

(E) Compressive Strength

Determine the compressive strength of concrete using one set of two 6 inch x 12 inch cylinders at 28 calendar days. Test samples will be made by the Engineer from the concrete as it comes from the mixer. The samples will be made and cured in accordance with AASHTO T 23. Test specimens will be tested by the Engineer in accordance with AASHTO T 22. Furnish curing facilities for the test samples in accordance with Section 725.

(F) Thickness

The thickness of the pavement will be determined by measurement of cores in accordance with AASHTO T 148.

Take 4 inch diameter cores in the presence of the Engineer. The Engineer will take immediate possession of the cores. Take the cores when the concrete has attained a compressive strength of at least 3,500 psi and at least 72 hours have elapsed since placement of the pavement. If the concrete has not attained a compressive strength of at least 3,500 psi, the gross vehicle weight rating of vehicles supporting the coring operation may not exceed 7,000 lbs. Take cores no later than 30 days after the pavement has been placed. The core locations for each lot will be selected at random by the Engineer.

Patch all core holes within 72 hours of taking the core, using an approved nonshrink grout compatible with the pavement or shoulder concrete.

(G) Surface Smoothness

Perform acceptance testing for surface smoothness on concrete pavements in accordance with Article 710-7. The Engineer will have a representative present during all testing and will take possession of the results at the completion of each day's testing.

700-16 MEASUREMENT AND PAYMENT

Remove and repair defects and damage to underlying asphalt course, Portland cement concrete and joints at no cost to the Department.

SECTION 710 CONCRETE PAVEMENT

710-1 DESCRIPTION

Perform the work covered by this section, including, but not limited to, designing the concrete mix; furnishing and placing concrete; furnishing of all admixtures and additives; constructing all joints and furnishing joint materials; marking the pavement; curing the pavement and furnishing all curing materials; furnishing concrete necessary for making test beams and cylinders; performing maturity testing; coring and patching the pavement; calibrating and checking the operation of batching equipment; taking actions necessary to prevent or to repair cracking; sawing and sealing joints; verifying dowel bar alignment; removing and replacing of defective pavement; and constructing Portland cement concrete pavement in accordance with these *Standard Specifications* and with the lines, grades and dimensions shown on the plans.

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1 710-2 MATERIALS

2 Refer to Division 10.

Item	Section
Curing Agents	1026
Dowels and Tie Bars	1070-6
Joint Filler	1028-1
Low Modulus Silicone Sealant	1028-3
Portland Cement Concrete	1000
Water	1024-4

3 710-3 COMPOSITION OF CONCRETE

4 Design the concrete mix in accordance with Section 1000.

5 Before placement, produce a trial batch through the plant. The Engineer will make
6 compressive and flexural samples from the trial batch for testing at 1, 3, 7, 14 and 28 days of
7 age. Until the trial batch meets 650 psi flexural strength and 4,500 psi compressive strength,
8 the Engineer will make acceptance samples for flexural and compressive tests for mix placed.
9 If the trial batch test results meet strength requirements, flexural samples representing placed
10 concrete will be discarded, and compressive samples will be used for acceptance. If the trial
11 batch does not meet strength requirements, flexural samples will be used for acceptance until
12 plant produced mix meets strength requirements.

13 If any major change as defined in Section 1000-3 is made to the mix design, this process shall
14 be initiated again.

15 710-4 ACCEPTANCE OF CONCRETE

16 The Department will test the concrete pavement for acceptance with respect to compressive
17 strength and thickness on a lot by lot basis in accordance with Article 700-15 and the
18 requirements herein.

19 For all concrete pavement, including mainline, shoulders, ramps, tapers, intersections,
20 entrances, crossovers and irregular areas not otherwise defined, produce a lot consisting of
21 1,333.3 sy or fraction thereof placed within 28 calendar days. From each lot, the Engineer
22 will make at least one set of two 6 inch x 12 inch cylinders from a randomly selected batch of
23 concrete. The average compression strength of the 2 cylinders is considered one test. If
24 Department personnel make and test additional sets of cylinders for a lot, all sets will be
25 averaged with the original set to determine the strength. In the case of low strength, the
26 Engineer will perform an investigation.

27 710-5 CONSTRUCTION METHODS

28 Construct concrete pavement in accordance with Section 700.

29 Place concrete in 2 lane minimum widths in a single operation except as follows:

30 (A) Where the total number of lanes is an odd number, in which case one of the lanes may be
31 placed in a separate operation.

32 (B) Areas such as ramps or auxiliary lanes where the total width is less than 2 lanes.

33 710-6 FINISHING

34 Screed and float finish the concrete to the required cross section that minimizes or eliminates
35 hand finishing. Additional water for finishing will not be allowed. Hand finishing will not be
36 permitted except under the following conditions:

37 (A) Narrow widths or irregular areas, where operation of mechanical equipment is
38 impractical.

- 1 (B) If a breakdown of mechanical equipment occurs, hand methods may be used to finish
2 only that concrete deposited on the base before the breakdown.
- 3 (C) Abnormal circumstances of short duration subject to approval.
- 4 Produce a final finish on the pavement surface true to grade and uniform in appearance and
5 free of irregular, rough or porous areas.
- 6 Following the finishing of the pavement by screeding, floating and checking with
7 straightedges, further finish the surface of the pavement by burlap dragging or other
8 acceptable method to produce a uniform surface texture. Pull the burlap drag in a longitudinal
9 direction.
- 10 Produce the final surface finish on all mainline pavement, auxiliary lanes, and ramps by
11 mechanical equipment for longitudinally tined grooves while the concrete is plastic. The
12 tining shall be done with a mechanical device such as a wire comb. The comb shall have a
13 single row of tines. Each shall have a nominal width of 5/56 inch to 1/8 inch. The nominal
14 spacing of the tines shall be $3/4 \pm 1/8$ inch center-to-center. The nominal depth of tined
15 groove in the plastic concrete shall be $1/8 \pm 1/32$ inch.
- 16 Longitudinal tining shall be accomplished by equipment with automated horizontal and
17 vertical controls to ensure straight, uniform depth tined grooves. The texture geometry shall
18 be the same as imparted throughout the length of the tining comb. A 2 inch to 3 inch wide
19 strip of pavement surface shall be protected from tining for the length of and centered about
20 longitudinal joints.
- 21 The tining operation shall be done so that the desired surface texture will be achieved while
22 minimizing displacement of the larger aggregate particles and before the surface permanently
23 sets. Where abutting pavement is to be placed, the tining shall extend as close to the edge as
24 possible without damaging the edge. If abutting pavement is not to be placed, the 6 inch area
25 nearest the edge or 1 foot from the face of the curb shall not be tined. Hand-operated tining
26 equipment that produces an equivalent texture may be used only on small or irregularly
27 shaped areas. Tines shall be thoroughly cleaned at the end of each day's use and damaged or
28 worn tines replaced.
- 29 When surface corrections for pavement smoothness are made in the hardened concrete, no
30 additional texturing is required.
- 31 After final finishing, hand finishing may be required on the edges of pavement and joints
32 whenever irregularities in surface texture or alignment occur. Care should be taken in hand
33 finishing pavement edges to avoid ridges or high places that will prevent water from draining
34 out of the transverse grooves.
- 35 The use of excessive water during the finishing operations will not be permitted.
- 36 Provide a textured surface with an average texture depth of 0.8 mm as tested in accordance
37 with ASTM E965 with no single test having a texture depth of 0.5 mm or less. Perform 4
38 randomly located tests in accordance with ASTM E965 within the initial pavement lot of each
39 mobilization in the presence of the Engineer. A "lot" is defined in Article 710-4. If the
40 average of the 4 tests does not meet the above criteria, make appropriate changes to the
41 surface texture operations and test the next lot as detailed above. Once the surface texture
42 process is established to meet minimum texture requirements, maintain consistency within the
43 operation to provide the above minimum texture depth. Perform additional sand patch tests in
44 accordance with ASTM E965 when directed.
- 45 If the surface texture becomes damaged or reduced by rain or any other action, reestablish or
46 restore surface texture by an approved method.

47 **710-7 FINAL SURFACE TESTING**

- 48 Use an Inertial Profiler to measure the longitudinal pavement profile for construction quality
49 control and smoothness acceptance. Use a profiler with line laser technology as single-point

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- 1 laser technology will not be allowed. Produce International Roughness Index (IRI) and Mean
2 Roughness Index (MRI) values for measuring smoothness.
- 3 Use testing and recording software to produce electronic inertial road profiles in a format
4 compatible with the latest version of FHWA's ProVAL (Profile Viewing and Analysis)
5 software.
- 6 The Inertial Profiler shall be calibrated and verified in accordance with the most current
7 version of AASHTO M 328. Provide certification documentation that the profiler meets
8 AASHTO M 328 to the Engineer before the first day the Inertial Profiler is used on the
9 project.
- 10 Configure the profiler to record the actual elevation of the pavement surface. Do not use the
11 profiler's internal IRI calculation mode. The profile data shall be filtered with a cutoff
12 wavelength of 250 feet. The interval at which relative profile elevations are reported shall be
13 a maximum of 1 inch.
- 14 Provide IRI data in accordance with most current version of ASTM E1926. Use personnel
15 trained to record and evaluate IRI data.
- 16 Provide a competent operator, trained in the operation of the Inertial Profiler. Operation of
17 the Inertial Profiling system shall conform to AASHTO R 57.
- 18 Provide the user selected Inertial Profiler settings to the Engineer for the project records.
19 Certification of the Inertial Profiling system shall conform to AASHTO R 56.
- 20 Remove all objects and foreign material on the pavement surface prior to longitudinal
21 pavement profile testing.
- 22 Operate the profiler at any speed as per the manufacturer's recommendations, however, the
23 speed must be constant to within ± 3 mph of the intended speed and any required acceleration
24 should be as gradual as possible. For example, if the intended speed were 30 mph, the
25 acceptable range of speed for testing would be 27 to 33 mph.
- 26 Operate the Inertial Profiler in the direction of the final traffic pattern. Collect IRI data from
27 both wheel paths during the same run. It is permissible to collect data one wheel path at a
28 time if each wheel path is tested and evaluated separately. Define a "wheel path" as the 3 feet
29 from the edge of the travel lane. MRI values are the average of the IRI values from both
30 wheel paths. When using an inertial profiler that collects a single trace per pass, take care to
31 ensure that the measurements from each trace in a travel lane start and stop at the same
32 longitudinal locations. Unless otherwise specified, multiple runs are not necessary for data
33 collection.
- 34 Operate the automatic triggering method at all times unless impractical. A tape stripe or
35 traffic cone wrapped with reflective material may be used to alert the profiler's automatic
36 triggering sensor to begin data collection. The profiler shall reach the intended operating
37 speed before entering the test section. The runup and runout distances should be sufficient to
38 obtain the intended operating speed and to slow down after testing is completed.
- 39 Divide the pavement surface for the project into sections which represent a continuous
40 placement (i.e. the start of the project to bridge, intersection to intersection). Terminate
41 a section 50 feet before a bridge approach, railroad track, or similar interruption. (Separate
42 into 0.10-mile sections).
- 43 The evaluation of the profiles will be performed on a section basis. A section is 0.10 mile of
44 a single pavement lane. For any section, which is less than 0.10 mile in length, the applicable
45 pay adjustment incentive will be prorated on the basis of the actual length.
- 46 Mark the limits of structures and other special areas to be excluded from testing using the
47 profiler's event identifier such that the exact locations can be extracted from the profile data
48 file during processing.

1 Unless otherwise authorized by the Engineer, perform all smoothness testing in the presence
 2 of the Engineer. Perform smoothness tests on the finished surface of the completed project or
 3 at the completion of a major stage of construction as approved by the Engineer. Coordinate
 4 with and receive authorization from the Engineer before starting smoothness testing. Perform
 5 smoothness tests within 7 days after receiving authorization. Any testing performed without
 6 the Engineer's presence, unless otherwise authorized, may be ordered retested at the
 7 Contractor's expense.

8 After testing, transfer the profile data from the profiler portable computer's hard drive to a
 9 write once storage media (USB flash drive, external hard drive or DVD-R) or electronic
 10 media approved by the Engineer. Label the disk or electronic media with the Project number,
 11 Route, file number, date, and termini of the profile data. Submit the electronic data on the
 12 approved media to the Engineer immediately after testing and this media will not be returned
 13 to the Contractor.

14 Submit documentation and electronic data of the evaluation for each section to the Engineer
 15 within 10 days after completion of the smoothness testing. Submit the electronic files
 16 compatible with ProVAL and the evaluation in tabular form with each 0.10-mile segment
 17 occupying a row. Include each row with the beginning and ending station for the section, the
 18 length of the section, the original IRI values from each wheel path, and the MRI value for the
 19 section. Each continuous run for a section will occupy a separate table and each table will
 20 have a header that includes the following: the project contract number, county, the roadway
 21 number or designation, a lane designation, the dates of the smoothness runs, and the
 22 beginning and ending station of the continuous run. Summarize each table at the bottom.

23 Traffic control and all associated activities included in the pavement smoothness testing of the
 24 pavement surface will be the responsibility of the Contractor.

25 **(A) Acceptance for New Construction**

26 IRI and MRI numbers recorded in inches per mile will be established for each
 27 0.10-mile section for each travel lane of the finished pavement surface designated by the
 28 Contract.

29 Areas excluded from testing by the profiler will be tested by the Contractor and the
 30 Engineer using a 10-foot stationary straightedge furnished by the Contractor. Any
 31 location on the pavement selected by the Department shall be tested as well as all
 32 transverse joints. Apply the straightedge parallel to the centerline of the surface. Do not
 33 exceed 1/8 inch variation of the surface being tested from the edge of the straightedge
 34 between any 2 contact points. Correct areas found to exceed this tolerance by removal of
 35 the defective work and replacement with new material, unless other corrective measures
 36 are permitted. Provide the work and materials required in the correction of defective
 37 work.

38 Table 710-1 provides the acceptance quality rating scale of pavement based on the final
 39 rideability determination.

MRI PRICE ADJUSTMENT PER 0.10-MILE SECTION	
MRI after Completion (Inches Per Mile)	Price Adjustment Per Lane (0.10-Mile Section)
45.0 and Under	\$200.00
45.1-55.0	PA = 600 – (10 * MRI)
55.1-70.0	Acceptable (No Pay Adjustment)
70.1-90.0	PA = 650 – (10 * MRI)
Over 90.1	Corrective Action Required

40 This price adjustment will apply to each 0.10-mile section based on the Mean Roughness
 41 Index (MRI), the average IRI values from both wheel paths.

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1 When corrections to the pavement surface are required, the Engineer shall approve the
2 Contractor's method of correction. Methods of correction shall be diamond grinding,
3 remove and replace, or other methods approved by the Engineer. To produce a uniform
4 cross section, the Engineer may require correction to the adjoining traffic lanes or
5 shoulders. Corrections to the pavement surface, the adjoining traffic lanes and shoulders
6 will be at no cost to the Department.

7 Where corrections are made after the initial smoothness testing, the pavement will be
8 retested by the Contractor to verify that corrections have produced the acceptable ride
9 surface. No incentives will be provided for sections on which corrective actions have
10 been required. The Contractor will have one opportunity to perform corrective action(s).

11 (B) Localized Roughness

12 Areas of localized roughness shall be identified through the "Smoothness Assurance
13 Module" provided in the ProVAL software. Use the "Smoothness Assurance Module" to
14 optimize repair strategies by analyzing the measurements from profiles collected using
15 inertial profilers. The ride quality threshold for localized roughness shall be 150 inches
16 per mile at the continuous short interval of 25 feet. Submit a continuous roughness report
17 to identify sections outside the threshold and identify all localized roughness, with the
18 signature of the Operator included with the submitted IRI trace and electronic files.

19 The Department will require that corrective action be taken regardless of final IRI.
20 Re-profile the corrected area to ensure that the corrective action was successful. If the
21 corrective action is not successful, the Department will assess a penalty or require
22 additional corrective action.

$$PA = (165 - LR\#) 5$$

Where:

PA = Pay Adjustment (dollars)

LR# = The Localized Roughness number determined from
SAM report for the ride quality threshold

23 Corrective work for localized roughness shall be approved by the Engineer before
24 performing the work and shall consist of either diamond grinding or other methods
25 approved by the Engineer. Any corrective action performed shall not reduce the integrity
26 or durability of the pavement that is to remain in place. Notify the Engineer 5 days prior
27 to commencement of the corrective action.

28 Localized roughness correction work shall be for the entire traffic lane width. Pavement
29 cross slope shall be maintained through corrective areas.

30 710-8 MARKING FOR STATION NUMBERS AND DRAINAGE OUTLETS

31 Mark the pavement at locations as shown on the plans with station numbers. Mark the
32 pavement by pressing beveled-face metal dies between 4 inches and 6 inches high into the
33 plastic concrete.

34 At locations where shoulder drain outlets are placed, mark the edge of pavement nearest the
35 outlet with the letters "OL". Use the same marking procedure as for station numbers.

36 710-9 THICKNESS TOLERANCES

37 A lot for thickness acceptance testing is defined in Article 710-4.

38 To establish an adjusted unit price, if appropriate, for mainline pavement, take one 4
39 inch diameter core from each lot at a random location as directed. Other areas such as
40 intersections, entrances, crossovers and ramps will each be considered as one lot and the
41 thickness of each of these lots will be determined separately. Small irregular areas may be
42 included as part of another lot. Take one core for each 1,333.3 sy of pavement or fraction
43 thereof in the lot.

1 When the measurement of any core, original core or additional cores taken to calculate the
 2 average, is less than the plan thickness by more than 1.0 inch, the extent of the removal area
 3 due to thickness deficiency will be determined by taking additional exploratory cores at
 4 approximately 10 foot intervals parallel to the center line in each direction from the deficient
 5 core until an exploratory core is found in each direction which is within 1.0 inch of the plan
 6 thickness. The pavement between these exploratory cores will be removed full lane width
 7 wide and replaced with concrete of the thickness shown on the plans. Exploratory cores for
 8 deficient thickness will not be used in averages for adjusted unit price.

9 When the measurement of the core from a lot is deficient by 0.2 inch or less from the plan
 10 thickness, no pay reduction will be made for thickness. When such measurement is deficient
 11 by more than 0.2 inch from the plan thickness, take 2 additional cores at random locations
 12 within the lot and calculate the average thickness of the lot from the 3 cores.

13 In determining the average thickness of the pavement lot, the Engineer will use all 3 core
 14 measurements. Individual core measurements which are greater than the plan thickness + 0.2
 15 inch will be considered as the plan thickness + 0.2 inch. Individual cores which are less than
 16 the plan thickness - 1.0 inch will be considered as the plan thickness - 1.0 inch. If the average
 17 measurement of the 3 cores is within 0.2 inch from the plan thickness, full payment will be
 18 made. If the average measurement of the 3 cores is deficient by more than 0.2 inch from the
 19 plan thickness, an adjusted unit price in accordance with Subarticle 710-10(B) will be paid for
 20 the lot represented.

21 Areas found deficient in thickness by more than 1.0 inch shall be removed and replaced with
 22 concrete of the thickness shown on the plans. Any full lane or full shoulder width repairs to
 23 the concrete pavement shall be performed in accordance with the *North Carolina Department*
 24 *of Transportation Partial and Full Depth Repair Manual* and not be less than 1/2 of the slab
 25 length.

26 Patch all core holes within 72 hours of taking the core, using a Department approved
 27 nonshrink grout compatible with the pavement concrete.

28 **710-10 MEASUREMENT AND PAYMENT**

29 **(A) General**

30 The quantity of Portland cement concrete pavement to be paid will be the actual number
 31 of square yards of concrete pavement completed and accepted. In measuring this
 32 quantity, the width of the pavement will be as called for on the plans or as directed. The
 33 length will be the actual length constructed, measured along the centerline of the
 34 pavement.

35 Separate measurement will be made of pavement that is deficient in thickness by more
 36 than 0.2 inch and of pavement that is deficient in compressive strength.

37 The quantities of Portland cement concrete pavement will be paid at the contract unit
 38 price per square yard for ___" *Portland Cement Concrete Pavement, Through Lanes, (with*
 39 *dowels)*, ___" *Portland Cement Concrete Pavement, Ramps, (with dowels)* or ___" *Portland*
 40 *Cement Concrete Pavement, Miscellaneous, (without dowels)*, or if applicable, at such
 41 contract unit prices adjusted in accordance with the requirements shown below. No unit
 42 price adjustments on lots will be made until a final determination of the lot strength and
 43 depth is made. Pavement will be classified as through lane, ramp or miscellaneous
 44 pavement in accordance with the classification shown on the plans.

45 Payment for all work of surface testing will be incidental to the contract unit price for
 46 *Portland Cement Concrete Pavement, Through Lanes, (with dowels)* for *Surface Testing*
 47 *Concrete Pavement*.

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(B) Pavement Deficient In Thickness

The quantities of Portland cement concrete pavement which are deficient in thickness by more than 0.2 inch but not deficient by more than 1.0 inch, measured as provided in Article 710-10, will be paid at an adjusted contract unit price per square yard for ___" *Portland Cement Concrete Pavement, Through Lanes, (with dowels)*, ___" *Portland Cement Concrete Pavement, Ramps, (with dowels)* or ___" *Portland Cement Concrete Pavement, Miscellaneous, (without dowels)* completed in place and accepted.

The adjusted contract unit price is determined by the following formula, except no pay over 100% will be allowed:

$$\text{Pay Factor (\%)} = 110 - \left[50 \times (\text{Plan Thickness} - \text{Average Core Thickness}) \right]$$

Exploratory cores for deficient thickness will not be used in averages for adjusted unit price. Where pavement deficient by more than 1.0 inch is removed and replaced, the replacement pavement will be paid at the contract unit price per square yard for ___" *Portland Cement Concrete Pavement, Through Lanes, (with dowels)*, ___" *Portland Cement Concrete Pavement, Ramps, (with dowels)* or ___" *Portland Cement Concrete Pavement, Miscellaneous, (without dowels)* which price and payment will be full compensation for all work of placement, removal, restoration of subgrade and base and replacement.

(C) Concrete Pavement Varying In Strength

One of the following formulas will be used to calculate the concrete pavement pay factor.

(1) Compressive Strength

The pay factor for pavement achieving a compressive strength in 28 days of 4,500 psi or greater is 100%. The pay factor for pavement achieving a compressive strength in 28 days between 3,500 psi and 4,500 psi is determined by the following formula:

$$\text{Pay Factor (\%)} = 100.0 - \left[0.05 \times (4,500 - \text{Compressive Strength}) \right]$$

(pay factor rounded to nearest 0.1%)

(2) Flexural Strength

The pay factor for pavement achieving a flexural strength in 28 days of 650 psi or greater is 100%. The pay factor for pavement achieving a flexural strength in 28 days between 600 psi and 650 psi is determined by the following formula:

$$\text{Pay Factor (\%)} = 100.0 - (650 - \text{Flexural Strength})$$

(pay factor rounded to nearest 0.1%)

The quantities of Portland cement concrete pavement that meet these criteria, will be paid at an adjusted unit price per square yard for ___" *Portland Cement Concrete Pavement, Through Lanes, (with dowels)*, ___" *Portland Cement Concrete Pavement, Ramps, (with dowels)* or ___" *Portland Cement Concrete Pavement, Miscellaneous, (without dowels)* completed in place and accepted. The adjusted contract unit price will be determined by multiplying the contract unit price by the pay factor level determined for the average strength of concrete in each lot and will be applicable to the total square yards of concrete in each lot.

Any pavement that fails to attain 3,500 psi in compression is subject to removal. If allowed to remain in place, the pavement will be accepted at a reduced unit price based on a pay factor level of 50% as provided in Article 105-3.

Where pavement deficient in strength is removed and replaced, the replacement pavement, if acceptable, will be paid at the contract unit price for ___" *Portland Cement*

1 Concrete Pavement, Through Lanes, (with dowels), ___" Portland Cement Concrete
 2 Pavement, Ramps, (with dowels) or ___" Portland Cement Concrete Pavement,
 3 Miscellaneous, (without dowels) which price and payment will be full compensation for
 4 all work including placement, removal, restoration of subgrade and base and replacement.

5 **(D) Multiple Adjustments in Price**

6 Pavement found deficient in both thickness and strength will be evaluated by the
 7 Engineer to determine if it may be permitted to remain in place. Pavement permitted to
 8 remain in place will be paid at a reduced price determined by successively multiplying
 9 the contract price by the appropriate factor indicated for each deficiency.

10 **(E) Compensation**

11 Payment at the contract unit prices for ___" Portland Cement Concrete Pavement,
 12 Through Lanes, (with dowels) and ___" Portland Cement Concrete Pavement Ramps,
 13 (with dowels) and ___" Portland Cement Concrete Pavement, Miscellaneous, (without
 14 dowels) will be full compensation for all work covered by this section.

15 **(F) Pay Items**

16 Payment will be made under:

Pay Item	Pay Unit
___" Portland Cement Concrete Pavement, Through Lanes (with dowels)	Square Yard
___" Portland Cement Concrete Pavement, Ramps (with dowels)	Square Yard
___" Portland Cement Concrete Pavement, Miscellaneous (without dowels)	Square Yard

17 **SECTION 720**
 18 **CONCRETE SHOULDERS**

19 **720-1 DESCRIPTION**

20 Perform the work covered by this section including, but not limited to, the construction of
 21 Portland cement concrete shoulders in accordance with this section and with the lines, grades
 22 and dimensions shown on the plans; designing the mix; furnishing and placing the concrete
 23 shoulders; furnishing maturity testing equipment; furnishing all admixtures and additives;
 24 constructing joints; furnishing joint materials; curing the shoulder and furnishing curing
 25 materials; coring and patching core holes; taking actions to prevent or repair cracking; and
 26 removing and replacing unsatisfactory shoulder.

27 **720-2 MATERIALS**

28 Refer to Division 10.

Item	Section
Curing Agents	1026
Dowels and Tie Bars	1070-6
Joint Filler	1028-1
Low Modulus Silicone Sealant	1028-3
Portland Cement Concrete	1000
Water	1024-4

29 **720-3 COMPOSITION OF CONCRETE**

30 Design the concrete mix in accordance with Section 1000.