

SECTION 02520

MISCELLANEOUS SITE WORK CONCRETE

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. Provide concrete thrust blocks, pipe encasements, bollard and post anchors, fillets, fill concrete for drain structures, minor walkways, and any other miscellaneous concrete as shown on the Drawings or directed by the Landscape Architect.

1.2 QUALITY ASSURANCE

- A. Codes and Standards governing the use, handling and installation of miscellaneous concrete are as follows:
 - 1. ACI 301 Specifications for Structural Concrete for Buildings.
 - 2. ASTM C94 Specification for Ready-Mixed Concrete.
- B. Testing
 - 1. None required for Miscellaneous Concrete Fill. For walkways (if applicable), provide material certificates from the concrete supplier, in lieu of laboratory testing.

1.3 SUBMITTALS

- A. Submit name and location of concrete suppliers at least 7 days in advance of placement of thrust blocks.
- B. Materials Certifications may be required from the concrete supplier, in lieu of a formal design mix review.

PART 2 MATERIALS

2.1 GRAVEL SUBBASE

- A. Refer to Section 02200 - Earthwork or as indicated on the Drawings.

2.2 FORM MATERIALS

- A. Forms for thrust blocks may be of standard form materials or earth berm to provide proper thrust block thickness, depth, and surface bearing area.
- B. Forms for Exposed-Finish Concrete: Construct form work in accordance with ACI 347 "Recommended Practice for Concrete Form Work". For exposed concrete surfaces with plywood, metal or other acceptable panel type form materials, provide continuous, straight, smooth surfaces. Minimize the number or conform to joint systems shown on the Drawings.
- C. Form Coatings: Provide commercially formulated form-coating compounds that will not bond with, stain or physically change concrete surfaces, nor impair subsequent concrete surface treatments.

2.3 REINFORCING MATERIALS

- A. Fiber Reinforcement for walkways. The fibers shall be discontinuous discrete fibers made from steel, plastic, glass and other acceptable materials. Materials and applications shall conform to ACI 544.1R.
- B. Welded Wire Fabric: ANSI/ASTM A185 and AASHTO M55, welded steel wire fabric in the sizes and gages as shown on the Drawings.
- C. Bar Reinforcement: ASTM A615 and AASHTO M31, Grade 60, new deformed billet steel bars in the sizes as shown on the Drawings.
- D. Supports: Provide supports for reinforcement including bolsters, chairs, spacers and other required devices for spacing, supporting or fastening wire fabric in place.

~~E. Dowels: Stainless steel dowels and sleeves in sizes indicated on the Drawings.~~

2.4 CONCRETE MATERIALS

- A. Portland Cement shall be ANSI/ASTM C150, Type II, unless otherwise directed by the ENGINEER.
- B. Normal Weight aggregates complying with ANSI/ASTM C33 shall be provided. Local aggregates may be used providing their historic use indicates an adequate strength and durability when acceptable to the ENGINEER.
- C. Water used in concrete shall be potable water.
- D. Air-entraining admixture shall conform to ANSI/ASTM C260.
- E. Water Reducing Admixture shall conform to ANSI/ASTM C494, types A or E.
- F. Calcium Chloride shall not be permitted.
- G. Walkway Expansion Joint Material:
 - 1. The expansion/contraction joint shall be versatile, resilient, flexible, and non-extruding cellular fiber joint which is uniformly saturated with asphalt, has 1/2" thickness, and conforms to ASTM D1751 and AASHTO M213. Material shall be as manufactured by W.R. Meadows or approved equal.
- H. Walkway Expansion Joint Sealant Material:
 - 1. The expansion joint sealant shall be versatile, resilient, flexible, and extruding-type material as manufactured by Sika, W.R. Meadows, or approved equal and in a color to closely match the color of the concrete.

I. Dowels: Smooth stainless steel dowels and sleeves in sizes indicated on the Drawings.

2.5 PROPORTIONING OF MIXES

- A. Design mixes to provide normal weight concrete with the following properties:
 - 1. Miscellaneous Concrete shall have a minimum 28 day compressive strength of 3500 psi.
 - 2. Maximum water/cement ratio: 0.49
 - 3. Minimum cement content: 611 lbs/c.y.
 - 4. Slump: not less than 1", not more than 4"
 - 5. Slump w/ HRWR Admixture (if allowed): not more than 8"
 - 6. Maximum coarse aggregate size: 1"
 - 7. Air content: 5% + 1%, by volume.

- B. Walkway Concrete shall have a minimum 28 day compressive strength of 4000 psi.
 - 1. Maximum water/cement ratio: 0.40
 - 2. Minimum cement content: 660 lbs/c.y.
 - 3. Slump: not less than 2", not more than 4"
 - 4. Slump w/ HRWR Admixture (if allowed): not more than 8"
 - 5. Maximum coarse aggregate size: 1"
 - 6. Air content: 6% + 1%, by volume.

- C. Provide batch tickets for each batch discharged indicating project name, date, number, mix type and time, quantity and amount of water introduced.

- D. Adjustment to Concrete Mixtures: Mix design adjustments may be requested by the Contractor when material characteristics, job requirements, weather, test results, or other circumstances dictate; adjustments submitted and accepted by the Owner's Representative and/or Landscape Architect shall be accomplished at no additional cost to the Owner. Laboratory results of adjusted mixes must be submitted to, and accepted by the Owner's Representative and/or Landscape Architect before use in the Work.

2.6 CONCRETE MIXES

- A. Ready-mixed concrete: Truck-mixed concrete shall be batched, mixed and transported in accordance with ASTM C94.

- B. Truck mixes shall be capable of combining the ingredients into a thoroughly mixed, uniform mass within industry-specified times or revolutions per load. Concrete shall be centrally dry-batched with final truck mixing at the job site. Provide batch ticket with each batch discharges and accepted in the work. Indicate project name; job number; date; mix type and volume of water introduced. Batches not placed within one hour of batching time shall be rejected for placement.

- C. Job-site mixing: Mix materials for concrete in an appropriate drum-type batch machine mixer. Minimum mixing times for 1 cubic yard, or smaller shall be 1-1/2 minutes after initial mixing has become homogenous. For mixers of capacity greater than 1 cubic yard increase mixing beyond homogeneity by 15 seconds per fraction over 1 cubic yard.

- D. Clean up area with running water needed. Location to e approved by project manager.

PART 3 EXECUTION

3.1 SUBBASE

- A. Place ~~gravel-stone~~ subbase in accordance with Section 02200 - Earthwork and as indicated on the Drawings.

3.2 FORMS

- A. Place formwork to assure the proper surface bearing area for the soil encountered. Refer to the "Thrust Block Bearing Area" schedule shown on the Drawings.
- B. Design formwork to withstand the weight of concrete during preliminary curing period.

3.3 PLACING REINFORCEMENT

- A. Fiber reinforcement shall be furnished, in conjunction with welded wire fabric, for walkways and other applications approved by the OWNER. The fiber reinforcement shall be installed at 1.5 pounds per cubic yard of volume of concrete and in accordance with the fiber reinforcement manufacturer's installation recommendations.
- B. Comply with CRSI recommended practice for placing reinforcement steel, supports, and details.
- C. Clean all reinforcement of loose rust, mill scale, earth, ice, and any other materials which affect the bond with concrete.
- D. Accurately position, support or secure reinforcing steel against displacement by formwork, construction procedures, or concrete placement operations. Secure reinforcement with appropriate ties, metal chairs, bolsters, hangers, or spacers as required.
- E. Position reinforcement to obtain required coverages. Set wire ties with ends directed inward away from exterior concrete surfaces.
- F. Install welded wire fabric in lengths as long as practical and lap adjoining pieces minimum of two (2) full meshes. Lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in any direction. The welded wire fabric for walkways shall be held off the sub-base material with 1.5 inch cement brick spacers.
- G. Install stainless steel dowels and sleeves as indicated in the Drawings.

3.4 CONCRETE PLACEMENT

- A. Wrap fitting glands and bolts of underground pipe work with polyfilm to prevent concrete from adhering.
- B. Consolidate concrete by rodding or spading to prevent voids forming between concrete and undisturbed soils or fitting.
- C. Provide low-slump concrete for fillets and sloped inverts. Provide a wood float finish on all fillets.
- D. Provide expansion and control joints to Hanover, NH Standards. Expansion joints for walkways shall be placed at maximum intervals of twenty feet (~~30~~), unless otherwise directed by the Landscape Architect. The placement of walkways shall be performed in alternating sections with at least twenty-four (24) hours curing time between placing sections. In conjunction with the asphalt-impregnated fiber expansion joint material, a gray-colored extruding-type sealant shall also be placed along the surface of the expansion joint.
 - 1. *Construction joints shall have 18" long smooth stainless steel dowels, 9" penetration into each slab, 12" o/c, with dowels 6" in from each side.*
- E. Walkways shall have a light broom finish to provide a non-skid surface perpendicular to the normal pedestrian traffic flow. Handicap ramps shall receive a heavy broom finish to allow for better traction. The borders and control joints shall be a trowel finish border that are 1-1/2 inches wide or as shown on the Drawings.

3.5 CONCRETE CURING AND PROTECTION

- A. Comply with ACI 308. Protect freshly placed concrete from excessive cold or hot temperatures.
- B. Provide curing of thrust block concrete by prompt backfill after initial curing period, or as directed by the OWNER.
- C. All curing concrete shall have security for protection from destruction by vehicle and pedestrian traffic or vandals until the concrete has set-up.
- D. All walkways shall be water cured with burlap and soaker hoses for the first twenty-four (24) hours at a minimum. Curing compounds will only be allowed if previously authorized by the ENGINEER prior to placement.

3.6 DEFECTIVE WORK AND REMEDIES

- A. Any work which fails to comply with the requirements of this section, Chapters 17 and 18 of ACI 301, or the "Thrust Block Bearing Area" schedule shall not be accepted.
- B. Deficient work shall be removed and replaced at the CONTRACTOR's expense.

END OF SECTION 02520