

PART 1 GENERAL

1.01 GENERAL

- A. All concrete shall be installed using the materials as shown on the Drawings and as called for in these Specifications.

1.02 SCOPE OF WORK

- A. Furnish all material, equipment, labor, and related items necessary to complete the work shown on the Drawings and/or as specified in the Specifications. The items of work to be performed shall include but are not limited to:
  - 1. Subgrade preparation
  - 2. Concrete anchors as shown on the Drawings
  - 3. Concrete wall
  - 4. Concrete bench
  - 5. Extruded concrete curb

1.03 RELATED WORK DESCRIBED ELSEWHERE

- A. Related work in other sections of these Specifications includes but is not limited to:
  - 1. Site Preparation
  - 2. Grading, Embankment, and Backfill
  - 3. Site Improvements

1.04 QUALITY ASSURANCE

- A. Standard Specifications:
  - 1. Conform to State of Washington Standard Specifications for Road and Bridge Construction, Latest Edition
  - 2. Standard Specifications for Municipal Public Works Construction, APWA, Latest Edition
  - 3. Concrete Reinforcing Steel Institute, "Manual of Standard Practice"
  - 4. Comply with building code and other local requirements, which are more stringent than the above.
- B. The Contractor shall establish all necessary elevations and grade stakes to provide a smooth and even surface. The Contractor shall immediately notify the Landscape Architect of any discrepancy of line and level. The Landscape Architect reserves the right to make minor changes in line or level to suit existing or developed conditions at no additional cost to the Owner.

1.05 SUBMITTALS

- A. Submit for review and approval, prior to placing concrete, a materials list naming manufacturer of cement and admixture proposed to be used and percentages incorporated into the mix.
- B. Provide shop drawings where noted on Drawings for Landscape Architect review and approval prior to construction.

1.06 ENVIRONMENTAL

- A. Concrete placement in cold weather, forty (40) degrees Fahrenheit or less, will be permitted only under conditions which shall meet the approval of the Landscape Architect, and the concrete in place shall receive special protection. In general, cold weather placing shall conform to ACI 306-66 (Recommended Practice for Cold Weather Concreting). Salts, chemical or other foreign materials shall not be mixed with the concrete to prevent freezing, unless such use is authorized by the Landscape Architect in writing.

1.07 PROTECTION

- A. Protect new concrete work from damage by construction traffic or equipment by covering with paper, cardboard or plywood as circumstances require.

1.08 GUARANTEE

- A. Any settlement in areas paved with concrete which may occur within the one (1) year guarantee period will be considered to be caused by improper compaction methods and shall be corrected at no cost to the Owner.
- B. Repair any damage caused by the settlement at no cost to the Owner.

PART 2 PRODUCTS

2.01 FORMWORK

- A. Forms shall be of steel, wood, or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects. Coat forms with a non-staining form release agent that will not discolor or deface surface of concrete or prevent subsequent application of concrete coatings.
- B. Materials selected shall offer optimum smooth, stain-free final appearance and minimum number of joints. Provide materials with sufficient strength to resist hydrostatic head without bow or deflection in excess of allowable tolerances.
- C. Overlaid Plywood: PS-1, "B-B High-Density Concrete Form Overlay", Class 1; or approved equal

PROJECT NAME  
BELLINGHAM, WASHINGTON

CAST-IN-PLACE  
CONCRETE  
SECTION 03300

- D. Snap Ties: Burke Concrete Accessories "Super-Tie", or approved equal. Standard snap tie assembly consisting of high-strength wire with flattened breakoffs; the portion of tie remaining within concrete shall leave no metal with one (1) inch of concrete surface.
- A. Cones: Plastic bond-free finish; tapered from one (1) inch to three-eighth (3/8) inch diameter.

## 2.02 CONCRETE

- A. Unless otherwise noted, cement shall be standard brand Portland Cement ASTM C 150, Type I. All cement to be of same brand with no interchanging of types.
- B. Concrete aggregates shall conform to the requirements of the Standard Specifications, APWA. Maximum size to be three-fourth (3/4) inch.
- C. Water used in the concrete mix shall be clear and free from injurious amounts of oil, salts, acid, alkali, organic matter or other deleterious substances.
- D. Concrete bonding agent shall be Grace Darwald, Larson Products, Weldcrete, Sonneborn, Sonobond or approved equal. Apply in accordance with manufacturer's written instructions.
- E. Curing agent shall be Grace "Harnoure," Sonneborn "Kure-N-Seal, Sike Grand "RH," or approved equal. Apply in accordance with manufacturer's written instruction.
- F. The concrete mix design for extruded cement concrete curb shall be ASTM C94, Type 1-2 Portland Cement, building sand aggregate curb mix.
- G. Air-entraining admixture shall meet the requirements of AASHTO M 154.

Chemical admixtures for concrete shall conform to the requirements of AASHTO M 194, Type A, B, or D. Chemical admixtures containing more than one (1) percent chloride ion (C1-) by weight shall not be used.

Acceptance for air entraining or chemical admixture will be based on the Manufacturer's Certification of Compliance.

If required by the Landscape Architect, the air-entraining or chemical admixture shall be sampled and tested by the Materials Laboratory before use.

## 2.04 REINFORCING MATERIALS

- A. Steel reinforcing bars shall be Number Four (4) bar, free from rust, dirt, grease and other defects affecting the strength or bond with the concrete.
- B. Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars in place. Use wire bar type supports complying with CRSI recommendations, unless otherwise acceptable.

## 2.05 WIRE MESH

PROJECT NAME  
BELLINGHAM, WASHINGTON

CAST-IN-PLACE  
CONCRETE  
SECTION 03300

- A. ASTM A 185 specification for welded wire fabric. 6" x 6", No. 10 wire, unless otherwise noted.

2.06 TIE WIRE

- A. No. 16-gauge double annealed wire. Provide galvanized wire for exposed concrete.

2.07 EXPANSION JOINTS

- A. Pre-molded expansion joint filler shall be one-half (1/2) inch thick felt of sufficient size to cover the full depth of the concrete section, of the non-extruding type.
- B. Joint sealant for concrete shall be a gun grade, two component, Class A, Type II sealant complying with Federal Specification TT-S-00227E, color: black.

2.08 MANUFACTURER'S DATA

- A. Submit manufacturer's product data with installation instructions for proprietary materials, including reinforcement and forming accessories, admixtures, joint materials, hardeners, curing materials and others for Landscape Architect approval.

2.09 DOWEL JOINT

- A. "Dayton Superior", D-15 Paper Tubing, No. 3 for one-half (1/2) inch rod.

2.10 CRUSHED GRAVEL BASE

- A. Crushed gravel base shall be five-eighths (5/8) inch minus, and shall meet the requirements of the Standard Specifications. Provide thickness as shown on the Drawings.

2.11 SKATE BARRIER

- 2.12 Skate deterrent shall be Brass Flat Bar with 3/4" to 1" bevel: "FB1.OB" with 5/8" Dia A307 Galvanized post-installed anchor bolt with counter sunk bolt head, 4" embedment, as manufactured by Ravensforge, or approved equal, and approved by sales@skateabate.com, phone: (619) 218-1343. The anchor bolt shall be secured using an epoxy injection adhesive by Hilti or equivalent. The entire backing of the flat bar shall also be epoxied to the concrete surface. The contractor shall provide shop drawings showing all details before installation. STEEL PIPE

- A. Steel pipe shall be 2" inside diameter schedule 40 galvanized steel pipe with 3/8" x 6" long j-bolts welded to pipe at 12" on-center.

2.13 SEALER

- A. L&M Construction Chemicals, SILOSEAL, or approved equal. Sealer shall not discolor concrete.

### PART 3 EXECUTION

#### 3.01 SUBGRADE

- A. Subgrades for all concrete work shall be constructed to the grade and cross-section as shown on the Drawings. All soft and spongy material shall be removed to a depth of not less than six (6) inches below subgrade. All subgrades shall be de-watered or dried as necessary and compacted as specified for fills within Section 02320 Grading, Embankment, and Backfill. The compaction shall be completed before any forms are constructed.

#### 3.02 FORMWORK

- A. The Contractor is responsible for design, engineering and construction of formwork, and for its timely removal. Design and fabricate forms for easy removal without impact, shock, or damage to concrete surfaces or other portions of the work. Design to support all applied loads until concrete is adequately cured within allowable tolerances and deflection limits.
- B. Construct and brace formwork to accurately achieve end results required by contract documents, with all elements properly located and free of distortion. Provide for necessary openings, inserts, anchorages and other features shown or otherwise required.
- C. All forms shall be smooth, mortar-tight and true to the required lines, grades and dimension, of sufficient strength to resist springing out of shape during the placement of concrete, and shall have a smooth, straight upper edge. All dirt, chips, sawdust, and other debris shall be removed from the forms before any concrete is deposited therein. Forms previously used shall be thoroughly cleaned of all dirt, mortar, and foreign matter before being reused.
- D. Forms shall be held rigidly in place by steel stakes placed at intervals not to exceed four feet. Clamps, spreaders, and braces shall be used where required to insure rigidity of the forms.
- E. Apply form release agents or wet forms as required. Re-tighten forms during concrete placement, if required, to eliminate mortar leaks.
- F. Tolerances for Formed Surfaces: Comply with minimum tolerances established in ACI 117, unless more stringent requirements are indicated on the drawings.
- G. Release Agent: Provide either form materials with factory-applied nonabsorptive liner or field-applied for coating. If field-applied coating is employed, thoroughly clean and recondition formwork and reapply coating before each use. Rust on form surfaces is unacceptable.

#### 3.03 EXPANSION/CONTROL JOINTS AND SCREEDS

- A. Expansion joints shall be constructed as shown on the Drawings. Expansion joint filler shall be shaped to fit the entire concrete section of the respective application.

- B. Control joints, cold joints and screeds shall be constructed as shown on the Drawings. Other joints and screeds, if necessary and not specified herein, shall be placed only at locations approved by Landscape Architect.

### 3.04 REINFORCEMENT

- A. Install reinforcement in as long lengths as practicable. Lap adjoining pieces at least twelve (12) inches, securely tie with wire and support at the proper elevation by suitable chairs or concrete "dobie" blocks. Off-set and lap in adjacent width, to prevent continuous laps in either direction.
- B. Position, support and secure reinforcement against displacement. Locate and support with metal chairs, runners, bolsters, spacers and hangers as required. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

### 3.05 CONCRETE

#### A. Ready-mixed Concrete

- 1. Ready-mixed concrete shall be batched at a central batching plant and transit-mixed in truck mixers, in accordance with the requirements of the Standard Specifications, APWA. Batching weight of all ingredients per cubic yard shall be furnished by the Contractor to the Landscape Architect when so requested.

#### B. Embedded Items

- 1. Set and build into work anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting diagrams, templates and instructions provided by others for locating and setting.

#### C. Job-Mixed Concrete

- 1. Any concrete mixed at the job site shall be mixed in a power operated, rotary batch mixer, with hoppers and controls permitted accurate measurement by weight of all materials. All such equipment and procedures shall be subject to the approval of the Landscape Architect.

#### D. Concrete Quality

- 1. Concrete shall be of a consistency suitable for satisfactory placing with reasonable amount of vibration and spading.

Comply with the following:

COMPRESSIVE STRENGTH - 3,000 PSI, MINIMUM AT 28 DAYS.

SLUMP RANGE - Two (2) to four (4) inches.

#### E. Placing Concrete

1. Concrete shall be deposited as nearly as practicable in its final position, to avoid rehandling and flowing. It shall be deposited in uniform horizontal layers, avoiding inclined planes; and each layer shall be placed before the previous layer has taken its initial set. Concrete shall be compacted as it is placed, to obtain maximum density and to eliminate voids and rock pockets, by means of hand spading, rodding, and tamping as required. No water may be added during placement or finishing.

F. Concrete Curing

1. All concrete shall be cured for at least seven (7) days after placing. Curing shall be accomplished by applying a membrane curing compound as required. Mix and apply material in accordance with manufacturer's recommendation. Provide protection as required to prevent damage to exposed concrete surfaces.

G. Concrete Bond

1. Where patching or joining new concrete with hardened concrete (joints must be approved) coat hardened surfaces with concrete bonding agent. Mix and apply material in accordance with manufacturer's recommendations.

3.06 CONCRETE FINISHING

- A. After striking-off and consolidating concrete, smooth surface by screeding and floating. Adjust floating to compact surface and produce uniform texture. After floating test surface for trueness of grade and line. Distribute concrete as required to remove surface irregularities and refloat repaired areas to provide a continuous smooth finish. Work edges of slab and formed joints with an edging tool and round to one-half (1/2) inch radius unless otherwise indicated.
- B. After completion of floating and when excess moisture of surface sheen has disappeared, exposed surfaces shall be uniform in appearance and finished to a smooth form finish, such that the exposed face is free of any architectural finish, including wood grain from plywood formwork.
- C. Do not remove forms for twenty-four (24) hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by the Landscape Architect.
- D. Do not remove ties for four (4) days after concrete has been placed.

3.07 SKATE BARRIER

- A. Install per manufacturer's recommendations in locations shown on Drawings.

3.08 STEEL PIPE

- A. Install per manufacturer's recommendations in locations shown on Drawings.

3.09 SEALER

- A. Install per manufacturer's recommendations.

### 3.10 REPAIRS AND PROTECTIONS

- A. Repair formed surfaces by removing minor honeycombs, pits greater than 1-square inch surface area or 0.25-inch maximum depth or otherwise defective areas. Provide edges perpendicular to the surface and patch with nonshrink grout. Patch defects when the forms are removed. Concrete with extensive honeycomb, including exposed entrapped debris, separated aggregate, or other defects which affect the serviceability, structural strength or aesthetics as determined by the Landscape Architect, will be rejected, unless correction of defects is approved. Obtain approval of corrective action prior to repair. The surface of the concrete shall not vary more than the allowable tolerances of ACI 347R.
- B. Protect concrete from damage, graffiti, stains and all other foreign de-facing materials until final acceptance of work.
- C. Sweep concrete pavement and wash free of stains, discolorations, dirt and other foreign material just prior to final inspection.

END OF SECTION