SECTION 02712

LEAN CONCRETE BASE COURSE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials and procedures for constructing a Lean Concrete Base Course.

1.2 RELATED SECTIONS

A. Section 02752: Portland Cement Concrete Pavement

1.3 REFERENCES

A. AASHTO M 85: Portland Cement

B. AASHTO M 148: Liquid Membrane-Forming Compounds for Curing Concrete

C. AASHTO M 154: Air-Entraining Admixtures for Concrete

D. AASHTO M 194: Chemical Admixtures for Concrete

E. AASHTO T 11: Materials Finer Than 75 Fm (No. 200) Sieve in Mineral Aggregates by Washing

F. AASHTO T 19: Unit Weight and Voids in Aggregate

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

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

I. AASHTO T 96: Resistance to Abrasion of Small Size Coarse Aggregate by Use of the Los Angeles Machine

1.4 ACCEPTANCE

A. Refer to Section 02752 with the following modifications:

1. No strength tests are required for acceptance.
2. Engineer takes cores to determine thickness-acceptance criteria at random locations with one core representing 12,000 ft^2 (a sublot).
3. The Engineer takes three measurements (using a tape measure) on each core. The average of these measurements will be used as the length of x.
   - x = Average length of core
   - *n* = Number of cores (1 per sublot)
   - $\bar{x}$ = Average length for entire project (lot)

$$\bar{x} = \frac{\Sigma x}{n}$$

4. Department will assess reductions for thickness and cement content separately. Any core less than 3.5 inches will be included in $\bar{x}$ determination and also have a price adjustment under sub lot. Refer to Table 02712-1 for Payment Reductions for Thickness.

Table 02712-1
Payment Reductions for Thickness

Thickness	**Pay Factor (Project)**
$\bar{x} \geq 3.75$ inch	1.00
3.50 inch < $\bar{x}$ < 3.75 inch-	0.90
3.00 inch < $\bar{x}$ < 3.50 inch	0.75
	Pay Factor (Sub lot)
Sub lot, 3.00 inch < x < 3.50 inch	0.75
Sub lots, x < 3 inch	0.50 or replace as directed by the Engineer.

5. Price adjustment for cement content under, 98 percent of mix design requirements will be assessed at 1.5 times the FOB Batch Plant price for cement.

1.5 QUALITY ASSURANCE - STOCKPILES

A. Department requires new trial batches and tests if the stockpile gradation changes from the job-mix gradation by more than the allowable variation as shown in Table 1.

B. Provide adequate supplies of aggregate and stockpiles for sampling and testing seven days before construction.

C. Make sufficient quantity of material available in the stockpiles to supply the mixing plant at full capacity and to provide continuous placing.

PART 2 PRODUCTS

2.1 PORTLAND CEMENT

A. Type I or Type II following AASHTO M 85.
   1. The Department may retest cement that has been stored over 60 days.
   2. Do not use cement containing lumps or cement that has partially set.

2.2 AGGREGATE

A. Portion of aggregate passing the No. 40 sieve: non-plastic. AASHTO T 90

B. Wear: Cannot exceed 50 percent. AASHTO T 96

C. Dry-rodded unit weight: Greater than 75 lb/ft^3 AASHTO T 19

D. Aggregate Job-Mix Gradation: AASHTO T 11, and AASHTO T 27

E. Meet Table 1

Table 1

Aggregate - Lean Concrete Base Course		
	Job-Mix Gradation Band	**Allowable Variation From Job-Mix Gradation**
Sieve Size	**Percent Passing**	**Percent**
1 ½ inch	100	-
1 inch	85 - 100	-
3/4 inch	50 - 100	± 8
3/8 inch	30 - 75	± 8
No. 4	25 - 60	± 8
No. 40	8 - 25	± 4
No. 200	0 - 9	± 3

2.3 WATER

A. Refer to Section 02752.

2.4 ADMIXTURES

A. Air-entraining agents. AASHTO M 154

B. Water-reducing admixtures: AASHTO M 194, Type A, except:
   1. Relative durability factor: at least 90.
   2. Chlorides content (as Cl^-): not exceeding one percent by weight of the admixtures.

C. Do not use calcium chloride.

2.5 CURING COMPOUND

A. As specified for white, pigmented material with wax base.

B. Meet AASHTO M 148, Type II.

2.6 BOND BREAKER

A. Use curing compound following article 2.5 above.

2.7 EQUIPMENT

A. Refer to Section 02752.

2.8 JOB-MIX DESIGN

A. Provide the Engineer with a written job-mix design for approval before placing lean concrete base course.
   1. Base the job-mix design on trial batch results that verify the concrete mix design strength.
   2. Do not change the job-mix design without written approval.
   3. Meet the requirements in Table 2.

Table 2

Job-Mix Design Requirements		
Slump	Air Content	Minimum Design Compressive Strength
Inches	Percent	psi, 7 days
2-1/2 ± 1-1/2	4.5 ± 1.5	750

4. Use a minimum of 255 lbs. of cement per cubic yard of concrete.
5. Do not exceed the water-cement ratio determined by the trial batches.

PART 3 EXECUTION

3.1 CONSTRUCTION METHODS

A. Line and Grade Control: Refer to Section 02752.

B. Pre-Wetting Base Course:
1. Moisten the subbase prior to placement.
2. If the subbase dries, sprinkle it without forming puddles or mud.
3. Keep at least 500 ft of subbase prepared ahead of the paver.

C. Formed paving option: Refer to Section 02752.

D. Batching materials: Refer to Section 02752.

E. Placing lean concrete base: Refer to Section 02752.

F. Finishing:
1. Screed the lean concrete base course to maintain line and grade within 3/8 inch in 10 ft.
2. Hand methods of strike-off and consolidation are permitted when the base width is less than 10 ft or where machine screeding is impractical.
3. Fill porous areas.

3.2 CURING

A. Curing Compound:
1. Warm curing compound (to a temperature not exceeding 100 degrees F) when it is too viscous for application.
2. Do not dilute or alter the compound.

3. Thoroughly mix the compound before application, and agitate the compound continuously during application.

B. Application:
   1. Immediately following finishing operations, spray entire exposed area of lean concrete base course (top and sides) with curing compound at a rate of 1 gallon per 160 ft^2 of surface.
   2. Apply compound with fully atomizing mechanical sprayers equipped with wind-protective hoods.
   3. Hand spraying will be permitted on small areas and areas inaccessible to mechanical spraying equipment.
   4. Amply cover edges, corners, sides, and rough spots with curing compound.

C. Immediately repair damage to the film of curing compound occurring within 72 hours of application.

3.3 BOND BREAKER

A. Apply a second application of curing compound (at 1 gallon per 160 ft^2 of surface) within 48 hours before placing Portland cement concrete pavement.

3.4 TRAFFIC CONTROL

A. Do not allow traffic or construction equipment until 72 hours after placing.

B. After 72 hours, trucks hauling Portland cement concrete for pavement will be permitted to maneuver (for only the minimum length necessary to back into paver).

C. After the lean concrete base has cured for seven days, legal loads may be hauled provided that:
   1. Hauling is limited to the lane adjacent to the median.
   2. Hauling does not cause damage.

D. Reduce the load or refrain from hauling if damage occurs.

E. Repair all damage at no additional cost to the Department.

END OF SECTION