

## Section 02775

## CONCRETE DRIVEWAYS

**1.0 GENERAL****1.01 SECTION INCLUDES**

- A. Portland Cement Concrete Pavement for Driveways.
- B. References to Technical Specifications:
  - 1. Section 01200 – Measurement and Payment Procedures
  - 2. Section 01350 – Submittals
  - 3. Section 01450 – Testing Laboratory Services
  - 4. Section 02751 - Concrete Pavement
- C. Referenced Standards:
  - 1. American Society for Testing and Materials (ASTM)
    - a. ASTM C 94, “Standard Specification for Ready-Mixed Concrete”
    - b. ASTM C 33, “Standard Specification for Concrete Aggregates”
    - c. ASTM C 260
    - d. ASTM A 615, “Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement”
    - e. ASTM D 994, “Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type)”
    - f. ASTM D 1751, “Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Type)”
    - g. ASTM D 6690, “Standard Specification for Joint and Crack Sealants, Hot-Applied, for Concrete and Asphaltic Pavements”
    - h. ASTM C 39, “Standard Test Method for Compressive Strength of Concrete”
    - i. ASTM C 31, “Standard Practice for Making and Curing Concrete Test Specimens in the Field”
    - j. ASTM C 143, “Standard Test Method for Slump of Hydraulic Cement Concrete”
    - k. ASTM C 231, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method”
    - l. ASTM C 171, “Standard Specification for Sheet Materials for Curing Concrete”
    - m. ASTM C 309, “Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete”
    - n. ASTM C 42, “Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete”

**1.02 MEASUREMENT AND PAYMENT**

- A. Measurement for concrete driveways is on square yard basis and includes removal of existing driveway, driveway curbs, select fill subgrade and reinforcement dowels.
- B. Payment includes all labor and materials required for installation of concrete driveways, joints and curing material. No payment will be made for work in areas where driveway has been removed for contractor's convenience.
- C. Refer to Section 01200 – Measurement and Payment Procedures.

**1.03 SUBMITTALS**

- A. Make Submittals required by this Section under the provisions of Section 01350 – Submittals.
- B. Submit proposed mix design and test data for each type and strength of concrete in Work. Include proportions and actual compressive strength obtained from design mixes at required test ages.
- C. Submit product data for joint sealing compound and proposed sealing equipment for approval.
- D. Submit samples of dowel cup, metal supports, and deformed metal strip for approval.

**2.0 PRODUCTS****2.01 MATERIALS**

- A. Concrete: Conform to material and proportion requirements for concrete of Section 02751 - Concrete Paving.
- B. Reinforcing Steel: Conform to material requirements for reinforcing steel of Section 02751 - Concrete Paving. Use No. 4 reinforcing bars.
- C. Subgrade Materials: Conform to subgrade material requirements of Section 02335 - Subgrade.
- D. Joints: Conform to concrete joint requirements of Section 02751 - Concrete Paving.

### **3.0 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify compacted subgrade is ready to support imposed loads and meets compaction requirements.
- B. Verify lines and grades are correct.

#### **3.02 PREPARATION**

- A. When removing existing concrete, all sawcuts shall be full depth unless otherwise approved by City.
- B. Properly prepare, shape and compact each section of subgrade before placing forms, reinforcing steel or concrete.
- C. Excavate subgrade 6 inches beyond outside lines of driveway. Shape to line, grade and cross section. Place compacted select fill as needed to bring grade up. Select fill shall be compacted to minimum of 95% maximum dry density at optimal or above optimal moisture content as per ASTM D698. Stabilize top 8" of subgrade with lime in accordance with Section 02335 - Subgrade. Compact subgrade to minimum of 90 percent maximum dry density at optimum to 3 percent above optimum moisture content, as determined by ASTM D 698. No separate pay for this requirement. This work shall be subsidiary to driveway square yard unit pricing.

#### **3.03 FORMS**

- A. Side Forms: Use clean forms of approved shape and section. Preferred depth of form shall be equal to required edge thickness of pavement. Forms with depths greater or less than required edge thickness of pavement will be permitted, provided difference between form depth and edge thickness if not greater than 1 inch, and further provided that forms of depth less than pavement edge are brought to required edge thickness by securely attaching wood or metal strips to bottom of form, or by grouting under form. Bottom flange of form shall be same size as thickness of pavement. Aluminum forms are not allowed. All forms shall be approved by the Engineer. Length of form sections shall be not less than 10 feet and each section shall provide for staking in position with not less than 3 pins. Flexible or curved forms of wood or metal of proper radius shall be used for curves of 200 foot radius or less. Forms shall have ample strength and shall be provided with adequate devices for secure setting so that when in-place they will withstand, without visible springing or settlement, impact and vibration of finishing machine. In no case shall base width be less than 8 inches for form 8 inches or more in height. Forms shall be free from warp, bends or kinks and shall be sufficiently true to provide reasonable straight edge on concrete. Top of each form section, when tested with straight edge, shall conform to requirements specified for surface of completed pavement. Provide sufficient forms for satisfactory placement of

concrete. For short radius curves, forms less than 10 feet in length or curved forms may be used. For curb returns at street intersections and driveways, wood forms of good grade and quality may be used.

- B. Form Setting:
  - 1. Rest forms directly on subgrade. Do not shim with pebbles or dirt. Accurately set forms to required grade and alignment and, during entire operation of placing, compacting and finishing of concrete, do not deviate from this grade and alignment more than 1/8 inch in 10 feet of length. Do not remove forms for at least 8 hours after completion of finishing operations.

### **3.04 REINFORCING STEEL AND JOINT ASSEMBLIES**

- A. Accurately place reinforcing steel and joint assemblies and position them securely. Wire reinforcing bars securely together at intersections and splices. Bars and coatings shall be free of rust, dirt or other foreign matter when concrete is placed. Place all reinforcing steel and secure to chairs. All reinforcing steel must be positively supported before pour begins.
- B. Place pavement joint assemblies at required locations and elevations, and rigidly secure all parts in required positions. Install dowel bars accurately in joint assemblies as shown, each parallel to pavement surface and to center line of pavement. Rigidly secure in required position to prevent displacement during placing and finishing of concrete. Accurately cut header boards, joint filler and other material used for forming joints to receive each dowel bar. Drill dowels into existing pavement, secure with epoxy, and provide paving headers, as required, to provide rigid pavement sections.

### **3.05 PLACEMENT**

- A. Place concrete only in rain-free days when air temperature taken in shade and away from artificial heat is above 35 degrees F and rising. Concrete shall not be placed when temperature is below 40 degrees F and falling.

When concrete temperature is 85 degrees F or above, do not exceed 60 minutes between introduction of cement to the aggregates and discharge. When the weather is such that the concrete temperature would exceed 90 degrees F, employ effective means, such as pre-cooling of aggregates and mixing water, using ice or placing at night, as necessary to maintain concrete temperature, as placed, below 90 degrees F.

- B. Place concrete within 60 minutes of mixing. Remove and dispose of concrete not placed within this period.
- C. Concrete slump during placement shall be 2 to 4 inches.

- D. Deposit concrete rapidly and continuously on subgrade or subbase in successive batches. Distribute concrete to required depth and for entire width of placement in manner that will require as little rehandling as possible. Where hand spreading is necessary, distribute concrete with shovels or by other approved methods. Use only concrete rakes in handling concrete.
- E. Take special care in placing and spading concrete against forms and at longitudinal and transverse joints to prevent honeycombing. Voids in edge of finished pavement will be cause for rejection.

### **3.06 FINISHING**

- A. Finish concrete driveway with power-driven transverse finishing machines or by hand finishing methods.
  - 1. Use transverse finishing machine to make at least two trips over each area. Make last trip continuous run of not less than 40 feet. After transverse screeding, use hand-operated longitudinal float to test and level surface to required grade.
  - 2. Hand finish with mechanical strike and tamping template as wide as pavement to be finished. Shape template to pavement section. Move strike template forward in direction of placement, maintaining slight excess of material in front of cutting edge. Make at least two trips over each area. Scream pavement surface to required section. Work screed with combined transverse and longitudinal motion in direction work is progressing. Maintain screed in contact with forms. Use longitudinal float to level surface.
- B. On narrow strips and transitions, finish concrete driveway by hand. Thoroughly work concrete around reinforcement and embedded fixtures. Strike off concrete with strike-off screed. Move strike-off screed forward with combined transverse and longitudinal motion in direction work is progressing, maintaining screed in contact with forms, and maintaining slight excess of materials in front of cutting edge. Tamp concrete with tamping template. Use longitudinal float to level surface.
- C. While concrete is still workable, give surface final belting to produce a uniform surface of gritty texture. Perform belting with short rapid transverse strokes having sweeping longitudinal motion.

### **3.07 JOINTS AND JOINT SEALING**

- A. When new work is adjacent to existing concrete, place joints at same location as existing joints in adjacent pavement.
- B. Contractor may use sawed joints as an alternate to contraction and weakened plane joints. Circular cutter shall be capable of cutting straight line groove minimum of

1/2 inch wide. Depth shall be one quarter of pavement thickness plus 1/2 inch. Commence sawing as soon as concrete has hardened sufficiently to permit cutting without chipping, spalling or tearing and prior to initiation of cracks. Once sawing has commenced, it shall be continued until completed. Make saw cut with one pass. Complete sawing within 24 hours of concrete placement. Saw joints at required spacing consecutively in sequence of concrete placement.

- C. Concrete Saw: Provide sawing equipment adequate in power to complete sawing to required dimensions and within required time. Provide at least one standby saw in good working order. Maintain an ample supply of saw blades at work site at all times during sawing operations. Sawing equipment shall be on job at all times during concrete placement.
- D. Provide 3/4 inch expansion joints conforming to ASTM D 1751 across driveway in line with street face of sidewalks, at existing concrete driveways, and along intersections with sidewalks and other structures. Extend expansion joint material full depth of slab. Where dowels are used, wrap or sleeve one end.
- E. Seal joints only when surface and joints are dry, ambient temperature is above 50 degrees F but less than 85 degrees F, and weather is not foggy or rainy.
- F. Joint sealing equipment shall be in first-class working condition, and be approved by the Engineer. Use concrete grooving machine or power-operated wire brush and other equipment such as plow, brooms, brushes, blowers or hydro or abrasive cleaning as required to produce satisfactory joints.
- G. Clean joints of loose scale, dirt, dust and curing compound. Term joint includes wide joint spaces, expansion joints, dummy groove joints or cracks, either preformed or natural. Remove loose material from concrete surfaces adjacent to joints.
- H. Fill joints neatly with joint sealer to depth shown. Pour sufficient joint sealer into joints so that, upon completion, surface of sealer within joint will be 1/4 inch below level of adjacent surface or at elevation as directed.
- I. Install the first expansion joint at Right-of-Way. The expansion joint shall be spaced at intervals same as the width of driveway. Expansion joint shall be placed at half of the width of the driveway if the width of driveway exceeds 20'.

### 3.08 CONCRETE CURING

- A. Concrete driveway shall be cured by protecting it against loss of moisture for period of not less than 72 hours immediately upon completion of finishing operations. Do not use membrane curing for concrete pavement to be overlaid by asphaltic concrete.
- B. Where curing requires use of water, curing shall have prior right to all water supply or supplies. Failure to provide sufficient cover material shall be cause for immediate suspension of concreting operations.

- C. Cotton Mat Curing:
  - 1. Immediately after finishing surface, and after concrete has taken its initial set, completely cover surface with cotton mats, thoroughly saturated before application, in such manner that they will contact surface of pavement equally at all points.
  - 2. Mats shall remain on pavement for specified curing period. Keep mats saturated so that, when lightly compressed, water will drip freely from them. Keep banked earth or cotton mat covering edges saturated.
- D. Liquid Membrand-Forming Compounds:
  - 1. Immediately after finishing surface, and after concrete has taken its initial set, apply liquid membrane-forming compound in accordance with manufacturer's instructions.

### **3.09 TOLERANCES**

- A. Test entire surface before initial set and correct irregularities or undulations. Bring surface within requirements of following test and then finish. Place 10 foot straightedge parallel and longitudinal to center of driveway. Correct any depressions and all high spots.

### **3.10 FIELD QUALITY CONTROL**

- A. Testing will be performed under provisions of Section 01450 – Testing Laboratory Services and Section 02751 - Concrete Paving.

### **3.11 PAVEMENT MARKINGS**

- A. Restore pavement markings to match those existing in accordance with City of Pearland Standard Details and the Engineer's requirements.

### **3.12 PROTECTION**

- A. Barricade pavement section from use until concrete has attained minimum design strength.
- B. On those sections of driveway to be opened to traffic, seal joints, clean pavement and place earth against pavement edges before permitting use by traffic. Such opening of driveway to traffic shall not relieve Contractor from his responsibility for Work.
- C. Maintain concrete paving in good condition until completion of Work.

- D. Repair defects by replacing concrete to full depth and limits as directed by Project Manager. Replace nonconforming work at no additional cost to City.

**END OF SECTION**