

SECTION 02770 - CURBS AND GUTTERS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Sidewalks, sidewalk ramps, driveways, curbs and drive approaches complete with concrete materials, concrete curing compounds, joint materials, field quality control and appurtenances.

1.02 REFERENCES

- A. Reference Standards: Conform the work for this Section to the applicable portions of the following standard Specifications:
 1. ASTM American Society of Testing Materials
 2. AASHTO American Association of State Highway and Transportation Officials
 3. MaineDOT Maine Department of Transportation - Standard Specifications for Road and Bridge Construction
 4. ADAAG American with Disabilities Act Accessibility Guidelines
 5. UFAS Uniform Federal Accessibility Standards

1.03 SUBMITTALS

- A. Reports: Written permission for the use of all local disposal sites Furnish copies to the ENGINEER.
- B. Test Reports
 1. Thickness and Compressive Strength: Provide the ENGINEER with two (2) certified copies of the test results. Perform the tests by a laboratory approved by the ENGINEER.

1.04 JOB CONDITIONS

- A. Environmental Requirements:
 1. Temperature: Comply with the requirements for concrete installation due to outside ambient air temperatures as specified under Article 3.3.I of this Section.
- B. Protection
 1. Protection Against Rain: Comply with the requirements for protection new work against damage from Rain, as specified under Article 3.3.I of this Section.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Concrete: use 2,500-psi concrete except as modified herein.

- B. Ready-Mixed Concrete: Use ready-mixed concrete that conforms to ASTM C94, Alternate 2.
- C. Water: Use water for mixing and curing concrete reasonably clean and free from oil, salt, acid, alkali, chlorides, sugar, vegetable, or other substances injurious to the finished product. Waters from sources approved by the local Health Department as potable may be used without test. Test water requiring testing in accordance with the current Method of Test for Quality of Water to be Used in Concrete, AASHTO T-26.
- D. Concrete Curing Compounds: Use white membrane curing compound for curing concrete that conforms to AASHTO M148, Type 1 clear, or Type 2 while per MaineDOT Section 925.
- E. Premolded Joint Filler: Use fiber joint filler that conforms to ASTM D1751. Use filler of the thickness, as specified herein, or as directed by the ENGINEER.
- F. Steel Hook Bolts: Use hook bolts that conform to ASTM A706, or for Grade 60 of ASTM A615, A616, or A617. Use 5/8-inch diameter hook bolts self-tapping.
- G. Joint Sealant: Use hot-poured type joint sealant that conforms to ASTM D1190.

PART 3 - EXECUTION

3.01 CONTRACTOR'S VERIFICATION

- A. Excavation and Forming:
 - 1. Prior to the installation of any concrete, examine the excavation and forms for the proper grades, lines, and levels required to receive the new work.
 - 2. Ascertain that all excavation and compacted subgrades are adequate to receive the concrete to be installed.
 - 3. Correct all defects and deficiencies before proceeding with the work.
- B. Existing Improvements:
 - 1. Investigate and verify location of existing improvements to which the new work is to be connected.
 - 2. Making necessary adjustment in line and grade to align the new work with the existing improvements must be approved by the ENGINEER prior to any change.

3.02 PREPARATION

- A. Forms:
 - 1. Use wood or metal forms, straight and free from warp, clean, and sufficient strength to resist springing during the process of depositing concrete against them.
 - 2. Use full depth of the concrete forms.

3.03 INSTALLATION

- A. Sidewalks, Sidewalk Ramps, Driveways and Driveway Approaches:

1. Construct all sidewalks and sidewalk ramps four (4) inches thick except at driveways and alleys.
 2. Construct thickness of the sidewalks six (6) inches at driveways and alleys.
 3. Construct sidewalks five (5) feet wide unless otherwise noted on the Plans, and slope $\frac{1}{4}$ inch per foot towards the center of the road.
 4. Normally, sidewalks will be located within the right-of-way, parallel the property lines, at a distance of 1-foot from the property line.
 5. Construct alleys, driveways and approaches six (6) inches thick.
 6. Construct the width of the driveways and driveway approaches as shown on the Plans or as directed by the ENGINEER.
- B. Removal of Existing Curb for Sidewalk Ramps and Driveway Approaches: Conform construction of sidewalk ramps within street intersections where curbed pavement existing to the current MaineDOT Roadway and Traffic Design Standards.
1. Saw cut, to full depth of pavement, and remove a minimum of an 18-inch wide curb and gutter section where there is no proper curb drop for the sidewalk ramp or driveway approach. When mountable curbs are present, remove a 24-inch wide curb and gutter section for the construction of sidewalk ramps, as specified above.
 2. Remove curb and gutter as determined by the ENGINEER in the field but remove curb and gutter at least as wide as the proposed sidewalk ramp plus 1-foot on each side.
 3. Replace the removed curb and gutter section with materials, equal to what was removed and seal joint with hot poured rubber asphalt.
- C. Install $\frac{5}{8}$ inch diameter self-tapping hook bolts, in the existing concrete pavement as indicated on the Plans prior to placing concrete for the removed curb and gutter section.
- D. Placement of Forms: Use wood forms, straight and free from warp, of nominal depth for sidewalk sections less than 25 feet in length.
1. Stake forms to line and grade in a manner that will prevent deflection and settlement.
 2. When unit slab areas are to be poured, place slab division forms such that the slab division joints will be straight and continuous.
 3. Set forms for sidewalk ramps to provide a grade toward the centerline of the right-of-way in accordance with current standards. Use a uniform grade, except as may be necessary to eliminate short grade changes.
 4. Oil forms before placing concrete. Leave forms in place at least 12 hours after the concrete is placed. Place forms ahead of the pouring operations to maintain uninterrupted placement of concrete.
 5. The use of slip form pavers can be allowed when approved by the ENGINEER in lieu of the construction system described above
- E. Joints: Construct transverse and longitudinal expansion and plane-of-weakness joints at the locations specified herein, or as indicated on the Plans or as directed by the ENGINEER.
1. Place the transverse expansion joints for the full width and depth of the new work. Use transverse expansion joints placed against an existing pavement a minimum of six (6) inches deep but no less than the thickness of the concrete being placed.
 2. Conform longitudinal expansion joints to the requirements as transverse expansion joints.
 3. Construct joints true to line with their faces perpendicular to the surface of the sidewalk. Install the top slightly below the finished surface of the sidewalk. Construct

- transverse joints at right angles to the centerline of the sidewalk and construct longitudinal joints parallel to the centerline or as directed by the ENGINEER.
4. Place transverse expansion joints, ½ inch thick, through the sidewalk at uniform intervals of not more than 50 feet and elsewhere as shown on the Plans, or as directed by the ENGINEER.
 5. Place expansion joints, ½ inch thick, between the sidewalk and back of abutting parallel curb, buildings or other rigid structures, concrete driveways and driveway approaches. When directed by the ENGINEER, place the expansion joint between sidewalks and buildings 1 foot from the property line and parallel to it.
 6. Form plan-of-weakness joints every five (5) feet. Form joints by use of slab divisions forms extending to the full depth of the concrete or by cutting joints in the concrete, after floating, to a depth equal to ¼ the thickness on the sidewalk. Construct cut joints not less than 1/8 inch or more than ¼ inch in width and finish smooth and at right angles to the centerline on the sidewalk.
- F. Placing and Finishing Concrete: Place all concrete on a prepared unfrozen, smooth, leveled, rolled and properly compacted base. Place concrete on a moist surface with no visible water present.
1. Deposit the concrete, in a single layer to the depth specified. Spade or vibrate and compact the concrete to fill in all voids along the forms and joints. Strike off the concrete with a strike board until all voids are removed and the surface has the required grade and cross section as indicated on the Plans, or as directed by the ENGINEER.
 2. Float the surface of the concrete just enough to produce a smooth surface free from irregularities. Round all edges and joints with an edger having a ¼ inch radius.
 3. Broom the surface of sidewalks, driveways and approaches to slightly roughen the surface.
 4. Texture the surface of the sidewalk ramps with a coarse broom transversely to the ramp slope, and coarser roughen than the remainder of the sidewalk. Contract the ramp slope in color (using a brick-red dye or approved equal) from the remainder of the sidewalk. Comply with minimum color contract and slope requirements from UFAS, ADAAG, Local Government Standards, or as directed by the ENGINEER.
- G. Curing: After finishing operations have been completed and immediately after the free water has left the surface, completely coat and seal the surface of the concrete (and sides if slip-forming is used) with a uniform layer of white membrane curing compound. Do not thin the curing compound. Apply the curing compound at the rate of one gallon per 200 square feet of surface.
- H. Barricades: Place suitable barricades and lights around all newly poured sidewalks, sidewalk ramps, driveways, driveway approaches and curb and gutter sections in order to protect the new work from damage from pedestrians, vehicles and others until the concrete has hardened.
1. Leave barricades in place for a minimum of two (2) days, except for driveway approaches and curb and gutter sections. Leave barricades in place for a minimum of three (3) days.
 2. Remove and replace any concrete that suffers surface or structural damage at no additional cost.

- I. Protection:
 - 1. Against Rain: Protect new concrete from the effects of rain before the concrete has sufficiently hardened. Have available on the job site at all times enough burlap or 6-mil thick polyurethane film to cover and protect one day's work. Stop work and cover completed work when rain appears eminent. As soon as the rain ceases, uncover the concrete and burlap drag the surface where necessary. Apply curing compound to any areas where the compound has been disturbed or washed away.
 - 2. Against Cold Weather: If concrete is placed between December 15 and February 15, have available on the site sufficient amount of clean, dry straw or hay to cover one (1) day's production. If the temperature reaches 40 degrees F and is falling, place the hay or straw 12 inches thick, immediately after the curing compound is applied.
 - 3. Concrete Temperature Limitations: Do not place concrete when the temperature of the concrete at the point of placement is above 90 degrees F.
- J. Cleanup: After the concrete has gained sufficient strength, but no sooner than within 12 hours, remove the fixed forms and backfill the spaces on both sides with sound earth of topsoil quality. Compact, level and leave backfill in a neat condition.
- K. Gutters and Curbs: Construct gutters and curbs in accordance with Section 520 MDOT Standard Specifications for Road and Bridge Construction, latest edition, including supplements.

3.04 FIELD QUALITY CONTROL

- A. Concrete Delivery Ticket: Use a ticket system for recording the transportation of concrete from batching plant to point of delivery. Issue this ticket to the truck operator at the point of loading and give to the ENGINEER upon delivery.
- B. Concrete Delivery Rejection: Remove concrete not permitted for inclusion in the work by the ENGINEER from the site. Rejection of concrete will be determined through Field Quality Control and elapsed time from mixer charging to delivery.
- C. Concrete Testing at Placement: Perform tests of each batch of concrete delivered, each 50 cubic yards, or whenever consistency appears to vary. The sampling and testing of slump, air content and strength will be performed at no cost to the CITY.
 - 1. Sampling: Secure composite samples in accordance with the Method of Sampling Fresh Concrete, ASTM C172.
 - 2. Slump Test: Test in accordance with ASTM C143. Use the least slump possible consistent with workability for proper placing of the various classifications of concrete.
 - a. Place structural concrete for walls and slabs, by means of vibratory equipment, with a slump of four (4) inches.
 - b. A tolerance of up to 1-inch above the indicated maximum will be allowed for individual batches provided the average for all batches or the most recent ten (10) batches tested, whichever is fewer, does not exceed the maximum limit.

3. Air Content: Determine air content of normal weight concrete in accordance with Method of test for Air Content of Freshly Mixed Concrete by the Pressure Method, ASTM C23 1, or by the volumetric method, ASTM C 173, for each strength test.
 4. Compressive Strength: Make two (2) strength tests of three (3) samples each for each 50 Cubic yards, or fraction thereof, of each mix design of concrete placed in any one (1) day.
 - a. Handling Samples: Mold and cure three (3) specimens from each sample in accordance with Method of Making and Curing Concrete Test Specimens in the Field, ASTM C31. Record any deviations from the requirements of this Standard in the test report.
 - b. Testing: Test specimens in accordance with Method of Test for Compressive Strength of Cylindrical Concrete Specimens, ASTM C39. Test one (1) specimen at seven (7) days for information and test two (2) at 28 days for acceptance. Use the average of the strength of the remaining cylinder. Should both specimens in test show any of the above defects, discard the entire test.
 - c. Acceptance of Concrete: The strength level of the concrete will be considered satisfactory so long as the averages of all sets of three consecutive strength test results equal or exceed the specified 28-day strength and no individual strength test results falls below the specified 28-day strength by more than 500 psi. If the strength test is not acceptable, perform further testing to qualify the concrete.
 - d. Concrete Temperature: Determine the temperature of concrete sample for each strength Test.
- D. Reductions due to deficiencies in thickness or compressive strength are additive, that is, if an area is deficient by 3/8 inch and under strength by 200 psi, the total reduction is 20% plus .02% or .40% reduction.

END OF SECTION 02770