305 Dense-Graded Base

305.1 Description

(1) This section describes constructing a dense-graded base using one or more of the following aggregates at the contractor's option:

Crushed stone	Reclaimed asphalt
Crushed gravel	Reprocessed material
Crushed concrete	Blended material

305.2 Materials

305.2.1 General

(1) Provide aggregate conforming to 301.2 for crushed stone, crushed gravel, crushed concrete, reclaimed asphalt, reprocessed material, or blended material. Provide QMP for dense-graded base as specified in 730.

(2) Where the contract specifies or allows 1 1/4-inch base, do not place reclaimed asphalt, reprocessed material, or blended materials below virgin aggregate materials unless the contract specifies or the engineer allows in writing. The department will allow virgin aggregate above reclaimed asphalt, reprocessed material, or blended materials in shoulder areas adjacent to concrete pavement.

305.2.2 Gradations

305.2.2.1 General

(1) Except for reclaimed asphalt, conform to the following gradation requirements:

	PERCENT PASSING BY WEIGHT		
SIEVE	3-INCH	1 1/4-INCH	3/4-INCH
3-inch	90 - 100	___	___
1 1/2-inch	60 - 85	___	___
1 1/4-inch	___	95 - 100	___
1-inch	___	___	100
3/4-inch	40 - 65	70 - 93	95 - 100
3/8-inch	___	42 - 80	50 - 90
No. 4	15 - 40	25 - 63	35 - 70
No. 10	10 - 30	16 - 48	15 - 55
No. 40	5 - 20	8 - 28	10 - 35
No. 200	2.0 - 12.0	2.0 - 12.0[1] [3]	5.0 - 15.0[2]

[1] Limited to a maximum of 8.0 percent for base placed between old and new pavement.

[2] 8.0 - 15.0 percent if base is >= 50 percent crushed gravel.

[3] 4.0 - 10.0 percent if base is >= 50 percent crushed gravel.

(2) Unless the plans or special provisions specify otherwise, do the following:

1. Use 1 1/4-inch in base course layers. Always use 1 1/4-inch in the top 4 inches of base. The contractor may substitute 3-inch for 1 1/4-inch in lower base zones including material underlying the shoulder.
2. Use 3/4-inch in shoulders. Always use 3/4-inch to match the thickness of the paved shoulder in the unpaved portion of the shoulder and on exposed shoulder foreslopes. The contractor may substitute 1 1/4-inch for 3/4-inch elsewhere in shoulders and shoulder foreslopes. If using 1 1/4-inch, limit the allowable reclaimed asphalt content to 50 percent or less.

305.2.2.2 Reclaimed Asphalt

(1) The contractor may use reclaimed asphalt with 100 percent passing a 1 1/4-inch sieve as 1 1/4-inch base. The engineer will assess gradation primarily by visual inspection but may test questionable material.

305.3 Construction

305.3.1 General

(1) Construct dense-graded base conforming to 301.3.

305.3.2 Compaction

305.3.2.1 General

(1) Compact each base layer, including shoulder foreslopes, with equipment specified in 301.3.1. Use standard compaction conforming to 301.3.4.2. Final shaping of shoulder foreslopes does not require compaction.

305.3.2.2 Compacting 1 1/4-Inch Base and 3/4-Inch Base

(1) If using a pneumatic roller, do not exceed a compacted thickness of 6 inches per layer. For the first layer placed over a loose sandy subgrade, the contractor may, with the engineer's approval, increase the compacted layer thickness to 8 inches.

(2) If using a vibratory roller, do not exceed a compacted thickness of 8 inches per layer.

305.3.2.3 Compacting 3-Inch Base

(1) Compact with a vibratory or pneumatic roller. Do not exceed a compacted thickness of 9 inches per layer.

305.3.3 Constructing Aggregate Shoulders

305.3.3.1 General

(1) Construct aggregate shoulders to the elevations and typical sections the plans show, except for minor modifications needed to conform to other work.

(2) Use equipment that does not damage or mar the pavement surface, curbs, or appurtenances.

(3) Place aggregate directly on the shoulder area between the pavement edge and the outer shoulder limits. Recover uncontaminated material deposited outside the limits and place within the limits.

(4) Do not deposit aggregate on the pavement during placement, unless the engineer specifically allows. Do not leave aggregate on the pavement overnight. After placing the shoulder aggregate, keep the pavement surface free of lose aggregate.

(5) Spread and compact the aggregate in compacted layers of 6 inches or less. Use standard compaction conforming to 301.3.4.2.

(6) After final compaction, shape the shoulders to remove longitudinal ridges to ensure proper drainage.

305.3.3.2 Shoulders Adjacent to Concrete Pavement or Base

(1) Construct shoulders along concrete pavement or concrete base so the completed shoulder is at the approximate grade and cross-section before opening the pavement to public traffic.

305.3.3.3 Shoulders Adjacent to Asphaltic Pavement or Surfacing

(1) If the roadway is closed to through traffic during construction, construct the aggregate shoulders before opening the road.

(2) If the roadway remains open to through traffic during construction and a greater than 2-inch drop-off occurs within 3 feet or less from the edge of the traveled way, eliminate the drop-off within 48 hours after completing that days paving. Unless the special provisions specify otherwise, provide aggregate shoulder material compacted to a temporary 3:1 or flatter cross slope from the surface of the pavement edge.

(3) Provide and maintain signing and other traffic protection and control devices, as specified in 643, until completing shoulder construction to the required cross-section and flush with the asphaltic pavement or surfacing.

305.3.4 Shaping Shoulders

(1) Under the Shaping Shoulders bid item, blade, shape, and compact the existing shoulder aggregate, before the end of the day's work, to ensure proper drainage while salvaging existing pavement and constructing new pavement. Do not contaminate the shoulder aggregate with deleterious material. Incorporate material obtained from shaping shoulders in the new shoulder, in widening the roadbed, or as the plans show.

305.3.5 Constructing Detours

(1) Under the Aggregate Detours bid item, provide aggregate on the designated detour at the locations the plans show or the engineer directs. Use 3/4-inch base unless the plans or special provisions specify otherwise.

305.4 Measurement

(1) The department will measure the Base Aggregate Dense and Aggregate Detours bid items under this section by the ton or cubic yard acceptably completed. The department may deduct for contaminated aggregate or unrecovered aggregate deposited outside the outer shoulder limits.

(2) If the department converts volume to weight as specified in 109.1, the conversion factor for the acceptably completed in-place Base Aggregate Dense bid items is 1.85 tons per cubic yard.

(3) The department will measure Shaping Shoulders by the station acceptably completed, measured along the centerline for each shoulder separately.

305.5 Payment

(1) The department will pay for measured quantities at the contract unit price under the following bid items:

ITEM NUMBER	DESCRIPTION	UNIT
305.0110	Base Aggregate Dense 3/4-Inch	TON
305.0115	Base Aggregate Dense 3/4-Inch	CY
305.0120	Base Aggregate Dense 1 1/4-Inch	TON
305.0125	Base Aggregate Dense 1 1/4-Inch	CY
305.0130	Base Aggregate Dense 3-Inch	TON
305.0135	Base Aggregate Dense 3-Inch	CY
305.0410	Aggregate Detours	TON
305.0415	Aggregate Detours	CY
305.0500	Shaping Shoulders	STA

(2) Payment for the Base Aggregate Dense and the Aggregate Detours bid items is full compensation for preparing the foundation; and for placing, shaping, compacting, and maintaining the base.

(3) Payment for Shaping Shoulders is full compensation for blading, shaping, compacting, and maintaining the existing aggregate shoulders.

(4) If the contractor substitutes 3-inch in base course or 1 1/4-inch in shoulders as allowed under 305.2.2.1, the department will pay for the substitute material as follows:

- At the Base Aggregate Dense 1 1/4-Inch unit price if substituting 3-inch in base course.
- At the Base Aggregate Dense 3/4-Inch unit price if substituting 1 1/4-inch in shoulders.