

**602 MINOR STRUCTURES****602.01 WALLS AND STEPS****(A) DESCRIPTION.**

- (1) **CONCRETE FOOTINGS.** This work shall consist of excavating, forming, furnishing and placing concrete footings for concrete and stone masonry walls to the dimensions and at the locations as designated in the contract documents and/or as directed by the Chief Engineer.
- (2) **CONCRETE WALLS.** This work shall consist of excavating, forming, furnishing and placing concrete on concrete footings, and backfilling of concrete walls, at the locations and to the dimensions as specified in the contract documents and/or as directed by the Chief Engineer.
- (3) **STONE MASONRY WALLS.** This work shall consist of excavating, furnishing and placing stone on the concrete footings, and backfilling of stone walls at the locations and to the dimensions as specified the contract documents and/or as directed by the Chief Engineer.
- (4) **CONCRETE STEPS.** The work shall consist of excavating, forming, furnishing and placing concrete for steps at the locations and to the dimensions as specified in the contract documents and/or as directed by the Chief Engineer.

**(B) MATERIALS**

Concrete (Steps) – [817, Class F](#)

Concrete (Footings and Walls) – [817, Class B](#)

Pervious fill – [805.02](#)

Backfill – [804.04](#)

Facing Stone for the wall, if required, shall be sound and durable, subject to approval of the Chief Engineer. It shall be gray granite, free from reeds, rifts, laminations and minerals which would cause discoloration or deterioration, and shall be 40 percent seam face and 60 percent split face of a light color.

Before proceeding with the work, the Contractor shall submit for approval the name of the quarry and 2 samples of the stone proposed to be used in the work. One sample shall show the lightest color and the other shall show the darkest color of the stone to be furnished. All stone in the work shall be within the color range defined by the approved samples and of the same type of stone. The samples shall have a face size of at least 6 inches by 6 inches.

Stones for wall facing shall have a minimum depth of 6 inches. Stone shall range in rise from a minimum of 4 inches to a maximum of 12 inches, with an average rise of not less than 8 inches. Exposed surfaces shall have stones with a ratio of length to rise of not less than 1-1/2to1 and no more than 4to1, with the exception of closure stones. A minimum number of closures, not exceeding 5 percent of the exposed surface of the work, may be placed. Closures shall be rectangular with the longest face laid horizontal.

Stone shall be 1-1/2 inch rock faced, i.e., the face shall be an irregular convex protecting surface without indications of tool marks, with no concave surfaces below the pitch line, and with no projections beyond the pitch line exceeding 1-1/2 inches.

Coping Stones shall be sound, durable, properly quarried gray granite free from reeds, rifts, seams, laminations and minerals, which by weathering would cause discoloration or deterioration. Before proceeding with the work, the Contractor shall submit for approval the name of the quarry and 2 samples of the stone proposed for use in the work. The samples, each having a face size of at least 2 inches by 6 inches, shall show the texture, color range, and finish of the stone to be furnished. All stone in the work shall be of the same kind and color range as defined by the approved samples. All dimensions shall conform to those shown on the plans unless otherwise ordered by the Chief Engineer. The minimum length of coping stone shall be 3 feet.

The top and roadway sides of coping shall be sawn. All sawn surfaces shall be sandblasted after tooling and dressing. The backside of the coping shall be coarse pointed, with the point depressions approximately 1 to 1-1/4 inches apart with surface variations not to exceed 3/8 inch. Joint faces shall be vertical and at right angles with the exposed faces of the stone.

Backing Stones shall be sound, durable stone subject to approval of the Chief Engineer.

Mortar for stone masonry walls – [806.05\(B\) \(1\) and \(2\)](#)

Reinforcing steel for steps – [812.02](#)

**(C) CONSTRUCTION REQUIREMENTS.**

(1) **CONCRETE FOOTINGS.** Construction shall conform to the applicable provisions of [205](#), [206](#), and [703](#).

(2) **CONCRETE WALLS.** Construction shall conform to the applicable provisions of [205](#), [206](#), and [703](#).

(3) **STONE MASONRY WALLS.** Construction shall conform to the applicable provisions of [205](#), [206](#), and [708](#) for Class B stone masonry except as herein noted.

Beds and joints shall be pointed to produce a concave surface from stone to stone approximately 1/4 inch in depth.

The coping stone shall be set on the top of the stone masonry wall on a mortar bed 1/2 to 1 inch in thickness and shall be anchored to the top of the wall by wrought iron or galvanized iron dowels 3/4 inch diameter, 6 inches long, one at each end of each coping stone. Joints for coping shall be not less than 1/4 inch nor more than 1/2 inch with an average of 3/8 inch. The Contractor shall exercise care in the setting of the coping course so that the stones present smooth and uniform line and grade.

(4) **CONCRETE STEPS.** Construction shall conform to the applicable provisions of [205](#), [206](#), and [703](#) except as herein noted. Reinforcing steel, when specified in the contract documents, shall be placed in conformance with [704](#).

Where the steps are to be constructed on existing ground, the ground shall be neatly graded to required elevation and dimensions as shown in the contract documents, and care shall be exercised to assure that the ground to receive the concrete is

undisturbed and is kept dry. The concrete shall be poured as soon as practicable after excavation is complete and the forms erected. Forms shall remain in place for at least 24 hours after the concrete is poured, unless permission for an earlier removal is granted by the Chief Engineer.

The treads of the steps shall be broomed with a stiff brush to some uniform pattern to provide a roughened surface that will not be slippery when wet.

**(D) MEASURE AND PAYMENT.**

- (1) **CONCRETE FOOTINGS.** The unit of measure for Concrete Footings will be the cubic yard. The actual number of cubic yards measured complete in place, or, if the footing is poured against side excavation computed based on plan dimensions, will be paid at the contract unit price per cubic yard, which payment will include all excavation and disposal of surplus material and all labor, materials, tools, equipment and incidentals necessary to complete the work.
- (2) **CONCRETE WALLS.** The unit of measure for Concrete Walls will be the cubic yard. The actual number of cubic yards measured complete in place will be paid at the contract unit price per cubic yard, which payment will include all excavation and disposal of surplus material, pervious fill and backfilling materials, and all labor, materials, tools, equipment, and incidentals necessary to complete the work.
- (3) **STONE MASONRY WALLS.** The unit of measure for Stone Masonry Walls will be the cubic yard. The actual number of cubic yards of stone masonry complete in place, measured in the field will be paid at the contract unit price per cubic yard, which payment will include all excavation and disposal of surplus materials, pervious fill and backfilling materials, and all labor, materials, tools, equipment, and incidentals necessary to complete the work.
- (4) **CONCRETE STEPS.** The unit of measure for Concrete Steps will be the cubic yard. The actual number of cubic yards of concrete measured complete in place, or, if the steps are poured against side excavation, computed based on plan dimensions, will be paid at the contract unit price per cubic yard, which payment will include all excavation and disposal of surplus material, backfilling materials, reinforcing steel when specified and all labor, materials, tools, equipment, and incidentals necessary to complete the work.

**602.02 PORTLAND CEMENT CONCRETE COPINGS**

- (A) **DESCRIPTION.** This work shall consist of the construction of standard and special copings to the dimensions and at the locations as indicated on the contract plans and/or as directed by the Chief Engineer.
- (B) **MATERIALS.** The copings shall be constructed of concrete conforming to PCC Mix Design, [Class F as per 817](#), with materials meeting the requirements of [501.02](#).
- (C) **CONSTRUCTION REQUIREMENTS.** Construction of copings 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\(B\)](#) with the following exceptions, changes or additions:

- (a) Backforms for both standard and special copings shall be of a depth equal to the depth of the coping.
  - (b) A front form will not be required for standard copings, but a method as approved by the Chief Engineer shall be employed to achieve the end product of an 8 inch radius on the front face of the coping as shown on the contract plans.
  - (c) Front forms for special copings shall be required, shall be of a depth equal to the depth of the coping and shall be so equipped that the grooves and bevel are formed as shown on the contract plans.
- (2) **PLACING CONCRETE.** The concrete for standard copings shall be placed against the back form and thoroughly compacted by working with suitable tools. Care shall be exercised in depositing the concrete so that it reaches a position in the forms so that it can be finished to the required dimensions with a minimum of working. It shall be compacted to insure a smooth, even surface free from voids and honeycombs. The plastering of honeycombed areas will not be permitted.

Concrete for special copings shall be placed in accordance with the requirements specified in [609.01\(E\) \(2\)](#).

- (3) **FORMING JOINTS.** Where the standard or special concrete coping is to be poured adjacent to a cement concrete sidewalk, the expansion joints and planes of weakness joints shall be formed at the same intervals and in line with the transverse joints in the sidewalk. Where the coping does not abut any sidewalk or any other concrete slab, the expansion joints shall be formed at 45 foot intervals with planes of weakness at intervals of 15 feet. Where shorter sections are necessary for closures, no section shall be less than 4 feet.

Where the copings terminate at alleys, driveways, or other permanent structures, expansion joint filler having a recovery of 90 percent or more shall be installed at the junction. Expansion joints shall be constructed with a single piece of joint filler meeting the requirements of [807.01\(A\)](#), cut to the dimensions of the coping. Intermediate transverse joints shall be formed as specified in [608.01\(C\)\(6\)](#) when the coping is poured integrally with the sidewalk. When the coping does not abut the sidewalk or any other concrete slab, the plane of weakness joints shall be formed by a bar or plate which can be easily removed without damage to the coping.

- (4) **FINISHING.** The front face of the coping shall be shaped to the required dimensions as soon as possible after the concrete has been deposited and is workable. The front face of the coping shall be finished true to line, grade, and contour in a smooth, neat, and even manner. When the concrete has set sufficiently, the surface shall be brushed with a fine hair brush meeting the requirements of [905.09\(E\)](#). The top surface of the coping 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 coping in excess of 3/16 inch from the straightedge shall be immediately corrected. There shall be no variation in alignment of the coping exceeding 1/8 inch. All rejected coping shall be removed and replaced without additional compensation. Back forms shall remain in place for at least 12

hours. Any irregular surface shall be corrected by rubbing with a carborundum stone.

Special concrete coping shall be finished in accordance with applicable requirements of [609.01\(E\)\(9\)](#).

- (5) **BACKFILLING.** Backfilling of the coping shall be done to meet the applicable requirements of [609.01\(E\)\(7\)](#).

**(D) MEASURE AND PAYMENT.**

The unit of measure for Standard Portland Cement Concrete Coping and of Special Portland Cement Concrete Coping will be the cubic yard. The actual number of cubic yards measured complete in place will be paid for at the respective contract unit price per cubic yard, which payment will include excavation and disposal of material, furnishing, hauling, and placing all materials including joints, curing, backfilling, and all labor, materials, tools, equipment and incidentals necessary to complete the work.