SECTION 02721

UNTREATED BASE COURSE (UTBC)

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Production, construction, and compaction of UTBC used for pavements, shoulders, and incidental construction.

1.2 RELATED SECTIONS

A. Section 01572: Dust Control and Watering

1.3 REFERENCES

A. AASHTO T 11: Materials Finer than 75-μm (No. 200) Sieve in Mineral Aggregates by Washing

B. AASHTO T 19: Bulk Density ("Unit Weight") and Voids in Aggregate

C. AASHTO T 27: Sieve Analysis of Fine and Coarse Aggregates

D. AASHTO T 89: Determining the Liquid Limit of Soils

E. AASHTO T 90: Determining the Plastic Limit and Plasticity Index of Soils

F. AASHTO T 96: Resistance to Degradation of Small-Sized Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

G. AASHTO T 180: Moisture-Density Relations of Soils Using a 4.54 kg (10 lb) Rammer and 457 mm (18 in) Drop

H. AASHTO T 193: The California Bearing Ratio

I. AASHTO T 255: Total Evaporable Moisture Content of Aggregate by Drying

J. AASHTO T 335: Determining the Percent of Fracture in Coarse Aggregate

1.4 DEFINITIONS Not Used

1.5 SUBMITTALS

A. Written report for approval for each aggregate class and source, a minimum of five working days before placement. Include the following:
   1. Aggregate suitability. Refer to this Section, Part 2.
   2. Name of supplier and location of source.
   3. Maximum Dry Density and Optimum Moisture Content and associated test result data. Refer to AASHTO T 180, Method D.
   4. Job mix gradation including single values for each sieve size, No. 4 and finer. The target values must be within the gradation limits of Table 2.

B. Job-mix gradation changes
   1. Refer to this Section, Article 3.2.

1.6 ACCEPTANCE

A. Type I Placement – Pavement Section
   1. Use Class A aggregate, Table 1.
   2. The Engineer takes random samples from the grade and tests for moisture, gradation, and laboratory density and performs in-place density determinations.
   3. Meet gradation limits and applicable tolerances of Table 2 for each gradation test.
      a. Evaluate each sublot separately and do not average with other sublots.
   4. Meet minimum density test average of 97 percent of maximum laboratory density with no test less than 94 percent.

B. Type II Placement – Incidental includes placement for Curb, Curb and Gutter, Driveways, Pedestrian Access Ramps, Sidewalk, Waterways, Flatwork, and other items of work in the contract to which UTBC is included and not measured or paid for separately.
   1. Use Class A aggregate, Table 1.
   2. The Engineer takes random samples from the grade and tests for moisture, gradation, and laboratory density and performs in-place density determinations.
   3. Meet gradation limits and applicable tolerances of Table 2 for each gradation test.
      a. Each sublot will be evaluated separately and not averaged with other sublots.
   4. Meet minimum density test average of 95 percent of maximum laboratory density with no test less than 92 percent.

C. Type III Placement – Shoulder
   1. Use Class A or B aggregate, Table 1.
   2. Adjust moisture content before compaction .

D. Material not meeting the gradation requirements may be allowed to remain in-place at the discretion of the Engineer provided density requirements are met.
   1. Additional lots may not be placed until the deficiencies are addressed and corrected.

E. Correct material that does not meet the specified criteria by scarifying, placing additional material, re-mixing, reshaping, and re-compacting when determined by the Engineer.

F. Do not place additional material on any unaccepted layer.

PART 2 PRODUCTS

2.1 AGGREGATES

A. Well-graded, clean, hard, tough, durable, and sound mineral aggregates consisting of crushed stone, crushed gravel, or crushed slag, free of organic matter and contamination from chemical or petroleum products, according to Table 1.

Table 1

Aggregate Properties			
	Aggregate Class		
	A	**B**	
Dry Rodded Unit Weight	Not less than 75 lb/ft^3		AASHTO T 19
Liquid Limit/Plastic Index	Non-plastic	PI $\leq$ 6	AASHTO T 89 AASHTO T 90
Aggregate Wear	Not to exceed 50 percent		AASHTO T 96
Gradation	Table 2		AASHTO T 11 AASHTO T 27
CBR with a 10 lb surcharge measured at 0.20 inch penetration	70% Minimum	N/A	AASHTO T 193
Two Fractured Faces	50% Min	N/A	AASHTO T 335

B. Establish the job mix (target) gradation for the ¾ inch sieve and finer within the gradation limits.
   1. The Job Mix Gradation Tolerance is the allowable deviation from the job mix (target) gradation on the applicable sieves.
   2. All other percents passing will be within the gradation limits. Refer to AASHTO T 11 and AASHTO T 27.

Table 2

Gradation Limits		
Sieve Size	**Job Mix Gradation Target Band**	**Job Mix Gradation Tolerance**
1½ inch	100	
1 inch	90 - 100	±9.0
¾ inch	70 - 85	±9.0
½ inch	65 - 80	±9.0
⅜ inch	55 - 75	±9.0
No. 4	40 - 65	±7.0
No. 16	25 - 40	±5.0
No. 200	7 - 11	±3.0

Percent passing based on total aggregate (dry weight) and fine and coarse aggregate with approximately the same bulk specific gravities.

PART 3 EXECUTION

3.1 PREPARATION

A. Remove vegetation before Type III placement. Refer to Section 02231.
   1. Protect existing delineators in place.

3.2 INSTALLATION

A. Provide moisture content of ± 2 percent of optimum at the time of placement. Refer to AASHTO T 180, Method D and AASHTO T 255.

B. Procedures for Changing the Job-Mix Gradation
   1. Submit changes in writing 24 hours before placement for approval by the Engineer.

C. Place in layers of uniform thickness and compact each layer to a thickness not to exceed a 6 inch depth.
   1. Do not place on any frozen surface. Refer to Section 01572.

D. Finish to a uniform line and grade with surface deviations no more than ⅜ inch in 10 ft in any direction.
   1. Correct any profile deviations greater than ⅜ inch.
      a. Rework minimum of 4 inch lift to achieve homogeneous density.
      b. Determine limits of correction based on extent of deviation.
      c. Continue finishing until existing deviation is less than ⅜ inch.

E. Maintain optimum moisture content ± 2 percent during compaction.
   1. Use appropriate compaction equipment adjacent to abutments, backwalls, approach slabs, wing walls, retaining walls, and other structures.
   2. Use a minimum of two passes with a roller for Type III placement or as directed by the Engineer.

END OF SECTION