

## SECTION 305

### SUBGRADE AND SHOULDERS

#### I. GENERAL

##### 1.1 DESCRIPTION OF WORK

The Contractor shall furnish all labor, supervision, material (except as herein provided), tools, equipment, supplies, and services; and, shall perform all Work necessary for the construction of subgrade and shoulders in reasonably close conformity to the cross section shown on the Drawings and Contract Documents.

##### 1.2 MATERIALS

Materials shall be furnished by the Contractor in accordance with Section 200.

##### 1.3 SUBMITTALS

Submittals shall be made by the Contractor in accordance with the procedures set forth in Section 105, and as described below:

The Acceptance Procedures for Aggregates shall be in accordance with VDOT Section 200.04.

#### II. EXECUTION

##### 2.1 SHAPING AND COMPACTING SUBGRADE

###### A. Subgrade Consisting of Material in Place

1. The subgrade area shall be scarified to a depth of 6-inches for a distance of 2 feet beyond the proposed edges of the pavement on each side. If sandy or other soil is encountered that will not compact readily, clay or other suitable material shall be added or water applied in such quantity and within the allowable moisture content specified herein as will permit compaction of the subgrade. Subgrade material shall be compacted at optimum moisture, within +/- 20 percent of optimum. The density of the subgrade when compared to the theoretical maximum density as determined in accordance with the requirements of VTM-1 shall conform the following

<u>% Retained on No. 4 Sieve</u>	<u>Min. % Density</u>
0 - 50	100
51 - 60	95
61 - 70	90

Percentages of material shall be reported to the nearest whole number.

2. The subgrade shall then be shaped and checked to ensure a typical cross section and uniform grade prior to placement of any subsequent courses. If the subgrade becomes

eroded or distorted prior to placement of material for subsequent courses, it shall be scarified, reshaped, and recompacted in accordance with the original requirements.

3. At the time of placing material for subsequent courses, the subgrade shall be compacted to the required density, free from mud and frost, and in a condition that will permit compaction of subsequent courses without distortion.
4. If the approved subgrade becomes unstable after placement of the subbase or base course and becomes mixed with the aggregate therein, material from the unstable area and contaminated aggregate shall be removed. The area shall then be backfilled and compacted, and the subsequent course thereon reconstructed.

B. Subgrade Consisting of Treated Materials in Place

1. Subgrade shall be treated in accordance with applicable provisions of VDOT Sections 306 and 307 except that the tolerance for depth will be waived when lime or cement is being used to bridge or correct extremely weak areas.
2. If lime can be satisfactorily manipulated during initial mixing, and bridging of the weak area has been performed satisfactorily, additional mixing and compacting will not be required. Additional layers of fill may be placed without delay.
3. Field density determinations will be performed in accordance with the requirements of AASHTO T191, T205, or T214, modified to include material sizes used in the laboratory determination of density, with a nuclear testing device, or by other approved methods. When a nuclear device is used, the nuclear density determination for treated in-place subgrade material will be related to the density of the same material tested in accordance with the requirements of VTM-1 or VTM-12 and a control strip will not be required.

C. Subgrade Consisting of Imported Material

1. The area to receive the material shall be graded to a true crown and cross section.
2. Material shall be placed and compacted in accordance with the requirements of the applicable specifications governing the type of material. When select material is used, material shall be placed and compacted in accordance with the requirements of VDOT Section 308 except that the provision for mixing will be waived. The top 6-inches of the finished subgrade shall be compacted in accordance with the requirements of the provisions of Paragraph A.1., above.
3. The provisions of Paragraph A.1., above that are not specifically amended herein shall apply. Imported material shall be placed in approximately equal layers not more than 8-inches for commercial material and 6-inches for local material, compacted measure. Material will be tested after compaction for thickness and density. If material fails to conform to thickness requirements, it shall be corrected by scarifying, adding material if necessary, mixing, reshaping and recompacting, or removing and replacing. If the material fails to conform to density requirements, additional rolling will be required until the required density is obtained provided the material is compacted at optimum moisture, within  $\pm 20$  percent of optimum. If the moisture content is outside the allowable

tolerance, the layer shall be scarified, brought to optimum moisture within the allowable tolerance, and recompacted to the specified density.

4. An aggregate spreader will not be required in the placement of select material and other imported materials used as subgrade and shoulder courses.

## 2.2 TREATMENT OF UNSUITABLE SUBGRADE

- A. When solid rock occurs in cuts or the material is not suitable for subgrade or finishing purposes, the roadbed shall be excavated below the grade shown on the Drawings.
- B. When solid rock or other unsuitable material has been removed, excavated areas shall be backfilled in accordance with the Drawings.
- C. Unsuitable materials are additionally defined as Classes III, Type SM and SC, Class IV & Class V, soil types listed under USCS Soil Classification System (ASTM D2487).

## 2.3 FINISHING SUBGRADE

- A. The Contractor shall provide effective drainage for the subgrade and maintain it in a satisfactory condition until the next course is placed.
- B. When practicable, the subgrade shall be prepared at least 500 feet ahead of placement of any subbase, base, or surface course. Material for subsequent courses shall not be placed until the subgrade has been checked and approved. The finished subgrade elevation shall be within  $\pm 0.04$  foot of the Drawing elevation unless otherwise specified. When imported material is used, acceptance of the course will be based on the requirements of Section 308.

## 2.4 SHOULDERS

- A. Aggregate shoulder material shall be placed in accordance with the requirements of the applicable specifications governing the type of material or construction being used and shall be compacted at optimum moisture, within  $\pm 2$  percentage points of optimum. The density of the aggregate shoulder material, when compared to the theoretical maximum density as determined in accordance with the requirements of VTM-1 or VTM-12, shall conform to the following:

<u>% Retained on No. 4 Sieve</u>	<u>Min. % Density</u>
0 - 50	95 - 100
51 - 60	90 - 100
61 - 70	85 - 100

Percentages of material will be reported to the nearest whole number.

- B. Aggregate in the guardrail section of fills (1 foot from the roadway side of the guardrail face to the outside of the shoulder) shall be compacted until a density of at least 90 percent of the theoretical maximum density has been obtained. The asphalt mixture in this area shall be sealed immediately after the hot mixture is spread. Rolling of the asphalt mixture shall continue until

roller marks are eliminated and a density of at least 85 percent of the theoretical maximum density has been obtained.

- C. Stabilized and paved shoulders shall be constructed in accordance with the requirements of the applicable specifications for pavement stabilization. If the aggregate shoulder material becomes over consolidated prior to final finishing, it shall be scarified for the approximate depth, reshaped, and recompacted to conform to the typical cross section.

- D. Shoulders shall be constructed simultaneously with nonrigid types of base or surface courses other than asphalt concrete or in advance of the base or surface course so as to prevent spreading of base or surface materials. The area of shoulders 12-inches adjacent to the pavement shall be rolled simultaneously with the course being deposited.
- E. Where base or surface courses are being constructed under traffic and are more than 1-inch in depth, shoulder material adjacent thereto shall be placed within 72 hours after placement of the base or surface course.

## 2.5 GRAVEL DRIVEWAY REPLACEMENT

- A. Gravel driveways will be replaced to a compacted thickness equal to the existing depth or to a compacted thickness of 6-inches, whichever is greater.
- B. Gravel driveways will be replaced with VDOT #25 or #26 crusher run stone aggregate or matching stone material.

## III. MEASUREMENT FOR PAYMENT

- A. When material in place is used for the subgrade and shoulders, no measurement will be made. Treated material in place will be measured in accordance with the method of measurement for the specified stabilizing material. When imported material is specified, it will be measured as follows:
  1. Select material, Type I and min. CBR will be measured in tons.
  2. Select material, Types II and III, will be measured in cubic yards.
  3. Payment will be made at the unit price bid per cubic yard or ton as indicated on the Bid Form.
  4. When the ton unit is specified, the quantity shall be determined in accordance with the requirements of VDOT Section 109.01.
- B. Moisture in excess of optimum, + 2 percentages points, will be deducted from the net weight of both truck and rail shipments.
- C. Allowances will not be made for unauthorized depths beyond those shown on the plans and the allowable tolerances. When tonnage measurements are used, deduction for material exceeding the allowable tolerance will be based on 110 pounds per square yard per inch of depth.
- D. When material in place is used for subgrade and shoulders, no separate payment will be made. The cost thereof shall be included in the price for other applicable pay items.

- E. When imported materials are used, the subgrade and shoulders will be paid for at the contract unit price per cubic yard or per ton as specified. Treated material in place will be paid for in accordance with the requirements of the applicable specification.
- F. Stabilized or paved shoulders shown as a pay item will be measured and paid for in accordance with the requirements of Sections 313 and 315 and VDOT Sections 306 and 307, as applicable.
- G. Measurement and payment will be made for each gravel driveway replaced.

End of Section