sewing machine or during manufacture of the fabric) as outlined in 715.11.3 or shall be installed so any splice joints have a minimum overlap of 3 ft. (900 mm) or as directed by the Engineer.

Once the fabric is placed, cover material shall be brought to the working face, dumped and spread with equipment exerting the minimum ground pressure possible. Construction equipment shall not operate directly on the fabric. A minimum of 6 inches (150 mm) of cover material shall be maintained between the construction equipment and the fabric.

Compaction shall be accomplished by conventional methods after the cover material is spread. Sheepsfoot rollers will not be permitted.

The completed subgrade shall present a uniform appearance and shall be checked for conformity to the lines, grades, and dimensions shown on the Plans.

When the Plans require engineering fabric for subsurface drainage or separation, the material shall conform to 715.11 and be placed as fabric for stabilization except the fabric may be joined by overlapping so the splice joints have a two foot (600 mm) minimum overlap. Construction equipment is permitted on the fabric provided all damage is repaired as specified in 715.11.3. When the fabric is placed in structure backfill applications, such as bridge abutments, the orientation of the fabric will be directed by the Engineer.

207.10-SHOULDERS:

Before any base or pavement may be placed upon the subgrade, the shoulders along and adjacent thereto shall be built to the dimensions shown on the cross section. In order to provide adequate side support for macadam or other stone types of base or surface, shoulders shall be constructed full width, substantially to line and grade and to the depth of the course being constructed, and compacted with at least a 10 ton (9 Mg) roller, and then trimmed to the required line. When concrete base or pavement is being constructed, or where the shoulders are to be built of stabilized material, these requirements may be

waived by the Engineer.

Upon completion of the base, pavement, or surfacing, the shoulders shall be finally shaped, dressed, and compacted to conform to the dimensions shown on the Plans. No stone exceeding 3 inches (75 mm) in maximum dimension will be permitted within 3 inches (75 mm) of the surface. The outer edge of the shoulder shall be trimmed to a neat line parallel with the centerline of the roadway, and the entire surface rolled to within 12 in. (300 mm) of the outside edge, refilling and rerolling any depressions that develop. Ditches and back slopes shall be finally cleaned and trimmed to line upon completion of the shoulder work.

The in-place density of shoulders shall be as specified for the subgrade in 716.

207.11-DRAINAGE:

When grading, subgrading, constructing shoulders, or placing base or pavement is suspended because of unsuitable weather or any other reason, suitable provisions shall be made to drain the grade, subgrade or shoulders by means of the construction of adequate side ditches and drains. The ditches and drains shall be kept open and maintained during the period of suspension, including the removal of slides. Upon failure of the Contractor to construct and maintain the temporary drains prior to the acceptance of the work, the Engineer may cause such work to be done by others, and the cost will be deducted from moneys due the Contractor.

Upon completion of the subgrade or shoulders and before any base on pavement is placed, subgrade drains or weeps shall be placed as shown on the Plans or as directed by the Engineer in accordance with 606.

207.12-TEMPORARY SURCHARGE:

When shown on the Plans or directed by the Engineer, a temporary surcharge composed of suitable compacted material from the "Unclassified Excavation" or "Unclassified Borrow Excavation" shall be placed after completion of the embankment to the elevations of the base of the subgrade. The temporary surcharge shall be placed in accordance with location limits and elevations shown on the Plans or as directed by the Engineer. Surcharge material shall be placed in accordance with the provisions of 207.7. The first 5 ft. (1.5 meters) of the surcharge shall be compacted as specified for embankment in the applicable provisions of 716. The remaining surcharge shall be compacted as specified above except that the target percentage of dry density shall be 90 percent.

The surcharge shall be maintained for the period indicated on the Plans or directed by the Engineer.

207.13-PROTECTION OF CURTAIN WALLS:

All bridges which will be used for permissible haulage, but which do not have the approach slabs constructed, shall have the pavement notch of the curtain walls built up to final grade by the use of timber to eliminate the

possibility of damage to the curtain walls.

207.14-SLIDES AND SLIPOUTS:

Material outside the planned roadway or ditch slopes which, in the opinion of the Engineer, is unstable and constitutes a potential slide area, material from slides which has come into the roadway or ditch, and material which has slipped out of new or old embankments shall be excavated to designated lines or slopes either by benching or in such manner as directed by the Engineer. Such material shall be used in the construction of the embankments and in flattening of slopes, or disposed of as directed by the Engineer.

Erosion, regardless of amount or extent, caused by the action of the elements and which results in damage to the work or materials shall in no case be considered a slide or slipout.

207.15-METHOD OF MEASUREMENT:

The quantity of work done will be measured in cubic yards (cubic meters) for Item 207001-*, "Unclassified Excavation", which shall be the material actually moved and disposed as herein prescribed, measured in its original position and determined from the cross sections by the method of average end areas. The quantity of unclassified excavation for payment will be the number of cubic yards (meters) as further described. The quantities shall be computed using the cross section areas shown on the Plans with deductions from or additions to such cross section areas in accordance with 109.2 and authorized deviations. The quantity for payment will be to plan lines for material excavated in accordance with the construction tolerance set forth in 207.3.1 except as provided. In no case where the tolerance line has not been reached will the quantity for payment exceed the quantity actually excavated; unless otherwise authorized, the Contractor will be required to continue or resume excavation until within tolerance rather than receive payment for a lesser (out-of-tolerance) excavated quantity.

No material removed beyond the slope lines or below the grade line shown on the Plans, except as provided in 207.3.4 and 207.9, will be included for payment unless authorized in writing by the Engineer. Slides and material removed from beyond the slope lines, not attributable to carelessness, overshooting, or unsuitable construction methods on the part of the Contractor, will be included only when so authorized.

Excavation below grade, including undercutting, as shown on the Plans or as directed by the Engineer; ditches to divert water from the slopes of cuts; inlet and outlet ditches for drainage structures; other ditches as authorized be the Engineer; removal of topsoil, sod, old pavement, boulders, walls, and other unsuitable material within the areas upon which the embankment is to be placed; benching; and all other excavation authorized but not shown by the cross sections, will be measured separately and included for payment.

Where stone base or concrete pavements have been scarified or broken but not removed, or slopes other than rock upon which embankments are to be made are plowed or scarified and the loose soil has been manipulated and

compacted but not removed, such work and all the work of placing and compacting all embankments, widenings or waste pits, placing and consolidating rockfills, will be considered as a necessary part of manipulation, the cost of which is included in the price bid per cubic yard (meter) for "Unclassified Excavation".

Payment for placing of temporary surcharge will be included in the contract unit price for "Unclassified Excavation" or "Unclassified Borrow Excavation", as the case may be. Removal of temporary surcharge will be paid at the contract unit price for "Unclassified Excavation".

The removal and disposal of slide and slipout material in accordance with 207.14 will be paid for at the contract price for "Unclassified Excavation", unless the Engineer, prior to the removal of such material, orders the slide or slipout material to be removed and disposed of as "Extra Work", or the Contractor, prior to performing any such work, requests in writing that the removal and disposal of any such slide or slipout material be paid for as "Extra Work", and the Engineer approves.

The cost of any work outside the limits of the slide necessary to make slide or slipout areas accessible to normal excavation equipment will be paid for as "Extra Work".

The above provisions shall not be so construed as to relieve the Contractor from the duty of maintaining all slopes true and smooth.

The quantity of subgrade work done under this item will be the number of cubic yards (meters) of "Subgrade" established in the Proposal, subject to adjustment as provided for in 104.2 and 109.2. Any additional work beyond the scope of the original Plans but authorized by the Engineer will be measured in cubic yards (meters), compacted in place, and paid for at the unit bid price for subgrade, subject to the provisions of 104.2.

Subgrade constructed outside the lines, dimensions and cross sections shown on the Plans or designated by the Engineer will not be measured for payment.

Measurement and payment for subgrade drains will be in accordance with the provisions of 606.

The work done for Item 207009-*, "Unclassified Excavation" will be measured on a lump sum basis.

The quantity of engineering fabric placed in subgrade stabilization or subsurface drainage or separation will be measured by the square yard (meter) complete in place and accepted, excluding laps.

207.16-BASIS OF PAYMENT:

The quantities, determined as provided above, will be paid for at the contract unit prices bid for these items, which prices and payments shall be full compensation for doing all the work prescribed in a workmanlike and acceptable manner, including all labor, tools, equipments, supplies, and incidentals necessary to complete the work.

The cost of unclassified excavation including the hauling of all material, any reserving and rehandling of unclassified excavation material, embankment

construction including compaction, furnishing and applying water as an aid to embankment compaction, and the cost of furnishing additional waste sites, grading, fertilizing, and seeding and mulching of all waste sites, shall be included in the unit price bid for "Unclassified Excavation".

The cost of furnishing all materials, including furnishing and applying water necessary as an aid to subgrade compaction, shall be included in the unit price bid for "Subgrade".

207.17-PAY ITEMS:

ITEM	DESCRIPTION	UNIT
207001-*	UNCLASSIFIED EXCAVATION	CUBIC YARD (METER)
207002-*	SUBGRADE	CUBIC YARD (METER)
207009-*	UNCLASSIFIED EXCAVATION	LUMP SUM
207032-*	FABRIC FOR SUBSURFACE DRAINAGE	SQUARE YARD (METER)
207033-*	FABRIC FOR SUBGRADE STABILIZATION	SQUARE YARD (METER)
207034-*	FABRIC FOR SEPARATION	SQUARE YARD (METER)

* Sequence number

208 THROUGH 210-BLANK

SECTION 211
BORROW EXCAVATION

211.1-DESCRIPTION:

This work shall consist of furnishing, excavating, transporting, placing, compacting, and furnishing material required to complete the roadway and embankments;

211.2-MATERIALS:

211.2.1-Unclassified Borrow Excavation: Materials shall be obtained which are suitable for the particular purpose for which unclassified borrow excavation is authorized.

211.2.2-Rock Borrow Excavation: Material shall meet the requirements specified for Rock in 207.7.3.2.3.

211.2.3-Select Borrow Excavation: Material shall consist of a granular material as defined in 716.1.1.2 unless otherwise specified in the Contract.

CONSTRUCTION METHODS

211.3-GENERAL:

All borrow excavation materials shall be obtained in the amounts directed, by the methods and subject to the same provisions as prescribed in 207 except

as modified or amended. Borrow excavation should not be placed until after the roadway excavation has been utilized in the embankments and there is no likelihood of slips or excess material.

The Contractor shall submit to the Engineer for review and approval a site grading plan for borrow areas, except as provided. No borrow area shall be opened until authorized by the Engineer.

All borrow site grading plans will be submitted by the Contractor to the State Historic Preservation Officer (SHPO) for determination of the effects on cultural resources, such as Indian Burial Grounds. If the SHPO feels that there could be an effect on cultural resources a lengthy investigation could be undertaken. The cost of any investigation would be borne by the Contractor.

Probable sites that could require an investigation are flood plains of major rivers and large rock shelters.

Non probable locations of cultural resources would be steep hillsides and/or narrow valleys.

Temporary roads, haulways, or other facilities which may be required for the use or convenience of the Contractor in excavating and transporting borrow material shall be provided by the Contractor without cost to the Division.

Materials shall be obtained from borrow pits in a workmanlike manner so as to minimize pollution or sedimentation of streams, lakes, and reservoirs and to facilitate the work of measuring and calculating the volume of material removed.

Borrow pits shall not be excavated below the level of the natural drainage for the area, and the drainage ditches required to keep the pit free from standing water during the progress of the work and upon completion shall be constructed without extra compensation.

Upon completion of the work, the borrow pit shall be neatly trimmed and all debris and soil disposed of in an acceptable manner. Borrow pits shall be graded, fertilized, seeded and mulched in accordance with 652.

211.4-UNCLASSIFIED BORROW EXCAVATION:

Unclassified borrow excavation shall consist of material, as prescribed, incorporated into embankments, backfill, shoulders, or any other type of work shown on the Plans or designated by the Engineer. The method of placement, compaction and density shall be in accordance with the applicable requirements of 207.7.

211.5-ROCK BORROW EXCAVATION:

Rock borrow excavation shall consist of materials, as prescribed, incorporated into embankments in accordance with the provisions of 207.7 covering the construction of rock fills.

211.6-SELECT BORROW EXCAVATION:

Select borrow excavation shall consist of material as prescribed, incorporated into embankments, backfills, shoulders, or any other type of work shown on the Plans or designated by the Engineer. The method of placement, compaction and density shall be in accordance with the applicable requirements

for granular material as prescribed under 207.7.

211.7-METHOD OF MEASUREMENT:

211.7.1 – Cubic Yard (Meter) Measurement: The quantity of work done will be measured in cubic yards (cubic meters) actually obtained and incorporated in the work, determined in its original position from cross sections by the average end areas.

The method of measurement may also be calculated as 80 percent of the truck load volume of each truck used to haul the material. The measurement of the load will be taken inside each bed and will include length, width and average height to the top of the load. However, the measurement will exclude the hoist housing. When Rock Borrow is obtained from a commercial source payment may be per cubic yard by converting 1.65 tons (2 Mg) to equal 1 cubic yard (cubic meter).

If the borrow is obtained in such quantity or in such manner that a waste of unclassified excavation, slips, or excess material is caused, the amounts of such waste shall be deducted from the borrow volume. In determining the amount of material to be developed due to unauthorized placement of borrow material or unclassified excavation material in the embankments, the quantity outside the construction tolerance will be measured and deducted from borrow on a yard-to-yard (meter to meter) basis without adjustment due to shrinkage or swelling.

211.7.2 – Lump Sum Measurement: The work done will be measured on a lump sum basis.

211.7.3 – Ton (Megagram) Measurement: The quantity of work done will be measured in tons (megagrams) actually obtained and incorporated in the work, determined by the total of the weights shown on receipted railroad freight bills when materials are shipped by rail, by actual measured displacement of barges certified by the Producer when water shipments are made, providing materials delivered by the aforementioned methods are not stockpiled or stared; or determined by the Contractor from the total of weigh slips for each vehicle load weighed on an approved truck scale, and certified by the Contractor to be correct.

The Producer or Contractor shall provide truck scales. The scales shall be of sufficient size and capacity to weigh the heaviest loaded trucks that are used for delivery of the material.

All truck scales shall be mounted on solid foundations, which will insure their retaining plumb and level. All truck scales shall be inspected and sealed by the West Virginia Department of Labor, Bureau of Weights and Measures, or other appropriate agencies of the State or its political subdivisions. The Department may, at its option, accept inspection and sealing by out of state agencies when the material is weighed outside West Virginia.

A digital recorder shall be required on all truck scales. The digital recorder shall produce a printed record of the gross, tare and net weights, and the time,

date, truck identification and project number. Provision shall be made for constant zero compensation and further provision shall be made so the scales may not be manually manipulated during the printing process. The system shall be interlocked so as to allow printing only when the scale has come to rest. In case of a breakdown of the automatic equipment, the Engineer may permit manual operation for a reasonable time, normally not to exceed 48 hours, while the equipment is being repaired.

A weighman shall be provided by the Producer/Supplier. The weighman shall certify that the weight of the material, as determined either by the scales or from the digital printout of the weights, is correct.

Each truck shall be weighed empty prior to each load.

211.8-BASIS OF PAYMENT:

The quantities, determined as provided above, will be paid for at the contract unit price bid for these items, which unit prices and payments shall be full compensation for doing all the work prescribed in a workmanlike and acceptable manner, including all labor, tools, equipment, supplies, and incidentals necessary to complete the work. There will be no additional compensation for furnishing, grading, fertilizing, seeding and mulching of borrow pits.

211.9-PAY ITEMS:

ITEM	DESCRIPTION	UNIT
211001-*	UNCLASSIFIED BORROW EXCAVATION	CUBIC YARD (METER)
211002-*	ROCK BORROW EXCAVATION	CUBIC YARD (METER)
211003-*	SELECT BORROW EXCAVATION	CUBIC YARD (METER)
211004-*	UNCLASSIFIED BORROW EXCAVATION	LUMP SUM
211005-*	ROCK BORROW EXCAVATION	LUMP SUM
211006-*	SELECT BORROW EXCAVATION	LUMP SUM
211007-*	UNCLASSIFIED BORROW EXCAVATION	TON (MEGAGRAMS)
211008-*	ROCK BORROW EXCAVATION	TON (MEGAGRAM)
211009-*	SELECT BORROW EXCAVATION	TON (MEGAGRAM)

* Sequence number