

303 AGGREGATE SUBBASE AND AGGREGATE BASE

303-2 Materials

The Special Provisions may allow use of salvaged asphaltic concrete or Portland cement concrete materials for aggregate subbase and aggregate base. Requirements for salvaged materials are not the same as Standard Specifications for aggregate subbase and aggregate base. The contractor may request use of salvaged materials on a project where specifications were not included in the Special Provisions. A copy of the normal requirements can be obtained from Contract and Specifications Section. If Special Provisions do not include salvage material specifications, then the engineer should contact Materials Group before initiating a Supplemental Agreement to allow use of salvage material for aggregate subbase and aggregate base.

All material sources will fall into one of the following categories:

- Department Furnished Source,
- Contractor Furnished Source, or
- Commercial Source.

When the Contractor furnishes pits, the Resident Engineer has the responsibility to approve the source in writing. Conditions for the Resident Engineer's approval are detailed in Section 1001-4 of the Standard Specifications.

The Resident Engineer is required to observe the Contractor's sampling of the pit and may furnish general comments about any special treatment or restrictions. The Contractor is responsible for both the quality and quantity of material in their own pits, but the Resident Engineer is expected to monitor the pit operations and assist the Contractor in producing a quality product.

Stripping Pits

When clearing or stripping of a pit is required at a Department Furnished Source, the Resident Engineer should direct where the waste is to be placed. Stripping may be deposited beyond the area intended for use, but not beyond the pit right-of-way boundaries. A survey should be performed to establish pit boundaries beforehand. Some material sources may have environmental restrictions that are shown in the licensing agreement. See the Standard Specifications for final placement of stripping.

The crushing plant should not be erected over a portion of the pit containing usable material unless there is a large surplus of material in the pit area. It is the responsibility of the Contractor to select a location that will enable them to produce the quantities required.

Haul Roads

When the Contractor prepares an environmental statement for an aggregate source, all haul roads must be included. No other roads are to be used for hauling or access.

Haul roads are to be kept to a minimum and must be located in such a manner as to cause the least amount of damage to the natural vegetation. In order to promote the best possible public relations, the owners of all lands traversed should be contacted before actual work in any pit or on any haul road is started. Fences are not to be cut or gates left open without the owner's permission. After completion of the pit use, the pit and haul roads should be cleaned up, and all damages repaired as required by the specifications, pit agreements, and the owner's requirements.

When the Contractor furnishes the pit or a private pit is obtained, the Contractor is expected to provide evidence in writing that the owner is satisfied with cleanup and/or restoration work.

Inspection of Aggregate Production

In the production of subbase and base course aggregates, if for any reason it is deemed advisable to depart from the requirements of the Standard Specifications or Special Provisions, a supplemental agreement shall be submitted. If it is found that the grading specifications or some other test requirements cannot be met, the District Engineer and Materials Group shall be advised without delay. Even one day's delay could be expensive, due to the large quantities that can be produced in a single day.

The Contractor's operations in the pit shall be in accordance with both the Standard Specifications and any environmental requirements. The Contractor shall be required to operate in such a manner as to produce a uniform product with a minimum of waste and leave the pit in such a condition that future use of the pit will not be adversely affected.

Sufficient tests shall be made during the production of base materials to determine the quality of the produced material. The Contractor should be aware of any unsatisfactory test results and should make any necessary corrections in their operation. The final placement of any material that does not meet the specifications should never be permitted. When test results indicate that material does not meet specifications, the Contractor will be required to make corrections to bring the material produced into compliance.

Sampling

Material samples of any type should always be taken by, or at the direction of, experienced personnel that are aware of the proper methods of obtaining representative samples. Production of base material requires close control. It is extremely important that the specifications covering the amount of material passing the #200 (75 μ m) sieve and the plasticity index of the material are rigidly enforced.

Information pertaining to material sampling frequency, methods, and testing may be found in the Materials Testing Manual and in the Materials Policy & Procedures Directives Manual.

Subsection 106.07 of the Standard Specifications requires a sampling device on all secondary crushers and screening plants. This device is a requirement to reduce the physical problems of obtaining a representative sample in a safe manner and without interrupting the Contractor's operation. The sampling device should be tested under operating conditions before production is started. The Contractor should be advised of this requirement at the preconstruction conference.

Stockpiling and Handling of Aggregates

Stockpiles shall be located within the right-of-way limits of pit areas or within an area that the Contractor has secured from the owner for that purpose. The site should not be subject to flooding or an excessive amount of blowing dust (such as on the downwind side of an asphalt or crushing plant).

The Standard Specifications do not have requirements for stockpiling aggregates, but there are stipulations against segregation of materials.

The following comments pertaining to stockpiling are generally accepted as good practice in the industry:

1. In order to minimize segregation, stockpiles must be constructed in layers, rather than in cones, and the thickness of the layers should not exceed 5 feet (1.5 meter).

2. If stockpiles are formed with a conveyor belt, they are to be leveled at intervals in order to avoid "coning". The same suggestion is applicable to stockpiles formed by stackers.
3. Crawler tractors should not be used on stockpiles because of breakdown of the aggregate due to the abrasive action caused by the steel tracks.
4. If the stockpiling methods or methods of handling will contribute to segregation, the Contractor should be advised of the problem and probable consequences of having material fail the grading specifications.

303-3 Construction Requirements

303-3.01 Placement

Watering of base courses must be done with care. Excess watering is wasteful, but more importantly, it may result in serious damage to the subgrade. Most of the water that falls on granular material penetrates to the subgrade almost immediately and this could create serious problems. This "sponginess" and resultant movement under wheel loads is usually first noticed as excessive looseness of base materials. The Inspector should be on guard for any soft spots that may develop in the roadway following rains or excessive watering. If this condition should occur, a thorough investigation shall be made and corrective measures taken before paving.

The subgrade upon which the first course is to be constructed must be thoroughly compacted and shall conform to the required cross section and grade. Subbase and base materials are usually more expensive than the material in the subgrade and should not be needlessly used to correct irregularities in the subgrade.

Each layer of material must be finished to the required tolerance in order to avoid unnecessary use of the more expensive material to properly finish the grade.

When finishing to blue tops, the machine operator has a tendency to hit right on grade at the blue top, and be high in between. This condition should always be looked for and can be checked quickly by means of a string line. The Contractor should be aware of this and make adjustments or corrections during the grade check.

If soft spots are found in the subgrade, they shall be corrected. If springs or seeps are present, they shall be drained by the use of perforated pipe or by other acceptable means. A sufficient amount of subgrade shall be approved ahead of the placement of base at all times.

303-3.02 Compaction

Each layer of base course applied to the roadway must be watered and compacted to the required density prior to the placement of successive lifts.

In most cases, pneumatic rollers or vibratory rollers will be used to compact the base material. The most positive means of determining the adequacy of water and compactive effort is by taking density tests. More frequent testing at the beginning of the work will usually pay off by preventing over-watering and over-rolling and by providing the Contractor and Inspector with a "feel" for the material. During compaction, it is important that the Inspector closely observe the performance of the material. If it compresses and springs back (a condition known as "pumping") the subgrade has been over-saturated and will require repairs.

If water from either rain or the Contractor's operation has penetrated the base course and saturated the subgrade prior to paving, proof rolling should be performed. This will require the Contractor to run heavy equipment over the base material with the Inspector checking for "pumping." Any "pumping" areas observed must be repaired prior to paving. It cannot be overemphasized that the Inspector needs to be alert to over watering which can damage the subgrade.

303-3.03 Finishing

To a great extent the riding surface of the completed pavement is dependent on the base surface upon which it is laid. Since smoothness of the pavement is one of the qualities most desired by the road users, the Resident Engineer should be satisfied that every means possible has been expended to obtain a finished base course having a cross section true to line and grade within the specified tolerance.

Upon completion of leveling the surface to the desired smoothness, the aggregate base should be watered and rolled to the required density. A string line is an effective tool to use in checking the grade and cross section of the compacted base for acceptance.

When asphaltic concrete is placed directly on subgrade, the use of a leveling device is not required. However, it is extremely important to finish the subgrade to as smooth and uniform a plane as possible.

Thickness measurements shall be made and recorded following the compacting of each course and prior to placing any succeeding course. The method and frequency of these measurements shall be as indicated in the Sampling Guide Schedule of the Materials Testing Manual.

303-3.04 Contractor Quality Control

The Special Provisions may require the Contractor to perform *special* quality control measures necessary to provide acceptable quality in the production, hauling, and placement of materials. Quality control is always the responsibility of the Contractor.