

SECTION 034800
PRECAST CONCRETE SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Fabrication of Precast Concrete Furnishings **and Precast Tile. (Addendum 03)**
 - 2. Placement of Precast Concrete Furnishings **and Precast Tile. (Addendum 03)**
- B. For Site Concrete Water Repellants, see Section 070921.
- C. For Site Concrete, see Section 321316.
- D. For Site Concrete Sealants, see Section 321373.
- E. For Site Furnishings, see Section 323000.
- F. For Sustainable Design Requirements, see Section 018113.

1.2 DEFINITIONS

- A. Acceptance: Wherever the terms “acceptance” or “accepted” are used herein, they mean acceptance of Owner’s representative in writing.

1.3 REFERENCES

- A. ASTM — American Society for Testing and Materials:
 - 1. A 185/A185M — Specification for Steel Welded Wire, Fabric, Plain, for Concrete Reinforcement. Most current edition.
 - 2. A 615/A615M — Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement. Most current edition.
 - 3. C 33 — Specification for Concrete Aggregates. Most current edition.
 - 4. C 140 — Method of Sampling and Testing Concrete Masonry Units. Most current edition.
 - 5. C 150 — Specification for Portland Cement. Most current edition.
 - 6. C 330 — Specification for Lightweight Aggregates for Structural Concrete. Most current edition.
 - 7. C 979 — Specification for Pigments for Integrally Colored Concrete. Most current edition.
 - 8. C 1116 — Specification for Fiber-Reinforced Concrete and Shotcrete. Most current edition.
 - 9. D 2000 — Classification System for Rubber Products in Automotive Applications. Most current edition.

1.4 SUBMITTALS

- A. Product Data:
 - 1. Color admixtures.
 - 2. Micro-reinforcement.
 - 3. Form material for exposed surfaces.

- B. Samples:
 - 1. Samples for each type of finish indicated on exposed surfaces of precast architectural concrete units, in sets of 3, illustrating full range of finish, color, and texture variations expected per specified size.
 - 2. Six-inch × six-inch finish and color sample of exposed surfaces of planter wall unit.
 - 3. 3' long × 1.5' tall x 2' wide three-sided unit of precast planter wall. Unit sample shall include accepted finish, color, faceted side, edges and one faceted top transition.
 - 4. Three-inch length of grout.
 - 5. Three-inch length of sealant.

- C. Proof of Work Experience:
 - 1. Precast Manufacturer: Submit project lists, including reference names, phone numbers and project dates.

- D. Certificates of Conformance or Compliance: Submit proofs of conformance or compliance for the following:
 - 1. Glass Fibers: Submit evidence that glass composition and Portland cement matrix have been designed for GFRC applications.

- E. Styrofoam Field Sample:

- F. Shop Drawings:
 - 1. Detail fabrication and installation of precast architectural concrete units. Indicate member locations, plans, elevations, dimensions, shapes, cross sections, limits of each finish, edge radii and types of reinforcement, including special reinforcement.
 - a. Indicate locations and extent and treatment of dry joints if two-stage casting is proposed.
 - b. Indicate welded connections by AWS standard symbols. Detail loose and cast-in hardware, inserts, connections, and joints, including accessories.
 - c. Indicate locations and details of anchorage devices to be embedded in other construction.
 - d. Comprehensive engineering analysis signed and sealed by the qualified professional engineer responsible for its preparation.

- G. Field Samples:
 - 1. Full scale Styrofoam field sample of each site furnishing element. Upon review of Styrofoam mock-ups, adjust form, if required, to achieve acceptable form.
 - 2. Full scale Precast field sample: Construct one full size segment of planter wall.
 - a. Include specified joints and three sloped tops of planter wall.
 - b. Construct as many samples as necessary to achieve an accepted sample.
 - c. Samples which are partially constructed or finished incorrectly will be rejected.

- d. Remove rejected samples immediately from the site.
- e. Place accepted samples in a location where samples can be referenced.
- f. Accepted sample shall become the project standard for tolerances and appearance.
- g. In presence of Architect, damage part of an exposed face for each finish, color and texture, and demonstrate materials and techniques proposed for repairs to match adjacent undamaged surfaces.

H. Test Results:

1. Concrete Cylinder Tests.

I. LEED Submittals:

1. Complete the LEED Material Buyout Form (MBoF) with all materials provided to the project. A complete submittal includes providing all material costs in the MBoF and all of the supporting documentation for the following credits:
 - MRc3 - Sourcing of Raw Materials - Recycled Content: Provide product data for pre- and post- consumer recycled content.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Established international reputation having work similar to that specified, in use for a minimum of 10 years.
2. Shop shall have proper equipment for Work specified, including application of finish.
3. Fabricators and finishers shall be recognized experts in the Work they are engaged to perform.
4. Meet requirements of applicable laws, codes, and regulations required by authorities having jurisdiction over such Work.
5. Provide for inspections and permits required by federal, state and local authorities in furnishing, transporting, and installing materials.
6. Firm presently specializing in the manufacture of the type product shown on the Drawings.
7. Assumes responsibility for engineering precast architectural concrete units to comply with performance requirements. This responsibility includes preparation of Shop Drawings (optional- comprehensive engineering analysis by a qualified professional engineer- if determined as being a requirement)
8. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of precast architectural concrete that are similar to those indicated for this Project in material, design, and extent.
9. Has a quality control program that is comparable to APA or PCI that is certified by a professional engineer. Must submit program with bid.
10. Has sufficient production capacity to produce required units without delaying the Work.
11. Is registered with and approved by authorities having jurisdiction.
12. Fabricator must manufacture product within 500 miles of project site.

13. Must have a qualified sales person located within 50 miles of the project site.
14. All product to be entirely sourced and manufactured in USA.
15. Manufacture to provide history of product still in use by municipality for 10 consecutive years.

B. Regulatory Requirements: Meet requirements of applicable laws, codes, and regulations required by authorities having jurisdiction over Work.

1.6 DELIVERY, STORAGE AND HANDLING

A. Loading and Shipment:

1. Carefully pack the units for shipment free from stains and other deleterious material.
2. Exercise precautions against damage in transit.

B. Storage:

1. Store units on non-staining wood skids or pallets at least four inches above grade.
2. Place and stack skids and units to distribute weight evenly and to prevent breakage or cracking.
3. Protect and store units from weather and soiling with waterproof non-staining covers or enclosure, but allow air to circulate around units.

C. Handling:

1. Handle units to prevent chipping, breakage, soiling or other damage.
2. Do not use pinch or wrecking bars without protecting edges of units with wood or other rigid materials.
3. Lifts with wide-belt type slings wherever possible.
4. Do not use wire rope or ropes containing tar or other substances which might cause staining.
5. If required, use wood rollers and provide cushion at end of wood slides.

D. Sequencing:

1. Furnish anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, templates, instructions, and directions, as required for installation.

1.7 WARRANTY

A. General Description:

1. In addition to manufacturer's guarantees or warranties, Work shall be warranted for one year from the date of Final Completion against defects in materials and workmanship.

B. Other Items Covered:

1. Warranty shall cover repair of damage to any materials and workmanship resulting from defects in precast concrete specialty materials and workmanship.

C. Exceptions:

1. Contractor shall not be held responsible for failures due to neglect by Owner, vandalism and other causes outside the Contractor's control.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Precast Work:
 1. QCP – qcp-corp.com/.
 2. Or accepted equal.
- B. Micro-Reinforcement:
 1. Nycon, Inc. – www.nycon.com.
 2. Or accepted equal.
- C. Coloring Admixture:
 1. **QCP qcp-corp.com/** ~~L.M. Scofield Company www.scofield.com~~ **(Addendum 03)**
 2. ~~Shaw & Sons www.shawconstruction.com/~~ **(Addendum 03)**
 3. Or accepted equal.
- D. Anchor Bolts, Nuts, Washers and Adhesive:
 1. Hilti Corp. – www.us.hilti.com.
 2. Or accepted equal.
- E. Shims:
 1. Williams Products, Inc. – www.williamsproducts.net.
 2. Or accepted equal.
- F. Form Sealer:
 1. Nox-Crete – www.noxcrete.com.
 2. Or accepted equal.
- G. Form Release Agent:
 1. Nox-Crete – www.noxcrete.com.
 2. Or accepted equal.

2.2 MATERIALS

- A. Mix:
 1. Material: SRC / Low-Carbon Precast Concrete Mix
 2. Color: Mission White
 3. Finish: ~~Lt Polish~~ **Light Honed (Addendum 03)**
 4. Sealer: 4200 Anti-graffiti Sealer

- B. Cement:
 - 1. ASTM C 150, Type I (white) Portland Cement.
- C. Aggregate for Regular Weight Concrete:
 - 1. ASTM C 33, with 3/4-inch maximum size.
- D. Reinforcing Bars:
 - 1. ASTM A 615, grade 40, galvanized, deformed billet-steel bars, clean and free from rust, scale, or coating that will reduce bond.
- E. Welded Wire Fabric:
 - 1. ASTM A 185.
- F. Water:
 - 1. Clean, potable, concrete mixing water free from injurious amounts of salts, oils, acids, alkalis, organic materials or other deleterious substances which could cause staining.
- ~~G. Coloring Admixtures for Colored Concrete: (**Addendum 03**)~~
 - ~~1. ASTM C 979, Scofield Chromix Admixture, color to match accepted sample for architectural concrete. (**Addendum 03**)~~
- H. Anchor Bolts, Nuts, Washers and Adhesive:
 - 1. Stainless steel bolts, nuts and washers with structural adhesive anchor systems; Hilti HVA/HAS-SS, or accepted substitute.
- I. Shims:
 - 1. ASTM D 2000, neoprene rubber; 80 – 90 pounds per cubic foot density, minus 40 to plus 200 degrees Fahrenheit temperature resistance, thickness as required to shim.
- J. Micro-Reinforcement:
 - 1. ASTM C 1116, 100-percent nylon.
- K. Forming Material:
 - 1. MDO or HDO composite overlaid plywood for face forms.
 - 2. Synthetic Polyethylene or milled wood for reveals and corner forms.
- L. Form Release Agent: Non-staining material, VOC compliant in California.
- M. Form Sealer: Nox-Crete Pre-Form transparent, penetrating polyurethane wood sealer.

2.3 GROUT MATERIALS

- A. Sand-Cement Grout: Portland cement, ASTM C 150, Type I, and clean, natural sand, ASTM C 144. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

2.4 MIXES

- A. Concrete Mix:
 - 1. Minimum Compressive Strength at 28 Days: 5,000 pounds per square inch, as determined by ASTM C 140.
 - 2. Absorption: Five percent (5%) maximum, as determined by ASTM C 140.
 - 3. Coloring Agent: Achieve color by integrally mixing color admixture with concrete, as specified by the color admixture manufacturer's current printed instructions.
 - 4. Micro-Reinforcement: Incorporate into mix as specified by the manufacturer's current printed instructions.

2.5 FABRICATING

- A. Proportioning and Mixing:
 - 1. Carefully measure mix constituents in a manner to achieve the desired mix proportions.
 - 2. Meter the glass fiber and cement slurry to the spray head at rates to achieve the desired mix proportion and glass content. Check rates in accordance with standard procedures described in PCI.
- B. Hand Spray Application:
 - 1. Spray apply a mist coat consisting of the matrix without fiber. Apply this coating not to exceed 1/32 inch thick in order to avoid an un-reinforced surface.
 - 2. Spray-up main body of material before the mist coat has set.
 - 3. Apply by spraying such that uniform thickness and distribution of glass fiber and cement matrix is achieved during the application process.
 - 4. Consolidate by rolling or such other techniques as necessary to achieve complete encapsulation of fibers and compaction.
 - 5. Control thickness by using a pin gauge or other accepted method. Perform a minimum of 2 measurements per 5 square feet of surface with at least 3 measurements per element.
- C. Forming & Molds:
 - 1. Select mold material to provide a finish matching the accepted sample.
 - 2. Cast elements in molds of rigid construction, accurate in detail with precise corners and arises, and so designed as to provide a close control of dimensions and details as indicated on the accepted Shop Drawings.
 - 3. Prior to casting of pre-cast elements, fill, grind, file and straighten mold surfaces to provide a finished concrete surface that is smooth, dense and free of honey-combing, air pockets, offsets, sinkages, joint marks and other irregularities.

4. Form exposed corners to produce square smooth, solid unbroken lines, unless indicated otherwise.
5. Provide recesses and openings as shown on the accepted Shop Drawings.
6. After forms have been placed in final position, seal forming members and corner/reveal members. Apply in two coats, wet-on-wet, and according to manufacturer's current directions.

D. Casting:

1. Cast concrete using methods and equipment that meet requirements of industry standards for this type of Work.
2. Perform Work at manufacturer's plant only.
3. Handle concrete to prevent segregation of materials, and vibrate either internally or externally, to achieve proper compaction, finish and distribution of concrete.
4. Take precautions to keep the reinforcing steel in the proper location during placing and consolidation of the concrete.
5. Accurately place embedded items and maintain them in their proper location during the casting operation.

E. Dimensional Tolerances:

1. Height and Width: Plus or minus 1/8 inch.
2. Thickness: Plus or minus 1/8 inch.

F. Color:

1. Color to match accepted submittal.

G. Finish:

1. ~~Polished~~ **Light Honed** finish to match accepted submittal. (**Addendum 03**)

H. Anti-Graffiti Coating

1. To match accepted submittal.

I. Curing:

1. Meet requirements of industry standards for this type of work.
2. Do not remove elements from the molds until they have reached a compressive strength of 2,000 pounds per square inch.

2.6 LEED REQUIREMENTS:

- A. IW/PS EPD: Products specified under this section must have either a Type III Product Specific EPD or the company must be listed in the industry group responsible for the Industry Wide Externally Verified EPD.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. Examine site and verify that conditions are suitable to receive Work and that no defects or errors are present which would cause defective installation of products or cause latent defects in workmanship and function.

B. Notification of Unsuitable Conditions:

1. Before proceeding with Work, notify Owner and Owner's representative in writing of unsuitable conditions.

3.2 PREPARATION

A. Protection:

1. Use every possible precaution to prevent damage to existing conditions to remain such as structures, utilities, irrigation systems, plant materials and paving on or adjacent to the site of the Work.
2. Provide barricades, fences or other barriers as necessary to protect existing conditions to remain from damage during construction.
3. Do not store materials or equipment, permit burning, or operate or park equipment under the branches of existing plants to remain.
4. Submit written notification of damaged plants and structures.

3.3 INSTALLATION

A. Location:

1. Install at locations shown on Drawings.

B. Anchorage:

1. Shim to level and anchor in place as shown on Drawings.

3.4 FIELD QUALITY CONTROL

A. Field Observation Reviews by Owner's representative:

1. Coordinate and schedule with Owner's representative.

3.5 REPAIRS

- #### A. Repair exposed exterior surfaces of precast architectural concrete units to match color, texture, and uniformity of surrounding precast architectural concrete if permitted by Architect.

- #### B. Remove and replace damaged precast architectural concrete units if repairs do not comply with requirements.

3.6 CLEANING

- A. Precast Concrete:
 - 1. Meet requirements of manufacturer's current printed instructions.
 - 2. Clean and keep clean until Final Completion.

3.7 PROTECTION

- A. Barricades and Coverings:
 - 1. Install hazard barricades and 3/4-inch plywood covers to protect Work against damage, defacement and staining during subsequent construction operations until Final Completion.

END OF SECTION