

SECTION 03 30 00

CONCRETE SIDEWALKS

PART 1 – GENERAL

1.1 PURPOSE

- A. This guideline is intended to provide useful information to the Professional Service Provider (PSP) to establish a basis of design. PSP is to apply the principles of this section such that the University of Texas at Arlington (UTA) may achieve a level of quality and consistency in the design and construction of their facilities. Deviations from these guidelines must be approved by UTA and may require justification through Life Cycle Cost (LCC) analysis and submitted to UTA for approval.

1.2 LESSONS LEARNED AND DESIGN CONSIDERATIONS

- A. **Design team and Contractor shall carefully coordinate to provide site concrete that meets ADA/TAS requirements for slopes.**
- B. **Concrete finish will be critically reviewed for color, texture and tooling to ensure the best possible match with adjacent existing paving.**
- C. **Control joints may be either tooled or saw cut depending on the location, as well as adjacency to existing surfaces. This decision must be discussed and agreed upon with UTA prior to preparation of the paving subgrade and reinforcing.**

1.3 REFERENCE STANDARDS

- A. The current editions of the applicable American Concrete Institute (ACI) publications, to the extent applicable in each reference.
- B. The current editions of the applicable American Society for Testing and Materials (ASTM) specifications, to the extent applicable in each reference.
- C. Concrete Reinforcing Steel Institute (CRSI) Manual of Standard Practices.
- D. The current edition of the applicable ADA Standards for Accessible Design, to the extent applicable in each reference.

1.4 ENVIRONMENTAL CONTROLS

- A. Rinsing out of the transit mix trucks, washing or wetting of concrete, site cleanup, or other activities related to water at the site shall be in strict conformance with all EPA requirements for the prevention of water runoff to storm water sewers or creeks.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Forms
 - 1. Earth forms will not be permitted for concrete paving.
 - 2. Provide wood or metal framework, including adequate bracing, to the lines and grades shown on the drawings. Follow industry standard for vertical and alignment tolerances.
 - 3. Wood forms shall be of good grade lumber, sound and free of warp.
 - 4. A nominal 2” minimum thickness is required unless extremely short radii of curves require thinner forms.
- B. Cement
 - 1. Cement shall conform to one of the following:

Type/ASTM #	Description
IA/C150	Standard Portland Cement
IIA/C150	Provides moderate sulfate resistance or moderate heat of hydration

- 2. Only one type and brand of cement will be permitted in any one structure.
- C. Fly-ash
 - 1. Conform to ASTM C618, Class F. Class F fly-ash is generally the best class of fly-ash to use but the source and quality should always be checked carefully.

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2. Fly-ash shall be produced from a single, known and consistent source.
3. The amount of fly-ash used shall be no greater than 20% by volume of the specified cement volume.
- D. Concrete
 1. Aggregates shall conform to ASTM C30, uniformly graded and clean. The type of aggregate will be approved by UTA Engineer or Architect prior to construction.
 2. Type 'A' – Latimore
 - a). Coarse Aggregate: crushed rock or washed gravel with minimum size #4 and maximum size between $\frac{3}{4}$ " and $1\frac{1}{2}$ ".
 - b). Fine Aggregate: Natural washed sand or hard, durable particles varying from fine particles passing $\frac{3}{8}$ " screen, of which at least 12% shall pass a 50 mesh screen.
 - c). Exposed Aggregate: Latimore concrete mix #3201 + 250 rock – 250 sand. 5 bag mix with native brown, 1" river rock.
 3. Type 'B' – RediMix: To order call (817) 835-4000.
 - a). Coarse Aggregate: RediMix Chatfield - $\frac{3}{8}$ " Pea Gravel.
 - b). Fine Aggregate: RediMix – concrete sand.
 - c). Exposed Aggregate: RediMix.
 - d). Additives: 322 N Water Reduce (3.00 fl. oz./100 lb.) and air entraining agent (0.25 fl. oz./lb.).
 4. Type 'C' – Light Brushed Gray Concrete: ASTM C150, Type 1.
 - a). Aggregates: ASTM C33. Refer to Portland Cement Concrete Paving (32 13 13).
 5. Compressive Strength: Not less than 3000 psi, or as specified, at 28 days after placement.
 6. Slump: not to exceed 4".
- E. Mixing water shall be potable.
- F. Admixtures
 1. The use of a super plasticizer is recommended, especially where waterproofing is required since it helps to produce a denser, more water-resistant concrete.
- G. Reinforcement
 1. Fabricate reinforcement to the required shapes and dimensions, with fabrication tolerances complying with the CRSI "Manual of Standard Practices." Comply with the following requirements:
 - a). Rebar: ASTM A615, Grade 60, unless otherwise shown on drawings. No. 3 rebar @ 18 O.C.E.W. will be used on all sidewalks.
 - b). Welded Wire Fabric: ASTM A185, in flat sheets only.
 - c). Bending: ACI 318
 - d). Dowels and Sleeves: Plain round bar dowels, conforming to reinforcing steel requirements coats with bituminous paint on one half of length. Provide sleeves where required, closed at one end, and allowing one inch movement at closed end.
- H. Water stops
 1. Water stops shall be manufactured with wire embedded in them in order to allow them to be tied off more securely during concrete placement.
 2. Spliced should be fused or "welded" in accordance with the material chosen and the manufacture's recommendations.
 3. Where "adhesive" or "rope" water stops are specified, the products shall have a proven life consistent with expected life of the structure being designed.

2.2 PROPORTIONING OF CONCRETE

- A. Select proportions of ingredients to produce a concrete having proper workability, durability, strength and appearance. Proportion ingredients to produce a mixture that will work readily into corners and angles of forms and around reinforcement by methods of placing and consolidation employed on the project.
- B. The maximum recommended allowable water/cement or water/cement-pozzolan ration shall not exceed 0.47.
- C. Air entrainment shall be 5% +/- 1%, unless required otherwise.

PART 3 – EXECUTION

3.1 SURFACE CONDITIONS

- A. Contractor shall examine areas and conditions under which this work will be provided and correct all conditions detrimental to the timely and proper completion of the work.
- B. Contractor shall not proceed with work until unsatisfactory conditions are corrected and approved by a UTA engineer or architect.

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3.2 RINSING TRUCKS

- A. Rinsing of transit mix trucks or other concrete mixing devices shall be off of the Owner's site. If rinsed in a contained area onsite, runoff must be prevented until concrete dries, at which time it must be removed as solid debris.

3.3 PLACEMENT OF BASE COURSE: SAND CUSHION

- A. A minimum of 4" of cushion sand shall be used beneath concrete sidewalks.
- B. Spread and compact specified sand cushion to a least 95% of Standard Proctor Maximum Dry Density.
- C. Use limited amounts of water, only as needed, to achieve the specified compaction.
- D. Correct deviations in the base course by removing materials, replacing with new materials, and reworking or compacting again as required.

3.4 CONSTRUCTION JOINTS

- A. Contractor responsible for developing a construction joint plan, to be approved by Engineer or Architect of Record, prior to construction.
- B. 100% of reinforcing shall be continuous across construction joints.

3.5 CONTROL JOINTS

- A. Control joints are herein described as joints that are designed to allow for movement either from contraction or expansion.
 - 1. Control joints should be placed at 10' spacing and around immovable objects.
- B. Contraction joints.
 - 1. 50% of reinforcing shall be continuous across contraction joints.
 - 2. If saw-cutting of contraction joints is allowed, the following shall be adhered to:
 - a). During hot and dry periods, saw-cutting should occur within 4 to 12 hours of concrete placement.
 - b). During cool and moist periods, saw-cutting should occur within 24 hours of concrete placement.
 - 3. Where applicable, use water stops to assure water-tightness.
- C. Expansion joints.
 - 1. Approved sealant shall be used as expansion joints.
 - 2. Expansion joints should be placed at 40' spacing and around immovable objects.
 - 3. Where applicable, use water stops to assure water-tightness.

3.6 INSTALLATION

- A. Upon completion of installation of base course and formwork, install reinforcement in middle of pavement thickness. Steel shall be free of rust, mill scale, dirt or oil.
- B. Transit mix concrete in accordance with ASTM C94. Do not use concrete that has stood over 30 minutes after leaving the mixer, or concrete that is not placed within 60 minutes after water is introduced into the mix.
- C. Place concrete in accordance with ACI 304.

3.7 PLACING AND FINISHING

- A. Placing: Deposit concrete so that specified thickness will be obtained after vibrating and finishing operations. Minimize handling to prevent segregation. Consolidate concrete by suitable means to prevent formation of voids or honeycombs. Exercise care to prevent disturbance of forms.
- B. Finishing: After consolidation and screening, float concrete level to within a tolerance of 1/4" in 10'. Use a straight edge to level and test surface in longitudinal direction to required grade. Cut down high spots and fill low spots.
 - 1. Medium Broom Finish: Draw a soft bristle broom across concrete surface perpendicular to line of traffic to provide a uniform line texture finish.
 - 2. Exposed Aggregate Finish: After completing float finish, uniformly spread 25 lbs. of dampened aggregate per 100 sq. ft. of surface.
 - 3. Pack aggregate flush with surface using a steel trowel, but do not force below surface. After curing, lightly work surface with a steel wire brush or an abrasive stone and water to expose aggregate.

3.8 CURING AND PROTECTION

- A. Apply membrane curing compound at a uniform rate of approximately 200 sq. ft. per gallon, or as recommended by manufacturer, as soon as finishing operation has been completed and concrete has lost its water sheen.
- B. Protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury for a

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period of 4 days after placing.

1. Cold weather temperature: conform to ACI 306.
 2. Hot weather temperature: conform to ACI 305.
 3. Spray concrete with water and wrap in plastic to contain water in the mix, if deemed necessary by Contractor.
- C. Do not allow pedestrians on concrete for a minimum period of 4 days after placing.

3.9 TESTING AND CONTROL

- A. The Contractor is responsible for preparing and testing the initial mix design for each class of concrete specified.
- B. The Contractor is also responsible for testing the mix design for each class of concrete for which the material source has been changed.
- C. Field test cylinders during construction
1. Mold four cylinders for each set of tests specified.
 2. Test 1 specimen at 7 days and 2 at 28 days, according to ASTM C39. If one or both of the 28-day tests indicate a compressive strength belowered the required strength, the fourth specimen shall be tested at 56 days.

3.10 NON-COMPLIANCE (TEST RESULTS)

- A. Should any of the tests indicate that concrete characteristics are not in compliance with these specifications, the burden of proof remains with the Contractor, subject to:
1. Contractor selection and submission of the laboratory for Owner acceptance.
 2. Acceptance by Owner of the quality and nature of tests.
- B. If tests confirm that the concrete characteristics comply with the specifications, the Owner will pay the cost of the test.
1. If tests reveal non-compliance, the Contractor will pay for the cost of that particular test and all future tests necessary to eventually confirm compliance with the required concrete specifications.
 2. Proof of noncompliance with these specifications will make the Contractor liable for any corrective action, including complete removal and replacement of concrete. In addition, all costs as a result of delays due to additional testing will be at the Contractor's expense, with no extension of contract length.

END OF SECTION