

SECTION 1500- CONCRETE CURB, CURB AND GUTTER, SIDEWALK, AND DRIVEWAY ENTRANCES

1501 SCOPE. This section covers concrete curb, curb and gutter, concrete sidewalk, concrete driveway entrances, and exposed aggregate concrete work, including reinforcing steel, forms, joints, finishing, curing, and other appurtenant work.

1502 GENERAL. All construction covered in this section shall conform to the requirements of Section 2000 *Concrete*. All forms shall be in good condition with not more than one-fourth (1/4") inch variation in horizontal and vertical alignment for each ten (10') feet in length.

1503 MATERIALS.

- A. Concrete, Exposed Aggregate Concrete, and Reinforcing Steel: Conform to the requirements of Section 2000 *Concrete*.
- B. Isolation Joint Filler: Isolation joints shall be formed with pre-formed isolation joint filler of the non-extruding and resilient type which shall meet the requirements of ASTM D1751 or D1752.
- C. Detectable Material for Ramps: The material used to provide contrast shall be an integral part of the walking surface. The material for detectable surface shall consist of either paving bricks or panels. Surface applied retrofit tiles shall not be allowed.
 - 1. Paving Bricks: Nominal size shall be 2 1/4" x 4" x 8" and shall meet the requirements of ASTM C902 for Class SX, Type 1 brick and ASTM C1272.
 - 2. Tiles or Panels: Acceptable products include Detectable Warning System's E-Z-Set Ceramic Composite Detectable Warning Panels, Armor Tile's Cast In Place System, ADA Solution's Composite Paver, CASTinTACT Detectable Warning Panel, or approved equal.
 - 3. Color for all surfaces options shall be 'brick red'. Any color variation to meet contrast requirements must be approved by Engineer.
- D. Concrete Sealant: Material for sealing exposed aggregate concrete shall be W.R. Meadows' *Decra-Seal* or similar non-yellowing, acrylic-based sealing product.

1504 GRADING AND SUBGRADE PREPARATION. All grading and preparation shall be done in conformance with Sections 1100 *Grading* and 1200 *Subgrade Preparation*.

1505 JOINTS.

- A. Isolation joints in concrete sidewalks shall be placed adjacent to existing concrete structures, as indicated in the standard details, or as directed by the Engineer. Material shall be one half ($\frac{1}{2}$) inch thick and extend for the full depth and width of the walk.
- B. Isolation joints in curbs and curb and gutter shall be placed at each end of curves, curb inlets, or other locations as indicated on the plans or as directed by the Engineer. Material shall be one half ($\frac{1}{2}$) inch thick and extend for the full depth and width of the joint.
- C. Contraction joints shall consist of planes of weakness created by sawing the surface of the concrete. Sawed joints shall be constructed by sawing through the surface of the concrete with an approved concrete saw. Sawing of the joints shall begin as soon as the concrete has hardened sufficiently to prevent excessive raveling.
- D. For sidewalks only, contraction joints may be tooled rather than sawed. The edges of tooled joints shall be rounded with a one fourth ($\frac{1}{4}$) inch radius.
- E. Contraction joints in curb/curb and gutter shall be placed at maximum intervals of 10 feet except as specified for curb and gutter with concrete pavement. Transverse joints in sidewalk shall be spaced at a distance equal to the width of the sidewalk.
- F. Contraction joints in separate curb and gutter shall be located to coincide with contraction joints in concrete pavement. They shall extend through the entire curb section from the top of curb to a depth of two (2) inches below pavement surface. Contraction joints shall be sawed.

1506 CONCRETE CURB. Concrete curb will be constructed as shown on the plans unless otherwise approved by the Engineer. Curb may be either integral with or separate from concrete pavement. Concrete in curbs and gutter shall be vibrated. If curbs are hand-poured, a strap shall be used for shaping. All excess material below, in front of, or behind forms shall be removed before the concrete hardens.

- A. Integral curb Integral curb shall be constructed during or immediately following the finishing operation unless otherwise shown on the plans.

Special care shall be taken so that the curb construction does not lag behind the pavement construction and form a "cold joint."

Curb forms or integral slipforming shall be required to form the backs of all curbs except where impractical because of small radii street returns or other special sections or as otherwise approved by the Engineer.

In placing curb concrete, sufficient spading shall be done to secure adequate bond with the paving slab and eliminate all voids in the curb.

Curbs shall be formed to the cross section as shown on the drawings with a mule or templates supported on the side forms and with a float not less than four (4) feet in length.

The finished surface of the curb and gutter shall be checked by the use of a ten (10) foot straightedge and corrected if necessary. Where grades are less than one percent (1%) and while the concrete is still plastic, the drainage of the gutter should be checked with a four (4) foot level to ensure positive drainage is provided.

B. Separate Curb and Gutter with Tiebars for Concrete Pavement.

Separate curb and gutter may be poured prior to the remaining pavement. Tiebars one half (½) inch in diameter and eighteen (18) inches long shall be cast in the curb and gutter at thirty (30) inch centers as shown on the standard details. Tiebars may be placed in drilled holes after the curb is placed as long as the required embedment length can be obtained and the bars are epoxied in place.

C. Separate Curb and Gutter for Asphaltic Pavements.

Contraction joints shall be spaced no more than 10 feet apart and shall extend through the entire curb section from the top of curb to a depth of two (2) inches below pavement surface. Contraction joints shall be sawed.

1507 FINISHING. Misting of concrete is allowed by spray nozzle only. Brushes are prohibited. Brooms for finishing concrete surfaces shall be periodically cleaned during finishing operations to remove excess concrete materials.

A. Curb and Curb and Gutter.

In all cases the resulting surface shall be smooth and of uniform color with all rough spots, projections, and form stakes removed. No plastering of the concrete will be allowed on exposed surfaces. The finished curb shall have a true surface, free from sags, twists, or warps, and shall have a uniform appearance, and shall be true to the specified lines, grades, and configurations shown on the drawings. Curbs and gutter shall be broom finished with brush strokes parallel to the back of curb.

B. Sidewalk and Driveway Entrances. After the concrete has been thoroughly consolidated and leveled, and the initial set has taken place, the surface shall be finished with a float and then broom finished with no other mortar than that contained in the placed concrete. The resulting surface shall be uniform in color and contain no imperfections. The edges shall be tooled with a one fourth ($\frac{1}{4}$) inch radius. Special care shall be taken to ensure a straight, neat appearance along the edges of the sidewalk or driveway entrance and at the joints.

C. Surface Tolerances. Finished sidewalks, drives, and multi-use paths shall have a surface tolerance of one-fourth ($\frac{1}{4}$) inch in 10 feet when checked with a 10-ft straightedge. Vertical deflections at sidewalk joints shall not exceed one-fourth ($\frac{1}{4}$) inch. All surfaces must drain and no low spots, which allow water to pond, shall be left in the finished surface.

When surface tolerances are not met, use one of the following methods for corrections:

- Grinding
- Remove and replace the entire section as directed by the Engineer
- Other methods proposed by the Contractor as approved by the Engineer.

The corrected areas shall have uniform texture and appearance.

1508 REINFORCEMENT. Reinforcement shall be as shown on the contract drawings and/or standard details for the project.

1509 DETECTABLE WARNINGS IN SIDEWALK OR RAMPS. Detectable warnings shall extend across the full width of the walking surface of the sidewalk or ramp, and shall be 2 feet long in the direction of pedestrian travel. Detectable warning materials shall be installed in accordance with manufacturer's recommendations.

1510 EXPOSED AGGREGATE CONCRETE. Place as specified in Section 2000 *Concrete* and as follows:

After the mixture has been properly struck off, to the line and grade as shown on the plans or as directed by the Engineer, the surface shall be lightly finished as not to force the coarse aggregate too deep into the mix. As soon as the bleed water has dissipated apply a uniform coating of an approved surface retarder at the rate specified by the manufacturer. Once sufficient cure has been attained on the concrete the Contractor shall pressure wash and or broom surface exposing the coarse aggregate to the desired affect.

Once concrete surface has sufficiently dried so that surface water has completely disappeared, an approved clear sealant shall be applied in accordance with the manufacturer's recommendations. Sealant shall be applied by rolling or by an approved sprayer and nozzle.

When the concrete has hardened enough so that excess raveling or spalling will not occur, and before random cracking occurs, the Contractor shall saw one-eighth (1/8) to one-fourth (1/4) inch wide relief joints to a depth equal to one-third the pavement thickness plus one-fourth inch ($D/3 + 1/4$ "). Joints shall be located as shown on the plans or as directed by the Engineer. For raised islands care should be taken to joint the exposed aggregate concrete to match the curb and gutter joints. Joints shall be sealed with a gray or beige silicone or polyurethane caulk approved by the Engineer.

- 1511 PROTECTION. The Contractor shall, at his own expense, protect the concrete work against damage or defacement of any kind until it has been accepted by the city.

All vehicular traffic, including construction vehicles, shall be prohibited from using new concrete pavement for a period of seven (7) days unless approved otherwise by the Engineer.

Concrete work, which is not acceptable to the Engineer because of damage or defacement, shall be removed and replaced, or repaired to the satisfaction of the Engineer. Sections of cracked curb and gutter, sidewalk or driveways shall be replaced joint-to-joint. Cracks identified during inspection at the end of the warranty period may be sawed and sealed if approved by the Engineer.