# SECTION 02520

# PORTLAND CEMENT CONCRETE PAVING

## PART 1—GENERAL

### 1.1 SUMMARY

**A. Section Includes:** Portland cement concrete paving as shown on drawings, including curbs, gutters, and walkways.

**B. Related Sections:**
1. Section 01450—Testing Laboratory Services.
2. Section 01500—Temporary Facilities and Controls.
3. Section 02200—Earthwork: Pavement base and prepared subgrade.
4. Section 02580—Pavement Striping and Markings: Traffic paint.
5. Section 02764—Joint Sealants: Joint fillers and sealers.
6. Section 02853—Precast Concrete Wheelstops
7. Section 03300—Cast-In-Place-Concrete: Concrete and related materials.

### 1.2 DEFINITIONS

**A. Subgrade:** The undisturbed earth or the compacted soil layer immediately below subsequent construction.

**B. Pavement Base:** Pumped riversand complying with LaDOTD LSSRB Section 1003.07, free of organic matter and other detrimental materials, compacted to 95% dry density per ASTM D-1557, as indicated on the drawings.

### 1.3 SUBMITTALS

**A. Product Data:** Submit the following:
1. Contractor's mix design and manufacturer's product specifications, test reports, and materials' certifications as required in referenced section for concrete.
2. Manufacturer's product specifications and installation instructions for joint fillers and sealers, for record purposes.

### 1.4 QUALITY ASSURANCE

**A. Testing Laboratory Services:** The testing laboratory specified in Section 01450 - Testing Laboratory Services will perform sampling and testing for:
1. Subgrade compaction.
2. Pavement base compaction.
3. Concrete slump and strength.

**B. Codes and Standards:** Comply with local governing regulations if more stringent than herein specified. Comply with applicable provisions of the following:

1. 2000 Edition - Louisiana Standard Specifications for Roads and Bridges (LSSRB), Section 901.
2. ACI 301 Specifications for Structural Concrete for Buildings.
3. ACI 318 Building Code Requirements for Reinforced Concrete.
4. CRSI Manual of Standard Practice.

## 1.5 JOB CONDITIONS

**A. Protection:** Protect adjacent surfaces from spatter during concrete placement.

**B. Traffic Control:** Maintain access for vehicular and pedestrian traffic as required for other construction activities.

# PART 2—PRODUCTS

## 2.1 MATERIALS

**A. Forms:** Steel, wood, or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects.

1. Use flexible spring steel forms or laminated boards to form radius bends as required.
2. Coat forms with a non-staining form release agent that will not discolor or deface surface of concrete.

**B. Welded Wire Mesh:** Welded plain cold-drawn steel wire fabric, ASTM A-185. Furnish in flat sheets, not rolls.

**C. Reinforcing Bars:** Deformed steel bars, ASTM A-615, Grade 60.

**D. Supports:** Position and fasten reinforcing, welded wire mesh, and dowel bars with chairs, supports, spacers and similar devices designed for the purpose. Comply with CRSI specifications. Provide supports with sand plates or runners on river sand or earth base material.

**E. Joint Dowel Bars:** Plain steel bars, ASTM A-615, Grade 60. Cut bars true to length with ends square and free of burrs. Provide dowel bars with close-fitting sheet metal cap sleeves, 4 inches long, positioned to form expansion space at end of dowel (for dowels through expansion joints).

**F. Concrete Materials:** Comply with requirements of Section 03300 - Cast-In-Place Concrete for concrete materials, admixtures, and other applicable products.

**G. Expansion Joint Materials:**

1. For vehicular pavement, curbs and gutters - Bituminous, non-extruding joint filler (ASTM D-1751) and cold applied rubber asphalt sealer (ASTM D-1850).
2. For walkways – Non-bituminous, non-extruding cork or rubber joint filler (ASTM D-1752) and self-leveling polyurethane sealer (ASTM C-920, Type S, Grade P, Class 25, Use T and M).

**H. Contraction and Construction Joint Materials:**

1. Contraction Joints: Embedded plastic strip with removable cap, similar to Greenstreak Void Former or Paul Murphy Plastics Clearcrack.
2. Construction Joints: Pre-moulded asphaltic fiber or sheet metal keyed joint form, similar to Sealtight AT & G Joint or Heckman No. 95 T & G Joint.

**I. Liquid-Membrane Forming and Sealing Curing Compound:** Comply with ASTM C 309, Type I, Class. Moisture loss no more than 0.055 gr./sq. cm. when applied at 200 sq. ft./gal.

**J. Bonding Compound:** Polyvinyl acetate or acrylic base, re-wettable type. Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

1. Daraweld C; W. R. Grace & Co.
2. Everbond; L & M Construction Chemicals.
3. SBR Latex; Euclid Chemical Co.
4. Sonocrete; Sonneborn-Chemrex.

**K. Epoxy Adhesive:** ASTM C 881, 2-component material suitable for use on dry or damp surfaces. Provide material "Type", "Grade", and "Class" to suit project requirements. Subject to compliance with requirements, products which may be incorporated in the work include but are not limited to the following:

1. Epoxtite Binder 2390; Tamms/A. C. Horn, Inc.
2. Sikadur 32 Hi-Mod; Sika Chemical Corp.
3. Euco Epoxy 452 or 620; Euclid Chemical Co.

**L. Geotextile:** Non-woven, continuous filaments of pervious polyester. Fabric shall be spun-bonded or needle-punched, per minimum physical properties indicated on the plans.

## 2.2 PAVEMENT BASE MATERIALS

**A. Fill Material:** Same as specified in Section 02200 – Earthwork.

## 2.3 CONCRETE MIX, DESIGN, AND TESTING

**A. General:** Comply with requirements of Section 03300 - Cast-In-Place-Concrete for concrete mix design, sampling and testing, and quality control and as herein specified.

**B. Design Mix:** Provide normal-weight concrete consisting of Portland Cement, aggregate, water-reducing or high-range water-reducing admixture (superplasticizer), air-entraining admixture, and water to produce the required properties and meet the requirements for Type B concrete as specified in the LSSRB, Section 901.

1. Fly Ash: Limit to not over 15% of cement content by weight.
2. Compressive Strength: 4,000 psi, minimum at 28 days, unless otherwise indicated.
3. Slump: 8 inches for concrete containing high- range water-reducing admixture (superplasticizer); 3 inches for other concrete.
4. Air Content: 2.5 to 4.5 percent.
5. Flexural Strength: 650 psi, minimum at 28 days.

## PART 3—EXECUTION

### 3.1 SURFACE PREPARATION

**A.** **Loose Material:** Remove loose material from prepared subgrade immediately before placing concrete.

**B.** **Sub-base Condition:** Compact 8" sand subgrade to minimum 95% dry density per ASTM D-1557. Do not begin paving work until improper conditions have been corrected. Proof-roll natural subgrade and correct problem areas.

**C.** **Geotextile:** Place geotextile filter fabric directly over prepared subgrade prior to installing pavement base.

### 3.2 PAVEMENT BASE

**A.** **Placement and Compaction:** Place limestone or sand base material in uniform layers, not more than 6" un-compacted thickness, and compact each layer to at least 95% of maximum dry density per ASTM 1557. Place and compact additional layers if necessary to achieve indicated thickness.

**B.** **Grading:** Shape, grade and compact pavement base to required profile and grade, allowing for paving thickness, with tolerance of 3" plus or minus in 10 feet.

**C.** **Maintenance:** Maintain completed base in smooth, uniform condition until covered by subsequent construction. Re-compact and resurface damaged and disturbed portions. Sprinkle periodically if necessary to prevent loosening of surface and loss of fine material.

### 3.3 FORM CONSTRUCTION

**A.** **General:** Set forms to required grades and lines, braced and secured. Install forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.

**B.** **Tolerances:** Check completed formwork for grade and alignment to following tolerances:
1. Top of forms: Not more than 1/8 inch variance in 10 feet.
2. Vertical face on longitudinal axis: Not more than 3 inch variance in 10 feet.

**C.** **Re-Use:** Clean forms after each use and coat with form release agent as necessary to ensure separation from concrete without damage.

**D.** **Steps:** Slope step treads 3 inch per foot to shed surface water.

**E.** **Grade Pins:** Provide steel grade pins or wood stakes in sufficient numbers and locations to ensure conformity of paving surface to indicated grades and elevations.

### 3.4 REINFORCEMENT

**A.** **General:** Locate, place and support reinforcement as indicated and as specified in Section 03300 - Cast-In-Place-Concrete. Unless otherwise indicated, all paving shall be reinforced. Where specific

reinforcement is not shown or noted on the Drawings, comply with local regulations governing street and sidewalk work and ACI-318, Article 7.

1. Remove loose rust and mill scale, earth, ice, and other bond-reducing materials.
2. Position and support reinforcement in location indicated, secure against displacement, with metal chairs, runners, bolsters, spacers and hangers, as necessary. Lap bars at splices 40 diameters minimum and wire tie securely. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
3. Install welded wire fabric in the longest practical lengths, lap splices at least one mesh. Offset splices in adjoining widths. Set mesh on chairs to ensure correct position.

**B. Embedded Items:** Set anchorage devices and other embedded items required for work that is attached to or supported by cast-in-place concrete. Use setting diagrams, templates and instructions for locating and setting.

## 3.5 CONCRETE PLACEMENT

**A. General:** Comply with requirements of LSSRB, Section 601.

**B. Related Construction:** Do not place concrete until base and forms have been checked for line and grade. Moisten base if required to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

**C. Bonding to Hardened Concrete:** Use bonding agent where fresh concrete is placed against hardened or partially hardened concrete surfaces. Comply with manufacturer's instructions for application of bonding agent.

**D. Methods:** Place concrete by methods that prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with internal vibrator. Consolidate with care to prevent dislocation of reinforcing, dowels, and joint devices.

1. Deposit and spread concrete in a continuous operation between transverse joints if possible. If placement is interrupted for more than 2 hour, provide a construction joint.

**E. Striking Off and Consolidating Surface:** Screed fresh concrete with a straightedge and strike off to plane or crowned surface. Use bull floats or darbies to form a smooth surface before excess moisture or bleed water appears. Do not further disturb surface prior to finishing.

**F. Curbs and Gutters:** Automatic machine may be used for curb and gutter placement at Contractor's option. If machine placement is to be used, submit revised mix design and laboratory test results that meet or exceed minimums specified. Machine placement must produce curbs and gutters to required cross-section, lines, grades, finish, and jointing as specified for formed concrete. If results are not acceptable, remove and replace with formed concrete as specified.

## 3.6 JOINTS

**A. General:** Construct expansion, isolation, weakened-plane (contraction), and construction joints true to line with face perpendicular to surface of concrete. Construct transverse joints at right angles to the centerline, unless otherwise indicated. All joints shall be sealed.

**B.** **Existing Construction:** When joining existing construction, place transverse joints to align with previously placed joints, unless otherwise indicated.

**C.** **Contraction Joints:** Provide contraction joints, sectioning concrete into areas no greater than 13' o.c. each way, or as indicated. Continue reinforcement across contraction joints. Construct weakened-plane joints for a depth equal to at least 3 concrete thickness, as follows:

1. Tooled Joints: Form weakened-plane joints in fresh concrete by grooving top portion with a recommended cutting tool and finishing edges with a jointer.
2. Sawed Joints: Form weakened-plane joints with powered saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut joints into hardened concrete as soon as surface will not be torn, abraded, or otherwise damaged by cutting action.
3. Inserts: Use embedded plastic strips or sealed wood to form weakened-plane joints. Set strips into plastic concrete and carefully remove strips after concrete has hardened. Fill void with specified expansion joint sealer.

**D.** **Construction Joints:** Place construction joints at locations where placement operations are stopped for more than 2 hour, except where such placements terminate at expansion joints. Construct joints as shown or, if not shown, use standard keyway-section forms. Continue reinforcement across construction joints, unless indicated otherwise.

**E.** **Expansion and Isolation Joints:** Provide pre-molded joint filler for expansion joints and isolation joints abutting concrete curbs, catch basins, manholes, inlets, structures, walks, and other fixed objects, unless otherwise indicated. Terminate reinforcement at expansion and isolation joints unless indicated otherwise. Provide joint dowels where indicated.

1. Locate expansion joints at maximum 80 feet o.c. for each pavement lane, unless otherwise indicated.
2. Extend joint fillers full width and depth of joint, not less than 2 inch or more than 1 inch below finished surface where joint sealer is indicated. If no joint sealer is required, place top of joint filler flush with finished concrete surface.
3. Furnish joint fillers in one-piece lengths for full width being placed wherever possible. Where more than one length is necessary, lace or clip joint filler sections together.
4. Protect top edge of joint filler during concrete placement with a metal cap or other temporary material. Remove protection after concrete has been placed on both sides of joint.

**F.** **Joint Dowels:** Where load-transfer slip dowels are indicated, provide bars with one end grease-coated to prevent concrete bond. At expansion joint dowels, position metal cap sleeve on end of bar to allow unrestricted movement in both directions, with expansion space inside cap filled with grease to prevent intrusion of concrete grout.

**G.** **Fillers and Sealers:** Comply with sealer manufacturer's instructions for preparation of joints, materials, installation, and performance.

## 3.7 CONCRETE FINISHING

**A.** **Floating:** After striking-off and consolidating concrete, smooth surface by power-driven floating. Use hand methods only where mechanical floating is not possible. Adjust floating to compact surface and

produce uniform texture. After floating, test surface for trueness with a 10-ft. straightedge. Distribute concrete as required to remove surface irregularities, and re-float repaired areas to provide a continuous smooth finish with a tolerance of 3 inch measured with a 10-ft. straightedge.

**B.** **Joints:** Tool edges of slabs, gutters, back top edge of curb, and formed joints with an edging tool, and round to 3/8-inch radius, unless otherwise indicated. Eliminate tool marks on concrete surface.

**C.** **Finish:** After completion of floating and when excess moisture or surface sheen has disappeared, complete troweling and finish surface as follows:

1. Broom finish pedestrian traffic surfaces by drawing a fine-hair broom across concrete surface perpendicular to line of traffic to provide a fine line texture.
2. On inclined slab surfaces, provide a coarse, non-slip finish by scoring surface with a stiff-bristled broom, perpendicular to line of traffic.
3. Burlap finish vehicular traffic surfaces by dragging a seamless strip of damp burlap across concrete, perpendicular to line of traffic to provide a gritty texture.

**D.** **Form Removal:** Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections with major defects.

## 3.8 CURING AND PROTECTION

**A.** **Curing:** Protect and cure finished concrete in compliance with applicable requirements of Section 03300 - Cast-In-Place-Concrete. Use membrane-forming curing and sealing compound or approved moist-curing methods.

**B.** **Protection:** Protect concrete from damage until acceptance. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

## 3.9 REPAIR AND CLEANING

**A.** **General:** Repair or replace broken or defective concrete, as required by applicable requirements of Section 03300—Cast-In-Place-Concrete.

**B.** **Cleaning:** Sweep concrete pavement and wash free of stains, discolorations, dirt, and other foreign material just before inspection for acceptance.

END OF SECTION