

602 Concrete Sidewalks, Driveways, Loading Zones, Safety Islands, Surface Drains, Rumble Strips and Steps

602.1 Description

- (1) This section describes constructing sidewalks, driveways, loading zones, safety islands, surface drains, rumble strips and steps including landings, of concrete, with or without reinforcement.
- (2) Unless specifically specified in the contract, sidewalks or steps built integral with and as a part of bridges or culverts are not included.

602.2 Materials

- (1) Furnish materials conforming to the following:

| | |
|-----------------------------|-------------------------|
| Expansion joint filler..... | 415.2.3 |
| Concrete..... | 501 |
| Reinforcement..... | 505 |
| Electrical conduit..... | 652 |
- (2) Provide grade A concrete as modified in [716](#). Provide QMP for class II ancillary concrete as specified in [716](#).
- (3) Furnish high early strength concrete under the HES bid items. The contractor may use HES concrete for driveways even where the contract does not require it, with engineer approval.
- (4) Furnish cast iron detectable warning fields for curb ramps from the [APL](#) for the color defined in the Curb Ramp Detectable Warning Field bid items.

602.3 Construction

602.3.1 General

- (1) The engineer will inspect ancillary concrete built under 602 for transverse cracking as specified in [415.3.17](#) for ancillary concrete. Repair cracked concrete as the engineer directs.

602.3.2 Sidewalks and Driveways

602.3.2.1 Preparing the Foundation

- (1) Form the foundation by excavating or filling to the required elevation of the concrete bottom, or subbase bottom if specified. Tamp or compact the foundation to ensure stability.
- (2) In cuts, make the foundation wide enough to allow placing forms and performing concrete placement and finishing. In embankments, construct the foundation at least 2 feet wider than the proposed sidewalk or driveway width. For sidewalk, extend foundation at least one foot beyond each end.
- (3) Unless specified otherwise, fill holes, ruts, and other depressions in the foundation with materials similar to those in the existing foundation. The contractor may use granular subbase or aggregate base.
- (4) If the plans show, place granular subbase or aggregate base to the thickness and section the plans show.

602.3.2.2 Forms

- (1) Furnish and use wood or metal forms straight and of sufficient strength to resist springing, tipping, or other displacement during depositing and consolidating the concrete. If using wood forms, provide surfaced planks, at least 2-inch nominal thickness stock except for sharply curved sections. If using metal forms, ensure they are the engineer-approved section with a flat surface on top. Use forms as deep as the depth of the sidewalk. Securely stake, brace, and hold the forms firmly to the required line. Make the forms tight to prevent mortar leakage. Clean and oil before placing concrete against them.

602.3.2.3 Placing and Finishing Concrete

- (1) The engineer will check and approve the foundation, forms, stringline, and reinforcement if required, before placing the concrete. The engineer will check thickness according to [CMM 870: WTP C-003](#) Preplacement Measurement. If slip-forming concrete, the engineer will check the stringline to assure suetup is in conformance to plan alignment and grade. Place the concrete on a moist foundation, deposit it to the required depth, and consolidate sufficiently to bring the mortar to the surface, then strike-off and finish to a true and even surface. Before the mortar sets, brush or lightly broom the surface. Before performing the final surface finish, check the sidewalk surface with a 10-foot straightedge and spotcheck driveways, correct areas that vary 1/4 inch from the testing edge by adding or removing concrete while the concrete is still plastic.

- (2) If the engineer allows, the contractor may construct concrete sidewalks with suitable, engineer-approved, slip-form equipment. The contractor may omit wood floating if the slip-form equipment produces a suitable finish.
- (3) Construct curb ramps at the locations and conforming to the details and dimensions the plans show. Embed detectable warning field arrays in plastic concrete conforming to manufacturer-recommended procedures. Do not install on hardened concrete. Do not field cut plates except where the ends of radial arrays abut ramp edges. Smooth the edges of field cuts.

602.3.2.4 Reinforcement

- (1) If required, use reinforcement conforming to, and place it as specified on, the plans.

602.3.2.5 Joints

602.3.2.5.1 General

- (1) Use contraction joints to divide the work into sections.
- (2) No joint may deviate more than 5 degrees from perpendicular to the surface of the finished. Ensure that joint axes do not deviate more than 1/2 inch from a straight line, or from the designated alignment at any point. If constructing the joints in sections, do not use offsets or concrete struts between adjacent units.
- (3) Contraction joints may be formed using one of the following methods:
 1. Create a slot or groove at least 1/4 of the depth and 1/4 inch wide. Form them by inserting a metal parting strip in the concrete after striking off and consolidating, and while the concrete is still plastic. As soon as the concrete retains its shape, remove the parting strip and edge-finish the joint.
 2. Cut the concrete not less than 1/4 of the depth through a pointed trowel or other suitable tool. Edge-finish the joint.
 3. Saw contraction joints no less than 1/4 of the depth and approximately 1/8 inch wide. Perform the sawing as soon as possible after the concrete sets sufficiently to prevent raveling during sawing and before shrinkage cracking occurs.
- (4) If constructing the work in partial width slabs, place transverse joints so they match the like joints in adjacent slabs. Place joints to match adjacent concrete joints regardless of expansion joint filler between new and existing concrete.
- (5) If possible, do not divide sidewalks into sections less than 3 feet, or greater than 12 feet in any dimension.
- (6) Extend the expansion joint filler to one inch below the concrete's full depth and make the top slightly below the finished surface.
- (7) Consolidate the concrete thoroughly at expansion joint faces to fill the voids, and finish the surface smooth and true to grade. Also, round edges along forms, un-sawed joints, and metal slab division forms with a 1/2-inch radius edger. For other work under this section, use mechanical vibration at expansion joint faces to fill the voids, and finish the surface smooth and true to grade.
- (8) Do not seal joints.

602.3.2.5.2 Sidewalk Joints

- (1) For sidewalks of uniform width, construct transverse joints at right angles to the sidewalk centerline, and construct longitudinal joints parallel to the centerline, unless specified otherwise. For sidewalks of variable or tapering widths, make the transverse and longitudinal joints at right angles to each other, if possible, and construct the joints as the engineer laid them out the field.
- (2) Place 1/2-inch-wide transverse expansion joint filler through the sidewalk at uniform intervals not greater than 100 feet apart.
- (3) Place 1/2-inch-wide expansion joint filler between the sidewalk and back of abutting parallel curb or gutter; driveway; or edge of pavement.
- (4) Place 1-inch-wide expansion joint filler between sidewalk and buildings or other rigid structures.
- (5) If widening existing sidewalks, place transverse joints in line with like joints in the existing sidewalk.

602.3.2.5.3 Driveway Joints

- (1) For driveways of uniform width, construct transverse joints at right angles to the driveway centerline, and construct longitudinal joints parallel to the centerline, unless specified otherwise. For driveways of variable or tapering widths, make the transverse and longitudinal joints at right angles to each other, if possible, and construct the joints as the engineer laid them out the field.
- (2) Place 1/2-inch-wide expansion joint filler between the driveway and back of abutting parallel curb or gutter; and between the driveway and parallel sidewalk.

- (3) Place 1-inch-wide expansion joint filler between driveway and buildings or other rigid structures.

602.3.2.6 Protecting and Curing

- (1) Cure the concrete as specified in [415.3.12](#).
- (2) Protect sidewalks and driveways as specified for concrete pavement in [415.3.14](#).

602.3.2.7 Opening to Service

602.3.2.7.1 Sidewalks

- (1) The engineer may allow the contractor to open sidewalks to pedestrian traffic after the concrete has developed sufficient strength to prevent damage to the surface.

602.3.2.7.2 Driveways

- (1) Open to service as specified in [415.3.15](#), except follow the opening strength for construction and public traffic as listed below:
 - Residential Driveways: 2000 psi
 - Commercial or Industrial Driveways: 3000 psi

602.3.2.8 Backfilling and Restoring the Site of the Work

- (1) If the sidewalk does not touch curb, curb & gutter, pavement, or other structures and if the concrete is cured and the forms removed, then backfill the spaces along the sides with satisfactory soil and thoroughly compact. For the backfill conform to the section the plans show. Dispose of surplus excavation and restore the work site to a neat and orderly condition.

602.3.3 Loading Zones

- (1) Construct raised loading zones in streets, if included in the contract, of concrete conforming to the requirements above, and at the locations, and as specified in the details and dimensions the plans show. Use construction methods conforming to [602.3.2](#).
- (2) If constructing loading zones on bases covered with a wearing surface, place the loading zone directly on base.
- (3) If constructing loading zones on concrete pavements, place the loading zones on the finished surface.
- (4) Tie loading zones to the pavement with at least four 3/4-inch diameter dowel or tie bars, 10 inches long. Use construction methods conforming to [602.3.2](#).
- (5) Provide openings for traffic signals, if any, as directed.

602.3.4 Safety Islands

- (1) Under the Concrete Safety Islands bid item, construct concrete safety islands conforming to the requirements above and the details and dimensions the plans show. This work includes furnishing, by the contractor, or by others, and installing fixtures, conduits, and other materials, the detailed plans show.
- (2) Place concrete between suitable forms accurately set to conform to the design of the island, and anchor securely to preclude movement during placement and finishing operations. Unless directed otherwise, use construction methods conforming to [602.3.1](#).
- (3) Provide or construct openings in the island and in the base as the plans show for installing fixtures, posts, or cables. Install fixtures and materials at the time and in the manner designated on the plans or as the engineer directs.

602.3.5 Surface Drains

- (1) Install and maintain temporary surface drains at locations designated for permanent drains until permanent drains are completed.
- (2) Place and secure steel reinforcement and tie bars in their plan position before placing concrete. Place and cure the concrete conforming to [415.3](#).
- (3) Excavate, prepare the subgrade and aggregate base, and backfill as required to place the drains and restore the grade after placement.

602.3.6 Concrete Rumble Strips

- (1) Mill shoulder rumble strips and diamond grind center line and edge line rumble strips into new or existing concrete pavements. For center line and edge line rumble strips stay a minimum of two inches away from longitudinal joint. Do not apply rumble strips across bridges.
- (2) If milling, use a rotary head mill with a cutting tip pattern that will produce a relatively smooth cut of the size, shape, spacing, and alignment the plans show. Ensure that cutting heads are on a suspension

independent from the power unit to allow the heads to self-align with slopes and irregularities. Ensure that the machine has a guidance system that consistently provides the rumble strip plan alignment.

If diamond grinding, use a wet process rotary head diamond grinding machine with a cutting tip pattern that will produce a relatively smooth cut of the size, shape, spacing, and alignment the plans show.

Ensure that cutting heads are on a suspension independent from the power unit to allow the heads to self-align with slopes and irregularities. Ensure that the machine has a guidance system that consistently provides the rumble strip plan alignment.

- (3) For center line and edge line rumbles apply concrete protective surface treatment to clean, dry surface after pavement markings are placed.
- (4) Mill or form transverse rumble strips into new concrete pavement or, if inlaid into existing HMA or concrete pavements, into work built under the Concrete Pavement Replacement bid item except use concrete conforming to [416.2.2](#).
- (5) If forming rumble strips into freshly placed concrete, form or finish the concrete to consistently produce the size, shape, spacing, alignment, and smoothness the plans show.
- (4) Before beginning the work, demonstrate to the engineer that the proposed operation achieves the desired surface inside each depression without damaging the pavement. Place rumble strips in the pattern and shape the plans show. For shoulders carrying temporary traffic during construction, do not install rumble strips until after routing traffic back to the mainline.
- (5) At the end of each workday, move equipment and material out of the clear zone and sweep or vacuum the traveled way pavement and shoulder areas. Sweep away or vacuum up milling debris before opening adjacent lanes to traffic. Dispose of waste material as specified in [203.3.4](#); do not place on the finished shoulder surface.

602.3.7 Steps

- (1) If constructing steps, and landings is included in the contract, build them at the locations and as specified in the design, dimensions, and details the plans show. This work includes reinforcement and necessary excavating, backfilling, and disposing of excess excavation material.
- (2) Provide a rubbed surface finish on formed surfaces of landings, risers, and sides of steps as specified for concrete bridges in [502.3.7.3](#).
- (3) Furnish and use materials and construction methods conforming to [602.3.1](#), except as specified otherwise.

602.4 Measurement

- (1) The department will measure the Concrete Sidewalk bid items by the square foot acceptably completed. Measurement includes the area of the curb ramp and warning field. The department will not measure the area of sidewalk intersecting a driveway if measured as driveway under [602.4\(2\)](#).
- (2) The department will measure the Concrete Driveway bid items by the square yard acceptably completed, measured as specified in [415.4](#) for Concrete Pavement including the driveway apron and any sidewalk within the limits of the driveway. The department will only measure area outside the specified limits for the pavement, curbs, gutters, combination curb & gutter or other structures.
- (3) The department will measure Concrete Loading Zones; Concrete Safety Islands; and the Curb Ramp Detectable Warning Field bid items by the square foot acceptably completed.
- (4) The department will measure Concrete Steps by the square foot acceptably completed. The measured area of steps, including landings equals the sum of the areas of the treads and landings, computed by multiplying the tread and landing width by the tread and landing length, out to out of integrally placed wall.
- (5) The department will measure the Concrete Surface Drains bid items by the cubic yard acceptably completed, based on the dimensions the plans show or the engineer directs.
- (6) The department will measure Concrete Shoulder and Edge Line Rumble Strips by the linear foot acceptably completed, measured as the length along each side of the traveled way from the first groove in a segment to the last groove in that segment. The department will measure Concrete Center Line Rumble Strips by the linear foot acceptably completed, measured as the length along the center line from the first groove in a segment to the last groove in that segment. A segment is a series of grooves including 50-foot and shorter gaps as well as skips at transverse joints the plans show. Gaps greater than 50 feet define a new segment. The department will deduct for skips at transverse joints greater than the plans show.
- (7) The department will measure Concrete Transverse Rumble Strips by the square yard acceptably completed, measured to include the area between the milled or cast-in-place grooves, or if inlaid into

existing HMA or concrete pavement, the area of the inlay. The department will not deduct for embedded fixtures with an area less than one square yard as measured in the plane of the pavement.

602.5 Payment

602.5.1 General

- (1) The department will pay for measured quantities at the contract unit price under the following bid items:

| <u>ITEM NUMBER</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|--------------------|---|-------------|
| 602.0400 - 0499 | Concrete Sidewalk (inch) | SF |
| 602.0500 - 0549 | Curb Ramp Detectable Warning Field (color) | SF |
| 602.0600 - 0649 | Curb Ramp Detectable Warning Field Radial (color) | SF |
| 602.0800 - 0849 | Concrete Driveway (inch) | SY |
| 602.0850 - 0899 | Concrete Driveway HES (inch) | SY |
| 602.1000 | Concrete Loading Zone | SF |
| 602.1500 | Concrete Steps | SF |
| 602.2400 | Concrete Safety Islands | SF |
| 602.3010 | Concrete Surface Drains | CY |
| 602.3015 | Concrete Surface Drains HES | CY |
| 602.3210 - 3279 | Concrete Rumble Strips, (location, type) | LF |
| 602.3280 | Concrete Rumble Strips, Transverse | SY |

- (2) The department will adjust pay for ancillary concrete crack repairs on items constructed under 602 as specified in [601.5.2](#).

602.5.2 Concrete Sidewalk, Driveways, Loading Zone, and Steps

- (1) Payment for the Concrete Sidewalk, Driveways, Loading Zone, and Steps bid items is full compensation for foundation excavation, preparation, and backfill if there is no adjacent roadway excavation taking place; for granular subbase or aggregate base if there is no adjacent roadway subbase or aggregate base being placed; providing concrete and reinforcement, and for restoring the site. Payment also includes providing tie bars and dowel bars in unhardened concrete. The department will pay separately for tie bars and dowel bars used to connect the work to concrete not placed under the contract under the Drilled Tie Bars and Drilled Dowel Bars bid items as specified in [416.5](#). The department will pay separately for coloring concrete as required.

602.5.3 Curb Ramp Detectable Warning Fields

- (1) Payment for the Curb Ramp Detectable Warning Field bid items is full compensation for providing the warning field arrays of the specified configuration and color.

602.5.4 Concrete Safety Islands

- (1) Payment for Concrete Safety Islands is full compensation for providing, placing, finishing and curing concrete; for providing and placing materials, except those that the plans show as furnished by others; for handling and installing fixtures and materials that the plans show as furnished by others; and for required excavating or openings in the base.

602.5.5 Concrete Surface Drains

- (1) Payment for Concrete Surface Drains bid items is full compensation for providing surface drains; for steel reinforcement and dowel and tie bars; and for excavating, preparing the subgrade and aggregate base, and backfilling.

602.5.6 Concrete Rumble Strips

- (1) Payment for Concrete Shoulder Rumble Strips is full compensation for milling or diamond grinding; for sweeping or vacuuming; for disposing of waste and for placement of protective surface sealant.
- (2) Payment for Concrete Rumble Strips Transverse is full compensation for milling or forming grooves; for sweeping or vacuuming; and for disposing of waste. The department will pay separately for new concrete pavement under the Concrete Pavement bid items; and for concrete inlaid in existing HMA or concrete pavement under the Concrete Pavement Replacement bid item.