

609 CURBS, GUTTERS, DITCHES, AND PAVED FLUMES

609.01 PORTLAND CEMENT CONCRETE CURB, CURB AND GUTTER, AND GUTTER

- (A) **DESCRIPTION.** Portland cement concrete curb, curb and gutter, and gutter shall consist of portland cement concrete proportioned, mixed, and constructed on the prepared base course in accordance with these specifications to the grade and cross-section specified. Except as herein specified, the requirements of [501](#) are applicable to this specification. Repair-Replace items will include also removal and disposal of existing curb and/or gutter.
- (B) **MATERIALS.** The materials shall meet the requirements specified in [501.02](#), except PCC shall be [Class F](#).
- (C) **COMPOSITION.** The proportions of materials shall meet the requirements of [817, Class F](#).
- (D) **CONSISTENCY.** The consistency of the portland cement concrete for this work shall meet the requirements specified in [501.15](#).
- (E) **CONSTRUCTION REQUIREMENTS.** Construction of portland cement concrete curb, curb and gutter, and gutter shall conform to the requirements of [501](#) with the following exceptions, changes, or additions.
- (1) **FORMS.** Forms for this work shall meet the requirements of [905.03\(B\)](#) and shall be set in conformance with [501.06](#).
 - (2) **PLACING CONCRETE.** The concrete shall be placed in the forms and thoroughly compacted by working with suitable tools and a mechanical vibrator. Care shall be exercised in compacting the concrete along the faces of the form in order to insure smooth, even surfaces free from voids and honeycomb. The plastering of honeycombed areas will not be permitted.
 - (3) **TREE SAFEGUARDS.** Every effort shall be made to safeguard trees. If it becomes necessary to trim tree roots, the Contractor must notify the Chief Engineer prior to any trimming. The Contractor will then carry out his trimming operation under the supervision of the Department of Transportation's Urban Forestry Administration.

In areas where new curb abuts a tree, wood forms may be used and the aggregate base directly under proposed curb may be omitted at the discretion of the Chief Engineer. Where new curb is placed directly against a tree's trunk or roots, the two shall be separated by strips of 1/2 inch preformed expansion joint. This work shall be included in the contract price for applicable PCC curb and/or gutter items.
 - (4) **REINFORCEMENT.** Reinforcement will be required in circular portland cement concrete curb, combination curb and gutter and gutter.
 - (5) **WEEP HOLES.** When directed by the Chief Engineer, the Contractor shall install in the curb an approved type of 4 inch fiber duct for weep holes. The fiber duct shall be cut so that it is flush with both the curb face forms and curb back forms. The costs of furnishing and placing materials for weep holes shall be included in the

contract unit price per linear foot per [609.01 \(G\) \(1\)](#) or [609.01\(G\) \(3\)](#) for Portland Cement Concrete Curb and PCC Curb and Gutter, or per cubic yard per [609.01\(G\) \(2\)](#) for Portland Cement Concrete Curb, Gutter and/or Curb and Gutter (Variable Dimensions).

(6) FORMING JOINTS.

- (a) Straight Portland Cement Concrete Curb, Curb and Gutter, and Gutter –** Portland Cement concrete curb, curb and gutter, and gutter, when constructed with flexible pavements, shall have expansion joints installed at intervals of 45 feet with control joints placed between them at intervals of 15 feet. Where shorter sections are necessary for closures, no section shall be less than 4 feet. All joints, both expansion and control in curb /or gutter shall be provided with two, 3/4 inch dowel bars meeting the requirements of [807.03\(B\)](#). These dowels shall be spaced a minimum of 8 inches and not more than 12 inches apart. In the curb and gutter section, one of the dowels shall be placed 4 inches from the back of the curb. All expansion joints shall be constructed with a single piece of expansion joint material meeting the requirements of [807.01\(A\)](#). The expansion joint material shall be 1/2 inch below the finished surface. The control joints shall be formed by means of 14 gauge metal sheets, or other approved materials, placed 1/2 inch from the finished surface and left in place.

Where concrete curb and gutter, or gutter is constructed integrally with portland cement concrete pavement, base, or alley, expansion joints and control joints shall be formed at the same intervals and in line with the transverse joints in the pavement or base. The expansion joints shall be of the same material and thickness as used in the pavement slab. At least 2 dowel bars meeting the requirements of [807.03\(B\)](#) and of the same diameter as used in the pavement shall be placed across each expansion joint and control joint in curb and/or gutter and shall be spaced as specified above for separately constructed sections.

- (b) Circular Portland Cement Concrete Curb, Curb and Gutter, and Gutter –** Portland cement concrete circular curb and gutter (for radii of 100 feet or less) shall be constructed as specified for straight curb and gutter with the following exceptions:

On radii of 100 feet or less, expansion joints shall be formed at equally spaced intervals of approximately 15 feet as is described in paragraph (a) above. On radii of less than 15 feet, one expansion joint will be required at the midpoint of the curve. The entire curve of the curb and gutter shall be reinforced by 1/2 inch deformed bars, two in the gutter section, and one approximately at the midpoint of the curb cross section above the plane of the gutter. Any lapping of the bars shall be a minimum of 10 inches.

- (7) BACKFILLING.** All backfilling behind curbs and combination curb and gutter sections shall be performed within 24 hours after removal of the rear curb forms.

Where the curb abuts a portland cement concrete sidewalk the preparation of the sidewalk foundation compacted to the density specified in [Table 203.03](#) shall constitute backfilling. In all other cases, backfill material meeting the requirements

of [804.04](#) shall be placed to within 4 inches of the top of the curb and compacted to 95 percent of maximum density. The top 4 inches shall be treated as indicated in the contract documents or as directed. Material limits for backfilling will be 2 feet in back of the face of the curb.

- (8) **SEALING OF JOINTS.** All expansion joints in portland cement concrete curb, curb and gutter, and gutter shall be sealed in accordance with [501.19\(A\)](#).

- (9) **FINISHING.** Portland cement concrete curb, curb and gutter, and gutter shall be finished as follows:

The curb face forms shall be removed as soon as the concrete has set sufficiently to insure against injury by such removal. The curb back forms and the gutter face forms shall remain in place for at least 12 hours. Any irregular surface shall be corrected by rubbing with an approved carborundum brick. The top surface of the concrete shall be finished true to line and grade in a smooth, neat, and even manner by means of metal trowels. When the concrete has set sufficiently, the surface shall be brushed with a fine hair brush meeting the requirements of [905.09\(E\)](#). The face edge of the curb shall be finished to a radius of 1 inch and the back edge to a radius of 1/4 inch. The edges of gutters shall be finished to a radius of 1/4 inch. The edging tools shall conform to the requirements of [905.09\(B\)](#). The top surface of the curb shall be tested with a straightedge meeting the requirements of [903.03](#), laid along the surface in the longitudinal direction. Any deviation of the top surface of the curb in excess of 3/16 inch from the straightedge shall be immediately corrected. There shall be no variation in alignment of the curb exceeding 1/8 inch. All rejected curb, curb and gutter, and gutter shall be removed and replaced without additional compensation.

- (10) **SUPERIMPOSED CURB.** Portland cement concrete superimposed curb shall be of the dimensions as shown on the standard drawings or the contract plans. It shall be constructed on the previously placed portland cement concrete pavement slab and finished in accordance with [609.01\(E\)\(9\)](#) above.

A control joint shall be cut midway between expansion joints to a depth of 1/3 that of the height, and shall be aligned as nearly as practicable with those of the existing PCC slab to prevent spalling. Superimposed curb shall be placed as soon as possible following placement of the pavement slab.

Measure and payment for superimposed curb will be as outlined in [609.01\(F\)\(1\)](#) and [609.01\(G\)\(1\)](#), and the depth of the curb shall include the depth of the concrete slab upon which it is superimposed.

- (11) **TREE AND CURB.** In areas where new curb abuts a tree, wood forms may be used and the aggregate base directly under proposed curb may be omitted at the discretion of the Chief Engineer. Where new curb is placed directly against a tree's trunk or roots the two shall be separated by strips of 1/2 inch preformed expansion joint. This work shall be included in the contract price for applicable PCC or stone curb and/or gutter items.

- (12) **NARROWED REINFORCED CURB.** A narrowed reinforced curb section shall be installed as directed by the Chief Engineer when full width curb is not practicable; reinforcement shall consist of 2 No. 4 deformed bars meeting requirements of [812.02](#). Bars shall be equidistant from the face and back of curb, 1

bar 4 inches from the top, and 1 bar 4 inches from the bottom. Payment for narrowed curb and the reinforcing steel will be included under applicable PCC curb and/or gutter items.

(F) MEASURE.

- (1) **PORTLAND CEMENT CONCRETE CURB, CURB AND GUTTER.** The unit of measure for straight Portland Cement Concrete Curb or Portland Cement Concrete Curb and Gutter will be the linear foot. The number of linear feet will be the actual number of linear feet for each type of curb or curb and gutter of the width and depth specified in the contract documents, measured complete in place.
- (2) **PORTLAND CEMENT CONCRETE CURB, CURB AND GUTTER, CURB AND/OR GUTTER (VARIABLE DIMENSIONS).** The unit of measure for Portland Cement Concrete Curb, Portland Cement Concrete Curb and Gutter or Portland Cement Concrete Curb and/or Gutter (Variable Dimensions) will be the cubic yard. The number of cubic yards will be the actual number of cubic yards of variable width and depth, measured complete in place.
- (3) **CIRCULAR PORTLAND CEMENT CONCRETE CURB, CURB AND GUTTER.** The unit of measure for Circular Portland Cement Concrete Curb or Circular Portland Cement Concrete Curb and Gutter will be the linear foot. The number of linear feet will be the actual number of linear feet for each type of curb or curb and gutter of the width and depth specified in the contract documents, measured complete in place.
- (4) **PORTLAND CEMENT CONCRETE GUTTER.** The unit of measure for Portland Cement Concrete Gutter will be the square yard. The number of square yards will be the actual number of square yards for each width and/or depth of gutter specified in the contract documents, measured complete in place.
- (5) **CIRCULAR PORTLAND CEMENT CONCRETE CURB FOR ALLEY AND DRIVEWAY ENTRANCES.** The unit of measure for Circular Portland Cement Concrete Curb for Alley and Driveway Entrances will be the linear foot. The number of linear feet will be the actual number of linear feet for each type of curb of the width and depth specified in the contract documents, measured complete in place.

(G) PAYMENT.

- (1) **PORTLAND CEMENT CONCRETE CURB, CURB AND GUTTER.** The number of linear feet of straight Portland Cement Concrete Curb or Portland Cement Concrete Curb and Gutter, as measured in [609.01\(F\)\(1\)](#), will be paid for at the contract unit price per linear foot, which payment will include furnishing, hauling, and placing all materials including joints, curing, and backfill, and for furnishing all equipment, tools, labor, and incidentals necessary to complete the work.
- (2) **PORTLAND CEMENT CONCRETE CURB, CURB AND GUTTER, CURB AND/OR GUTTER (VARIABLE DIMENSIONS).** The number of cubic yards of Portland Cement Concrete Curb, Portland Cement Concrete Curb and Gutter or Portland Cement Concrete Curb and/or Gutter (Variable Dimensions), as measured in [609.01\(F\)\(2\)](#), will be paid for at the contract unit price per cubic yard, which payment will include furnishing, hauling, and placing all materials including joints,

reinforcement for circular curb, curing, and backfill, and for furnishing all equipment, tools, labor, and incidentals necessary to complete the work.

- (3) **CIRCULAR PORTLAND CEMENT CONCRETE CURB, CURB AND GUTTER.** The number of linear feet of Circular Portland Cement Concrete Curb or Circular Portland Cement Concrete Curb and Gutter, as measured in [609.01\(F\)\(3\)](#), will be paid for at the contract unit price per linear foot, which payment will include furnishing, hauling, and placing all materials including joints, reinforcement, curing, and backfill, and for furnishing all equipment, tools, labor, and incidentals necessary to complete the work.
- (4) **PORTLAND CEMENT CONCRETE GUTTER.** The number of square yards of Portland Cement Concrete Gutter, as measured in [609.01\(F\)\(4\)](#) will be paid for at the contract unit price per square yard, which payment will include furnishing, hauling, and placing all materials including joints, curing, and backfill, and for furnishing all equipment, tools, labor, and incidentals necessary to complete the work.
- (5) **CIRCULAR PORTLAND CEMENT CONCRETE CURB FOR ALLEY AND DRIVEWAY ENTRANCES.** The number of linear feet of Circular Portland Cement Concrete Curb for Alley and Driveway Entrances, as measured in [609.01\(F\)\(5\)](#), will be paid for at the contract unit price per linear foot, which payment will include furnishing, hauling, and placing all materials including joints, reinforcements, curing, and backfill, and for furnishing all equipment, tools, labor, and incidentals necessary to complete the work.

609.02 STONE CURB

(A) **DESCRIPTION.** Work shall consist of furnishing and setting new stone curbing, resetting or adjusting existing stone curbing, both straight and circular, at locations and of dimensions as shown in the contract documents or as directed. Work shall include PCC foundation, backfilling, and other incidentals necessary for complete curb installation.

(B) **MATERIALS.**

- (1) **STONE CURB.** All new curbstones shall be first quality granite, hard and durable, of a uniformly light color from one deposit or quarry, free from seams, cracks, or other imperfections, and have a smooth splitting character.

It shall also be clean, and show no evidence of any iron rust or iron particles.

- (a) **DIMENSIONS.** Straight granite curbstone shall have a nominal width of either 5 inches or 8 inches plus or minus 1/8 inch at the top surface, a minimum width of 4 inches at the bottom surface for at least two-thirds of each curb piece or as shown in the contract documents or as directed. The front surface shall be between 12 inches and 14 inches in height. . The front surface shall be between 12 and 14 inches in height. Curbs 8 x 8 inches and 8 x 9 inches shall have a front surface of 8 inches and 9 inches respectively.

Straight curbing may be of random lengths, but no piece shall be less than 3 feet in length.

Unless otherwise shown in the contract documents, or directed, the front face shall have a batter of 1 inch in 12 inches.

Circular curb up to and including 100 feet radius shall have the same cross-section dimensions as straight curb, and shall be cut exactly true to the radius ordered. Circular curb with a 3, 6 or 15 feet radius shall have an arc length of 4.71 feet. All others shall have an arc length of 5.25 feet.

Circular curb greater than 100 feet through 200 feet radius shall consist of straight sections not exceeding 5 feet in length with ends cut to form radial joints.

- (b) FINISH.** The top surface of curbstone shall be finished with 4-cut or 550-shot finish, or a wire cut finish to an approximately true plane, free from drill holes, and shall have no projection or depression greater than 1/8 inch.

The front face shall be at right angles to the horizontal plane of the top surface and shall be free from drill holes, except as specified in [609.02\(C\)\(5\)](#). The front face shall have either a smooth or rough surface as indicated in the contract documents or as directed.

The smooth front face shall be finished the full height for the 8 inch and 9 inch deep curb and 2 inches greater than the height of curb reveal for the 12 inch deep curb. The smooth face shall have no projection or depression greater than 1/8 inch. Remaining depth of front face may be rough cut with depression or projections not exceeding 1-1/2 inches. The arris line between the top surface and front face shall have a 1/4 inch bullnose. A sawn finish will be an acceptable alternate.

The rough front face shall be smooth quarry split and shall have no projection greater than 3/4 inch nor depressions greater than 1/2 inch as measured from the vertical plane of the face through the top arris line, for a distance down from the top of eight inches. The remaining depth shall have no projection or depression greater than one inch measured in the same manner.

Front and back arris lines shall be straight and true with no variation from a straight line greater than 1/8 inch.

Bottom surfaces shall have no projection or depression greater than 1-1/2 inches and drill holes will be permitted.

Back surfaces shall be sawn or split approximately at right angles to the plane of the top surface. No projection or depression greater than 1/4 inch will be allowed for a distance of 4 inches down from the top. The remaining distance shall have no projection or depression greater than 1-1/2 inches. Drill holes will be permitted in the back surface but shall not show in the top arris line.

Ends of stone shall be square with the plane of top surfaces; except for curbs greater than a 100-200 foot radius where joints are cut radial, ends of the stone shall be square with the planes of the face and so finished that when set, no space more than 1/2 inch shall show in the joint for the full width of the top or down the face for 8 inches.

The remainder of the end may break back not over 8 inches from the plane of the joint (not over 2 inches from the plane of the joint for Bridge Curb).

- (2) **PCC FOUNDATION.** The PCC foundation shall be of a dry consistency, and composed of materials conforming to [817](#). Proportions shall be as specified in [\(C\)\(3\)\(b\)](#) below.

(C) CONSTRUCTION REQUIREMENTS.

- (1) **EXCAVATION FOR STONE CURB.** Excavation for setting of stone curb or resetting to a new line shall be as shown in the contract documents. The cost of this excavation will be paid for at the contract unit price per cubic yard for the type of excavation encountered. Where stone curb is reset on approximately the same line, no payment will be made for excavation as this cost will be included in the contract unit price per linear foot for the type of curb reset.

The bottom of the excavation shall be thoroughly compacted to grade. Any unsuitable material encountered shall be removed and replaced with base material meeting the requirements of [804.04](#). This excavation shall be paid for under the appropriate excavation item.

- (2) **LINES AND GRADES.** Before setting, resetting, or adjusting any curb, the Contractor shall check all lines and grades furnished him, by the use of string line and tees. Upon the discovery of any error in line and grade furnished, the Contractor shall immediately notify the Chief Engineer before proceeding with the work. Any curb set to an improper grade shall be removed and reset at the Contractor's expense.

(3) SETTING AND RESETTING CURB.

- (a) **General.** In the setting of stone curb, the joint space between the sections of curb shall be 1/4 inch with 1/4 inch preformed expansion joint filler meeting the requirements of [807.01 \(A\)](#) placed therein. Before any concrete for pavement is placed against the curb, that portion of the curb against which concrete is to be placed shall be treated with a coating meeting the requirements of [802.03](#).

- (b) **Setting Curb.** A bed of dry-mix consisting of 5 bags portland cement, 1300 pounds of fine aggregate (sand) and 1800 pounds of No. 67 aggregate shall be placed to a minimum depth of 7 inches. Immediately after the mix has been properly compacted, the curb shall be placed upon it and set to a firm bearing by ramming with crowbars. The face of the curb must be plumb and true to line, and the top set to grade. Care must be exercised in ramming the curb to grade to prevent marring or breaking the stone. A wood shield or board shall be placed on top of the curb to prevent such damage.

After the curb has been set to line and grade, the area behind the curb shall be filled with the specified mix to within 4 inches of the top of the curb and to a width of 6 inches. That part of the bed used in setting the curb which projects into the PCC or brick gutter, base, or pavement shall be removed. Removal shall not be done until the bed has sufficiently set to prevent any damage to the portion under the curb.

- (c) **Resetting Curb.** Resetting of curb shall be performed as described for setting new curb, except that no hauling will be necessary other than the disposition of the curb within the project limits. It will be necessary to entirely remove the curb and old concrete foundations. Any curb broken due to the Contractor's negligence shall be replaced at his expense. Any curb deemed unsuitable for re-use by the Chief Engineer shall be removed and new curb, furnished either by the District or by the Contractor as determined by the Chief Engineer, shall be set by the Contractor. Payment for removal and disposal of unsuitable curb will be made under the appropriate excavation item.
- (4) **ADJUSTING CURB.** The work to be performed under this item shall consist of slight adjustment to line and grade of sections of curb which do not require complete resetting. Under this item, the removal of the curb, excavation, or replacement of concrete is not required. Adjustment shall be made by maneuvering the curb into position and ramming a dry mix under the curb to provide a firm foundation to maintain the curb in proper vertical and horizontal alignment. The cost of this mix shall be included in the contract unit price per linear foot for adjusting curb.
- (5) **DRILL WEEP HOLE IN STONE CURB.** The work to be performed under this item consists of core drilling weep holes, with a neat finish, in stone curbs for the purpose of connecting existing drain pipe (roof drains, etc.) to gutter. The diameter of the weep hole shall not exceed 4 inches.
- (6) **BACKFILLING.** After the curb and backing are in place the remaining area shall be backfilled to within 4 inches of the top of the curb with materials meeting the requirements of [804.02](#) and compacted to 93 percent of standard density.
- In backfilling, including replacement of unsuitable material, suitable materials excavated from the project shall be used insofar as possible. When sufficient suitable material from the site is not available, embankment or aggregate base, as directed, shall be used. Care shall be taken in this operation so that the curb will not be forced out of line. The Contractor will be required to refill any depressions that may occur after sufficient time has elapsed for settlement of the backfill. The lateral limits of this backfill shall be 2 feet from the face of curb.
- (7) **SALVAGE OF STONE CURB.** The work consists of the loading and hauling of existing stone curb to such locations off the project as may be designated by the Chief Engineer.
- (8) **TREE SAFEGUARDS.** Tree safeguards shall conform to the requirements of [107.12](#) and [609.01\(E\)\(3\)](#).
- (D) **MEASURE.**
- (1) **FURNISHING AND SETTING, RESETTING, ADJUSTING, AND SALVAGING STONE CURB.** The unit of measure for Furnishing and Setting, Resetting, Adjusting, and Salvaging Stone Curb will be the linear foot. The number of linear feet will be the actual number of linear feet set, reset, adjusted, or salvaged as measured complete in place. All stone curb for payment under this item shall be furnished by the Contractor.

- (2) **DRILL WEEP HOLE IN STONE CURB.** The unit of measure for Drill Weep Hole in Stone Curb will be each. The quantity will be the actual number of weep holes drilled complete.
- (3) **EXCAVATION, AGGREGATE BASE AND EMBANKMENT.** These items will be measured under the appropriate items of [Division 200](#).

(E) PAYMENT.

- (1) **FURNISHING AND SETTING 8" x 12" STRAIGHT AND/OR CIRCULAR STONE CURB.** The number of linear feet of Furnishing and Setting 8" x 12" Straight and/or Circular Stone Curb, as measured above, will be paid for at the contract unit price per linear foot. This payment will include furnishing, hauling, and placing all materials. Payment will include joining, dressing up and rounding off ends at driveways, backfilling trench bottom and back of curb and all labor, materials, tools, equipment and incidentals necessary to complete the work.

Payment for straight and circular curb sections with ends cut to form radial joints shall be made at the respective contract unit price per linear foot. Circular curb greater than 100 feet shall be paid as straight curb. Measure and payment shall include all provisions outlined herein.

- (2) **RESETTING STRAIGHT AND/OR CIRCULAR STONE CURB.** Payment for Reset Stone Curb will be made at the contract unit price per linear foot for all sizes both straight and circular, which payment will include excavation, hauling existing curb sections from one location to another on the job site and from one job site to another, as well as loading and hauling old and new stone curb as required from the District property yard; all other material, placement, joining, dressing, rounding off ends at drives, backfilling and all labor, tools, equipment and incidentals needed to complete the work. Where broken curb sections are encountered as determined by the Chief Engineer, removal and disposal of broken curb shall be included as part of the work; the District will furnish replacement curb sections to the Contractor at the District property yard at no cost.
- (3) **ADJUSTING STRAIGHT AND/OR CIRCULAR CURB.** Payment for Adjusting Stone Curb will be made at the contract unit price per linear foot for all sizes both straight and circular, which payment will include excavation if necessary, all other materials, adjustment, joining, dressing, backfilling, and all labor, tools, equipment, and incidentals needed to complete the work.
- (4) **DRILL WEEP HOLE IN STONE CURB.** Payment for Drill Weep Hole in Stone Curb will be made at the contract unit price each, which payment will include drilling and all labor, tools, equipment and incidentals needed to complete the work.
Payment for adjusting drain pipes and extending drain pipes to back of curb will be made under other appropriate pay items.
- (5) **SALVAGING STONE CURB.** Payment for Salvaging Stone Curb will be made at the contract unit price per linear foot, which payment will include removal, loading, and hauling to locations off the project site and all labor, tools, equipment and incidentals needed to complete the work.

609.03 ASPHALTIC CONCRETE CURB

- (A) **DESCRIPTION.** This work shall consist of the construction of an asphaltic concrete curb, on a prepared surface course, of the dimensions and at the locations as shown on the contract documents, and/or as directed by the Chief Engineer.
- (B) **MATERIALS.** The class of hot asphaltic concrete for curb will be stone-filled sheet asphalt or hot asphaltic concrete pavement, Class C, as directed by the Chief Engineer. [401.03](#) shall also be applicable.
- (C) **CONSTRUCTION REQUIREMENTS.**
- (1) **PREPARATION OF CURB FOUNDATION.**
- Asphalt curbs shall be placed on a newly laid asphalt pavement immediately following compaction of the asphalt surface. If this is impossible, as in the case of existing pavements, extra care must be taken to see that dust or any other foreign material is removed prior to laying the asphalt curb.
- (2) **PLACING CURBS.**
- (a) **General.** Placing temperature shall be the temperature specified for the type of asphalt being used. Adjustment of temperatures within the specified range shall be made in the initial stages of construction to achieve the best placement temperature. The cross-section of the curb shall be as designated in the contract documents.
- (b) **Machine Placing.** Machine-laid work usually requires no additional compaction. In areas where it is evident that compaction is inadequate, measures shall be taken to provide adequate compaction. No forms are needed for machine-placed curbs.
- (c) **Hand Placing.** Hand placing will be permitted only in areas where it is necessary to construct a transition curb section. Material placed by hand shall be tamped into place and screeded to a smooth finish in a workmanlike manner. Forms may be removed as soon as the material has cooled to air temperature.
- (d) **Tree Safeguards.** Tree safeguards shall conform to the requirements of [107.12](#).
- (D) **MEASURE AND PAYMENT.** The unit of measure for Asphaltic Concrete Curb will be the linear foot. The actual number of linear feet of the width and depth specified, measured complete in place, will be paid for at the contract unit price per linear foot, which payment will include all labor, materials, tools, equipment, and incidentals necessary to complete the work.

609.04 PCC WHEELCHAIR/BICYCLE RAMPS

- (A) **DESCRIPTION.** Work includes furnishing all materials for and construction of PCC Wheelchair/Bicycle Ramps in accordance with the contract documents, or as directed. Work also includes cutting to a neat line, excavation and disposal of all excavated materials when ramps are incorporated into an existing sidewalk and/or curb. Except as amended herein, requirements of [608.01](#) apply.

- (B) **MATERIALS.** Materials shall be as specified in [817 for Class F](#) concrete.
- (C) **COMPOSITION.** The proportions for portland cement concrete used in wheelchair/bicycle ramps shall meet the requirements of [817, Class F](#).
- (D) **CONSISTENCY.** The consistency of the portland cement concrete for this work shall meet the requirements specified in [501.15](#).
- (E) **CONSTRUCTION REQUIREMENTS.** Unless otherwise directed, neither reinforcement nor darkening agents shall be used in ramp construction. Ramp surfaces shall be finished with a steel bristle broom.
- (1) **NEW CONSTRUCTION AREAS.** Ramps shall be constructed on aggregate base prepared as part of the work under other appropriate items of work. Where gutters are incorporated, the gutter section adjacent to the ramp shall be constructed monolithically with the ramp as part of this work.
 - (2) **EXISTING SIDEWALK AND/OR CURB AREAS.** The existing sidewalk, curb and/or gutter shall be cut to a neat line. Any damage to adjacent areas shall be repaired by the Contractor at no additional cost to the District. Where existing stone curbs are encountered, the curb sections affected by new ramp construction shall be removed. Wherever possible, a ramp shall be constructed within the confines of one curb section. When this is not possible, existing stone curb may have to be cut to accommodate the ramp construction. Where the resulting gap between an edge of a new ramp and the remaining curb section is less than 3 feet in length, new PCC curb shall be constructed in the gap. Where the gap is three feet or greater in length, the removed stone curb section shall be cut to proper dimensions and reset in the gap per applicable requirements of [609.02\(C\)\(3\)](#). If the Chief Engineer determines that a section of stone curb is unsuitable for resetting, then PCC curb will be constructed. Preformed expansion joint filler shall be placed around the wheelchair/bicycle ramp flush with the finished surface.
- (F) **MEASURE.** PCC Wheelchair/Bicycle Ramps will be measured by either of the following methods as specified in the contract documents:
- (1) The unit of measure will be each. The number will be the actual number of complete ramps constructed in new and existing construction, respectively.
 - (2) The unit of measure will be the square yard.
- (G) **PAYMENT.** Payment for PCC Wheelchair/Bicycle Ramps will be made by either of the following methods as specified in the contract documents:
- (1) **NEW CONSTRUCTION AREAS.** Payment for PCC Wheelchair/Bicycle Ramps in new construction shall be made at the contract unit price per each (or per square yard), which payment will include furnishing and placing all materials and all labor, tools, equipment and incidentals necessary to complete the work.
 - (2) **EXISTING SIDEWALK AND/OR CURB AREAS.** Payment for PCC Wheelchair/Bicycle Ramps incorporated into existing sidewalk and/or curb areas will be made at the contract unit price per each (or per square yard), which payment will include cutting to a neat line, excavation and disposal of excavated materials,

cutting and resetting stone curb if necessary, furnishing and placing all materials, tools, equipment and incidentals necessary to complete the work.

609.05 PORTLAND CEMENT CONCRETE DITCHES

(A) DESCRIPTION. This work shall consist of constructing portland cement concrete paved drainage ditches on a prepared subgrade to the lines, grades, and dimensions as indicated in the contract documents, or as directed by the Chief Engineer.

(B) MATERIALS. Materials shall meet the requirements of [501.02](#).

Geotextile fabric shall meet the requirements of [822.09](#).

(C) CONSTRUCTION REQUIREMENTS. All work shall be done in accordance with the applicable provisions of [609](#) with the following modifications.

Expansion joints shall be installed in all PCC paved ditches at intervals of approximately 45 feet, with contraction joints between them at intervals of approximately 15 feet, unless otherwise directed by the Chief Engineer.

Dowel bars for load transfer devices at expansion joints shall be 1/2 inch in diameter, 16 inches in length, and spaced approximately 1 foot on centers. Dowel bars shall be placed not less than 6 inches from the edge of the ditch paving. Dowel bars at the contraction joints will not be required.

Contraction joints shall be formed by pressing a metal strip vertically downward into the soft concrete surface and removing this strip after the concrete has stiffened sufficiently to hold its form. The strip shall form a slot 3/8 inch wide at the top, and 1/4 inch wide at the bottom, with a depth equal to 1/3 the paving thickness. Alternate methods of joint formation may be used, upon approval of the Chief Engineer.

All expansion and contraction joints in the PCC ditch paving shall be sealed in accordance with the requirements of [501.19](#).

(D) MEASURE AND PAYMENT. The unit of measure for Paved Portland Cement Concrete Flumes will be the square yard. The actual number of square yards measured complete in place on the exposed surface will be paid for at the contract unit price per square yard, which payment will include excavation and disposal of surplus materials, preparation of subgrade, installation of geotextile fabric, curing, backfilling, and all labor, materials, tools, equipment, and incidentals necessary to complete the work.

609.06 PAVED BITUMINOUS CONCRETE DITCHES

(A) DESCRIPTION.

This work shall consist of constructing bituminous concrete flumes on a prepared subgrade to the lines, grades, and dimensions as indicated in the contract documents, or as directed by the Chief Engineer.

(B) MATERIALS.

The bituminous concrete mixture shall be Class B, hot asphaltic concrete pavement, and shall conform to the applicable requirements of [402](#).

Geotextile fabric shall meet the requirements of [822.09](#).

- (C) **CONSTRUCTION REQUIREMENTS.** The subgrade shall be constructed to the depth and dimensions as indicated in the contract documents.

The bituminous material shall be placed in accordance with the applicable provisions of [402.03](#), except that a hand tamper meeting the requirements of [904.06](#) shall be used for compaction.

- (D) **MEASURE AND PAYMENT.**

The unit of measure for Paved Bituminous Concrete Flumes will be the square yard. The actual number of square yards, measured complete in place will be paid for at the contract unit price per square yard, which payment will include furnishing, hauling, and placing all materials, excavation and disposal of surplus materials, preparation of the subgrade, installation of geotextile fabric, placing and compacting the bituminous material, backfilling, and all labor, materials, tools, equipment, and incidentals necessary to complete the work.

609.07 BRICK GUTTER

- (A) **DESCRIPTION.** Brick gutter shall be constructed in the area and to the grade and pattern shown in the contract documents. The brick shall be laid in a mortar bed on a PCC base. Brick is to be laid prior to the start of any asphalt paving.

- (B) **MATERIALS.** Materials shall meet the following requirements:

Portland cement – [801.01](#)

Sand – [803.06](#)

Water – [822.01](#)

Brick – [806.01 \(D\)](#)

Masonry Cement – [801.02](#)

Preformed Expansion joint – [807.01\(A\)](#)

Sealant – [807.02\(A\)](#)

- (C) **CONSTRUCTION REQUIREMENTS.**

- (1) **PREPARATION OF CONCRETE BASE.**

Prior to the placement of the mortar setting bed, the surface of the concrete base shall be chipped or ground as necessary to the required elevations. The base shall be thoroughly cleared of all dirt and debris and shall be free from water before any bed material is laid. If chipping is required, upon completion, the concrete base shall be blown clean of all particles before the mortar setting bed is laid. In particular, the Contractor shall ensure that the concrete base elevations adjacent to the catch basins are such that the finished brick gutter surface elevations match the details shown herein.

- (2) **MORTAR SETTING BED AND JOINT FILLER.**

- (a) The mortar setting bed shall comprise of 1 part by volume of portland cement and 2 parts by volume of sand.

- (b) Mortar joint filler shall be composed of 1 part by volume of portland cement and 2 parts by volume of sand. Mortar joint filler shall contain an approved, black colorant in an amount not to exceed 2-3 percent by weight of the portland cement. Colorant shall be of a type and quality which will not adversely affect workability, durability, setting or strength of the mortar joint filler and of a type specifically prepared for use in cement mortar.
- (3) **PLACING MORTAR SETTING BED.** The mortar mix for the setting bed shall be thoroughly mixed to uniform color and shall be free from irregularities or streaks of unmixed materials. The mortar setting bed shall be spread on the prepared concrete base to a finished depth of not more than 1 inch or less than 1/2 inch and regulated so as to be exactly parallel to the finished grade of the roadway when laid. The mortar setting bed shall be uniformly tamped, prior to laying brick.
- (4) **PLACING BRICK.** At the curb, brick is to be laid perpendicular to the curb alternating between a full brick and a half-brick at the curb. Work will start with a full brick end at the crosswalks and proceed to mid-block. The brick gutter pattern is to be completed continuously along the curb.

Laying of brick shall proceed in such manner that un-laid sections of the mortar setting bed are not disturbed. Any depressions formed in the mortar setting bed shall be corrected prior to placement of brick.

At midblock the joint width between bricks shall be adjusted within the limits specified over such a distance along the gutter that will allow the brick gutter to be completed using full width brick only.

A uniform 3/16 inch joint plus or minus 1/16 inch is to be provided between brick and between brick and granite curb. joints shall be solidly filled to the full depth with mortar joint filler and care shall be taken not to smear mortar joint filler on the surface of adjoining brick or other surfaces.

After installation, joints shall be finished by tooling with a non-staining jointer to produce a very slightly concave, smooth joint free of cracks. Special care shall be taken to properly protect brick gutter paving immediately after installation against adverse weather and too rapid drying during hot weather.

Expansion joint material shall be installed in the brick gutter and mortar setting bed at joints with the crosswalk granite shorelines. Expansion joints in the brick gutter and mortar setting bed shall also be installed over existing expansion joints located in the portland cement concrete road base. Sealant shall be applied to a depth of 1/2 inch over the expansion joint material. The sealant surface shall be flush with the brick surface.

- (5) **MEASURE AND PAYMENT.** The unit of measure for Brick Gutter will be the square foot. The number of square feet of this item will be paid for at the contract unit price per square foot, which payment will include the furnishing, hauling and installation of all materials, preparation of concrete base, disposal of excess materials, and all labor, materials, tools, equipment and incidentals necessary to complete the work.