

SNYDER & ASSOCIATES

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LETTER OF TRANSMITTAL

DATE: June 8, 2016
TO: All Prospective Bidders
FROM: Randy Mendenhall, P.E.
RE: Rock Port Downtown Streetscape Phase III – Rock Port, MO
TAP-9900(119)
Addendum No. 1

CONTENT: The following is Addendum No. 1 for the above reference project. **Please complete the confirmation portion from this addendum and fax it back to our office at (816) 364-6086 or scan and email to akatakis@snyder-associates.com** to ensure that you have received the addendum.

**CONFIRMATION OF RECEIPT
ADDENDUM NO. 1**

This is to confirm that we did receive Addendum No. 1 for the above
referenced project on this _____ day of _____, 2016.

Company: _____

By: _____

Addendum No. 1

**Rock Port Downtown Streetscape Phase III
Rock Port, Missouri**

All Prospective Bidders:

The contract documents are hereby amended in the following particulars only. All other terms and conditions remain unchanged.

A. TECHNICAL SPECIFICATIONS: The following technical specifications sections shall be added to the contract documents.

- 02060 – Site Demolition
- 03100 – Concrete Formwork
- 03300 – Cast in Place Concrete
- 03360 – Integrally Colored Concrete
- 03370 – Concrete Curing & Sealing
- 16500 – Electrical

The above interpretations and alterations are hereby made a part of the contract documents and supersede all other addenda or interpretations.

Issued this Sixteenth (8th) day of June, 2016.

SNYDER & ASSOCIATES



Randy Mendenhall, P.E.



MoDOT

SECTION 02060 - SITE DEMOLITION

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Demolish pavements, walls, steps, footings, and structures as indicated on plans.
- B. Remove materials and structures from site.
- C. Cap and identify active utilities.
- D. Remove utilities as indicated on site plans.

1.02 SUBMITTALS

- A. Permits and notices authorizing site demolition for transport and disposal of debris if required by local authorities.
- B. Certificates of Severance of Utility Services.
- C. Demolition procedures and operational sequence for review and acceptance by Owner.

1.03 PROTECTION

- A. Maintain free and safe passage to and from businesses and residences.
- B. Prevent movement or settlement of adjacent structures. Provide and place bracing or shoring and be responsible for safety and support of structure. Assume liability for such movement, settlement, damage, or injury.
- C. Cease operations and notify Owner immediately if safety of adjacent structure appears to be endangered. Take precautions to properly support structure. Do not resume operations until safety is restored.
- D. Prevent movement, settlement, or collapse of adjacent services, sidewalks, driveways, and structures. Assume liability for such movement, settlement, or collapse. Promptly repair damage at no cost to the Owner.
- E. Provide, erect, and maintain street boarding, barricades, lighting, and guardrails as required to protect general public, workers, and adjoining property.
- F. Protect existing sidewalks, drives, curbs, utilities, buildings, and other features to remain as shown on plans.
- G. Locate all existing active utility lines, which are to remain, transversing the work area and determine the requirements for their protection.
- H. Verify hauling routes of debris hauling trucks with the Owner.

1.04 EXISTING SERVICES

- A. Arrange and pay for disconnecting, removing, capping and/or plugging utility services as noted on drawings. Disconnect and stub off. Notify the affected utility company in advance and obtain approval before starting this work.
- B. Manholes, utility stop boxes, fire hydrants, utility vents, and power and light poles, occurring in walks, alleys, or pavement that are required to remain in service, shall be left intact and the sidewalk or pavement removed from around them. The Contractor shall exercise extreme care and caution and will become liable for any damages to the existing utilities regardless of their location.

1.05 MAINTAINING TRAFFIC

- A. Maintain pedestrian traffic into all businesses and residences. Construct temporary ramps as required to provide access.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Except where noted otherwise, maintain possession of materials being demolished. Immediately remove from site.

2.02 FILL MATERIALS

- A. Fill material used beneath the sidewalk and pavement areas are to be brought up to the proposed grades and shall be approved by the Owner prior to delivery to site.
- B. Compacted Granular Fill: Shall be MoDOT Type I Base Rock. Place and compact material in continuous layers not exceeding 6" depth. Each lift shall achieve 95% compaction.
- C. Topsoil: Earth free of debris, rocks larger than three inches (3"), roots, or frozen matter, and shall be approved by Engineer prior to delivery site.

PART 3 - EXECUTION

3.01 DEMOLITION

- A. Work with pneumatic or vibratory tools will generally be permitted. Use of explosives will not be permitted.
- B. Completely demolish structure and appurtenances in an orderly and careful manner. Remove all materials from site.
- C. Provide protection to the public, workmen, and adjacent properties from debris and operating equipment adjacent to structures under demolition. Warning signs and lights

shall be placed at night at locations where the public is exposed to danger. Maintain continuously during the period that danger to the public exists.

- D. Completely remove from the site all foundations, footings, slabs, curbs, existing fill materials, sidewalks, and paving within the area of work to the extent required by the drawings.
- E. Remove existing utilities indicated on drawings.
- F. Perform demolition in accordance with applicable authorities having jurisdiction.
- G. Repair demolition performed in excess of that required at no cost to the Owner.

3.02 BACKFILLING

- A. Ensure areas to be backfilled are free from debris and water.
- B. Compact existing subgrade surfaces if densities are not equal to that required for backfill materials.
- C. Cut out soft areas of existing subgrade. Backfill with cohesive material and compact to required density.
- D. Backfill areas to grades, contours, levels, and elevations as shown on plans.
- E. Backfill systematically and as early as possible to allow maximum time for natural settlement and compaction.
- F. Place and compact fill materials in continuous 6" depth layers. Use a method so as not to disturb or damage structure.
- G. Compacted MoDOT Type I base rock shall be used as backfill beneath all paved areas.

3.03 SCHEDULE OF BACK FILL DENSITIES

- A. Topsoil fill, each lift compacted to 80 percent.
- B. Granular fill, each lift compacted to 95 percent.

3.04 REPAIR

- A. Repair damage to adjacent structure caused as the result of this work.

3.05 CLEANING

- A. All public streets and walks shall be kept free of debris and washed down as required to remove mud, soil, and dust on streets that result from tucking at points of site access.
- B. Wet down dry materials and rubbish to lay dust.

- C. Leave site free of any vertical objects projecting above grade inside the bounded area enclosed by the surrounding site fence.

END OF SECTION 02060

SECTION 03100 - CONCRETE FORMWORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.
- B. Openings for other work.
- C. Form accessories.
- D. Form stripping.

1.02 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

- A. Section 03300 - Cast-In-Place Concrete: Supply of concrete accessories for placement by this section.

1.01 RELATED SECTIONS

- A. Section 03200 - Concrete Reinforcement.
- B. Section 03300 - Cast-in-Place Concrete.

1.02 REFERENCES

- A. ACI 301 - Structural Concrete for Buildings.
- B. ACI 318 - Building Code Requirements for Reinforced Concrete.
- C. ACI 347 - Recommended Practice For Concrete Formwork.
- D. PS 1 - Construction and Industrial Plywood.

1.03 DESIGN REQUIREMENTS

- A. Design, engineer and construct formwork, shoring and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line and dimension.

1.04 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 347.

1.05 REGULATORY REQUIREMENTS

- A. Conform to applicable code for design, fabrication, erection and removal of formwork.

1.06 COORDINATION

- A. Coordinate this Section with other Sections of work which require attachment of components to formwork.
- B. If formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Architect/Engineer.

PART 2 - PRODUCTS

2.01 WOOD FORM MATERIALS

- A. Form Materials: At the discretion of the Contractor, to obtain required form finish.

2.02 FORMWORK ACCESSORIES

- A. Form Ties: Removable Snap-off type, metal, adjustable length, cone type, 1-1/2 inch back break dimension, free of defects that could leave holes larger than 1 inch in concrete surface.
- B. Form Release Agent: Colorless mineral oil which will not stain concrete, or absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02 EARTH FORMS

- A. Earth forms are permitted only where trench foundations are indicated or for wall footings. If earth forms are used for wall footings, line earth with 4 mil. polyurethane all sides of earth form.

3.03 ERECTION - FORMWORK

- A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to over stressing by construction loads.
- C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.

- D. Provide chamfer strips on external corners as indicated. Provide uniform smooth lines and tight edge joints.

3.04 APPLICATION - FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete will be placed.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings which are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.
- D. Coat steel forms with a non-staining, rust preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.

3.05 JOINTS

- A. Construction Joints: Locate and install construction joints as indicated or, if not indicated, locate so as not to impair strength and appearance of the structure, as acceptable to Architect/Engineer.
- B. Provide keyways at least 1-1/2" deep in construction joints in walls, slabs, and between walls and footings; accepted bulkheads designed for this purpose may be used for slabs.
- C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints, except as otherwise indicated.

3.06 INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Provide formed openings where required for items to be embedded in passing through concrete work.
- B. Locate and set in place items which will be cast directly into concrete.
- C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.
- D. Install accessories in accordance with manufacturer's instructions, straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- E. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
- F. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.07 FORM CLEANING

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.
- C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
- D. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.08 FORMWORK TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI 301.

3.09 FIELD QUALITY CONTROL

- A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.

3.10 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
 - 1. Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may not be removed in less than 14 days and until concrete has attained design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.
- B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces.
- C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.

END OF SECTION 03100

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1- GENERAL

1.01 SECTION INCLUDES

- A. Cast-in-place concrete for walls, beams, and columns.
- B. Slabs on grade.
- C. Control, expansion and contraction joint devices associated with concrete work.

1.02 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

- A. Section 03100 - Concrete Formwork: Placement of joint device anchors in formwork.

1.03 RELATED SECTIONS

- A. Section 03100 - Concrete Formwork: Formwork and accessories.
- B. Section 03370 - Concrete Curing.

1.04 REFERENCES

- A. ACI 301 - Structural Concrete for Buildings.
- B. ACI 302 - Guide for Concrete Floor and Slab Construction.
- C. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.
- D. ACI 305R – Hot Weather Concreting.
- E. ACI 306R - Cold Weather Concreting.
- F. ACI 308 - Standard Practice for Curing Concrete.
- G. ACI 318 - Building Code Requirements for Reinforced Concrete.
- H. ANSI/ASTM D994 - Preformed Expansion Joint Filler for Concrete (Bituminous Type).
- I. ASTM C33 - Concrete Aggregates.
- J. ASTM C94 - Ready-Mixed Concrete.
- K. ASTM C150 - Portland Cement.
- L. ASTM C260 - Air Entraining Admixtures for Concrete.

M. ASTM C494 - Chemicals Admixtures for Concrete.

1.05 SUBMITTALS

- A. Submit under provisions of Division 1.
- B. Product Data: Submit data for proprietary materials and items, including admixtures, patching compounds, joint systems, curing compounds, dry-shake finish materials, and others as requested by Engineer.
- C. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent Work.

1.06 PROJECT RECORD DOCUMENTS

- A. Accurately record actual locations of embedded utilities and components which are concealed from view.

1.07 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 301.
- B. Concrete Testing Service: Contractor to hire a testing laboratory acceptable to Engineer to design concrete mixes. Owner to hire testing laboratory to perform field quality control testing.
- C. Acquire cement and aggregate from same source for all work.
- D. Conform to ACI 305R when concreting during hot weather.
- E. Conform to ACI 306R when concreting during cold weather.

1.08 COORDINATION

- A. Coordinate work under provisions of Division 1.
- B. Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

- A. Cement: ASTM C150, Type I - Normal Portland type.
- B. Normal Weight Aggregates: ASTM C33, and as herein specified. Provide aggregates from a single source for exposed concrete. Use crushed stone aggregate for all exposed concrete and floor slabs. Gravel aggregate may be used for unexposed concrete, footings, and grade beams. Aggregate for exposed concrete shall limit chert, shale, iron oxide, and deleterious

materials. Maximum aggregate size to be 1" (Unless noted otherwise).

1. Natural Sand Fine Aggregate: ASTM C-33; clean, hard, strong, durable, and uncoated. Limit shale, chert, coal, and iron oxide.
 2. Crushed Limestone Coarse Aggregate: ASTM C-33; clean, hard, durable, and uncoated.
 - a) Limit clay lumps to 0.5 percent, coal and carbonaceous shale to 0.5 percent, total of shale and coal combined to 1.0 percent, iron oxide to 0.5 percent, and unsound chert particles retained on 3/8 inch (9mm) sieve to 1.5 percent. Chert particles which break into 3 or more pieces when subjected to MoDOT freezing and thawing test shall be considered "unsound".
- C. Lightweight Aggregate: ASTM C330.

D Water: Potable.

2.02 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
- B. Water-Reducing Admixture: ASTM C 494, Type A.
- C. High-Range Water-Reducing Admixture (Super Plasticizer): ASTM C 494, Type F or Type G.
- D. Calcium chloride is not permitted.

2.03 ACCESSORIES

- A. Non-Shrink Grout: CRD-C 621, factory pre-mixed grout.
 1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
 - a) Type D Non-metallic
- B. Dovetail Slots: See "Unit Masonry" Section.
- C. Epoxy Adhesive: ASTM C 881, two component material suitable for use on dry or damp surfaces. Provide material "Type", "Grade", and "Class" to suit project requirements.

2.04 JOINT DEVICES AND FILLER MATERIALS

- A. Joint Filler 1/4 inch: Closed cell polyethylene chloride foam.

2.05 CONCRETE MIX

- A. Prepare design mixes for each type and strength of concrete by laboratory trial batch or field experience methods as specified in ACI 301.

- B. Design mixes to provide normal weight concrete with the following properties, as indicated on drawings and schedules:
1. 4000 psi 28-day compressive strength; W/C ratio, 0.44 maximum.
- C. Adjustment to Concrete Mixes: Mix design adjustments may be requested by contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to Owner and as accepted by Engineer. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Engineer before using in work.
- D. Admixtures:
1. Use water-reducing admixture in all concrete.
 2. Use non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50 degrees F (10 degrees C).
 3. Use air-entraining admixture in exterior exposed concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content within following limits:
 - a) Concrete structures and slabs exposed to freezing and thawing, or subjected to hydraulic pressure:
 1. 5% to 8% for maximum 1" aggregate.
 4. Use admixtures for water-reducing and set-control in strict compliance with manufacturer's directions.
- E. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
1. Ramps, slabs, and sloping surfaces: Not less than 1" and not more than 4".
 2. Reinforced foundation systems: Not less than 1" and not more than 4".
 3. Other concrete: Not less than 1" and not more than 4".

2.6 CONCRETE MIX-STAMPED.COLORED CONCRETE

The following concrete mix shall be used for the stamped/colored concrete:

<u>Weights Per Cubic Yard (SSD)</u>	<u>Specificlb Gravity yd³</u>	<u>Absolute Volume</u>	
Cement ASTM C150	3.15	606	3.08
	0.00	0	0.00
Sand ASTM C33	2.63	1456	8.87
Aggregates ¾" x No. 4 (No. 67) ASTM C33	2.64	1463	8.88
Water	33.0 gal	1.00	275 4.41
Entrained Air	6.5% ± 1.5%		1.76
		<u>Total Yield</u>	<u>27.00</u>

Water/Cement Ratio,	0.45
Slump, “± Max	4.0
Concrete Unit Weight, lb per ft ³	140.72

<u>Admixtures</u>	<u>oz/cwt</u>
Air Entrainment ASTM C260	0.75

2.7 CONCRETE MIXING:

- A. Ready-Mix Concrete: Comply with requirements of ASTM C 94, and as herein specified.
 - 1. "Delete references for allowing additional water to be added to batch for material with insufficient slump. Addition of water to the batch will not be permitted."
- B. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required.
 - 1. When air temperature is between 85 degrees F (30 degrees C) and 90 degrees F (32 degrees C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 degrees F (32 degrees C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify site conditions under provisions of Division 1.
- B. Verify requirements for concrete cover over reinforcement.
- C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.
- D. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work.

3.02 PREPARATION

- A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.

3.03 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304 as herein specified.
- B. Notify Engineer/City minimum 24 hours prior to commencement of operations.
- C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints, are not disturbed during concrete placement.

- D. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.
- E. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
- F. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.
- G. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.
- H. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
 - 1. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Bring slab surfaces to correct level with straightedge and strikeoff. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
 - 3. Maintain reinforcing in proper position during concrete placement operations.
- I. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.
 - 1. When air temperature has fallen to or is expected to fall below 40 deg F (4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C), and not more than 80 deg F (27 deg C) at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 - 3. Do not use calcium chloride, salt, and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.
- J. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.
 - 1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 deg F (32 deg C). Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing water.
 - 2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel

temperature will not exceed the ambient air temperature immediately before embedment in concrete.

3. Wet forms thoroughly before placing concrete.
4. Use water-reducing retarding admixture (Type D) when required by high temperatures, low humidity, or other adverse placing conditions.

3.4 CONCRETE FINISHING

- A. Rough Form Finish: For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.
- B. Smooth Form Finish: For formed concrete surfaces exposed to view, or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or other similar system. This is as -cast concrete surface obtained with selected form facing materials, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.
- C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.05 MONOLITHIC SLAB FINISHES

- A. Scratch Finish: Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and as otherwise indicated.
 1. After placing slabs, plane surface to tolerances for floor flatness (Ff) of 15 and floor levelness (Fl) of 13. Slope surfaces uniformly per drawings where required. After leveling, roughen surface before final set, with stiff brushes, brooms, or rakes.
- B. Float Finish: Apply float finish to monolithic slab surface to receive trowel finish and other finishes as hereinafter specified.
 1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Check and level surface plane to tolerances of Ff 18 - Fl 15. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
- C. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin film finish coating, system.

1. After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with surface leveled to tolerances of Ff20 - F1 17. Grind smooth surface defects which would telegraph applied floor covering system.
- D. Non-Slip Broom Finish: Apply non-slip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated
1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Engineer before application.
- E. Hardener/Sealer:
1. Apply liquid hardener in accordance with manufacturer's instructions on floor surfaces scheduled.

3.06 JOINTS

- A. Construction Joints: Locate and install construction joints as indicated or, if not indicated, locate so as not to impair strength and appearance of the structure, as acceptable to Engineer.
- B. Provide keyways at least 1-1/2" deep in construction joints in walls, slabs, and between walls and footings; accepted bulkheads designed for this purpose may be used for slabs.
- C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints, except as otherwise indicated.
- D. Isolation Joints in Slabs-on-Ground: Construct isolation joints in slabs-on-ground at points of contact between slabs-on-ground and vertical surfaces, such as column pedestals, foundation walls, grade beams, and elsewhere as indicated.
1. Joint filler and sealant materials are specified in Division-7 sections of these specifications.
- E. Contraction (Control) Joints in Slabs-On-Ground: Construct contraction joints in slabs-on-ground to form panels of patterns as shown or noted. Joints shall be tooled unless directed otherwise by Engineer.
- F. Form contraction joints by inserting premolded plastic, hardboard or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.
1. Contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.

3.07 CURING AND PROTECTION

- A. Cure concrete in accordance with Section 03370.

3.08 FIELD QUALITY CONTROL

- A. The Owner will employ a testing laboratory to perform tests and to submit test reports.
- B. Concrete shall be sampled and tested for quality control during placement of concrete as follows:
- C. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 - 1. Slump: ASTM C 143; one test at point of discharge for each set of compression test specimens.
 - 2. Air Content: ASTM C 173, volumetric method for normal weight concrete; ASTM C 231 pressure method for normal weight concrete; one test for each set of compression test specimens.
 - 3. Concrete Temperature: Test hourly when air temperature is 40 deg F (4 deg C) and below, and when 80 deg f (27 deg C) and above; and each time a set of compression test specimens are made.
 - 4. Compression Test Specimen: ASTM C 31; one set of 3 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cured test specimens are required.
 - 5. Compressive Strength Tests: ASTM C 39; one set for each 50 cu. yds. or fraction thereof, of each concrete class placed in any one day or for each 5,000 sq. ft. of surface area placed; 1 specimen tested at 7 days, 1 specimen tested at 28 days, and one specimen retained in reserve for later testing if required.
 - 6. When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
 - 7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
 - 8. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.
- D. Test results will be reported in writing to Owner, Engineer and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests, slump, air content and temperature.
- E. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Engineer. Testing service may conduct tests to determine

adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests when unacceptable concrete is verified.

3.09 MISCELLANEOUS CONCRETE ITEMS

- A. Filling-In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment. All interior and exterior concrete equipment bases and foundations are to be provided by those perspective Contractors.
- D. Grout base plates and foundations as indicated, using specified non-shrink grout. Use non-metallic grout for exposed conditions, unless otherwise indicated.
- E. Reinforced Masonry: Provide 3000 psi concrete for reinforced masonry lintels and bond beams where indicated on drawings and as schedule. Maintain accurate location of reinforcing steel during concrete placement.

3.10 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Engineer.
- B. Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with specified bonding agent. Place patching mortar after bonding compound has dried.
- C. For exposed-to-view surfaces, blend white portland cement and standard portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify moisture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- D. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Engineer. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with epoxy bonding agent.

- E. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.
- F. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness using a template having required slope.
- G. Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, popouts, honeycomb, rock pockets, and other objectionable conditions.
- H. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.
- I. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Engineer.
- J. Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- K. Repair isolated random cracks and single holes not over 1" in diameter by dry-pack method. Groove top of cracks and cut-out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry pack after bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.
- L. Perform structural repairs with prior approval of Engineer of method and procedure, using epoxy adhesive and mortar.
- M. Repair methods not specified above may be used, subject to acceptance of Engineer.

3.11 EPOXY BONDING DOWELS

- A. Epoxy adhesive for bonding dowels in drilled holes shall be used in strict accordance with the manufacturer's recommendations.
- B. The Contractor shall arrange a meeting with the technical representative and the Engineer to review the manufacturer's recommendations prior to construction.

- C. Drilled holes for dowels and anchor bolts shall be 1/8" larger in diameter than the diameter of the bar.
- D. Minimum embedment is 15 times the bar diameter, unless noted otherwise.
- E. Installation Procedure:
 - 1. Blow hole clean using oil-free compressed air.
 - 2. Place epoxy to predetermined depth in hole, and insert clean bar, working back and forth, up and down, to ensure complete embedment and coating.
 - 3. Position bar in center of hole with template until epoxy sets.

END OF SECTION 03300

SECTION 03360 - INTEGRALLY COLORED CONCRETE STAMPED/IMPRINTED CONCRETE PAVEMENT

PART 1 - GENERAL

1.01 SUMMARY

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to Work of this Section.
- B. Section Includes:
 - 1. Integrally colored concrete slabs-on-grade.
 - 2. Stamping/Imprinting.
 - 3. Curing of integrally colored and imprinted concrete.
- C. Related Sections:
 - 1. Section 03300 Cast-in-Place Concrete: for general applications of concrete and coordination of sample submittal and color selection.
 - 2. Section 03100 – Concrete Formwork: formwork and accessories
 - 3. Section 03200 – Concrete Reinforcement
 - 4. Section 03370 – Concrete Curing and Sealing

1.02 REFERENCES

- A. American Concrete Institute (ACI):
 - 1. ACI 301 "Specification for Structural Concrete for Buildings."
 - 2. ACI 302 IR "Recommended Practice for Concrete Floor and Slab Construction."
 - 3. ACI 303.1 "Standard Specification for Cast-In-Place Architectural Concrete."
 - 4. ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing of Concrete."
 - 5. ACI 305R "Recommended Practice for Hot Weather Concreting."
 - 6. ACI 306R "Recommended Practice for Cold Weather Concreting."
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM C309 "Liquid Membrane-Forming Compounds for Curing Concrete."
 - 2. ASTM C494 "Standard Specification for Chemical Admixtures for Concrete."
 - 3. ASTM C979 "Standard Specification for Pigments for Integrally Colored Concrete."
- C. American Association of State Highway and Transportation Officials (AASHTO):
 - 1. AASHTO M194 "Chemical Admixtures."

1.03 SUBMITTALS

- A. Product Data: Submit manufacturer's complete technical data sheets for the following:
 - 1. Colored admixture.
 - 2. Imprinting/Texturing tools.
 - 3. Powder antiquing release agent.
 - 4. Curing compound.
 - 5. Sealant.
- B. Design Mixes: For type of integrally colored concrete.
- C. Samples for Initial Selection: Manufacturer's color charts showing full range of colors available.
- D. Qualification Data: For firms indicated in "Quality Assurance" Article, including list of completed projects.
- E. Contractor to provide mockup examples for Owner approval prior to construction.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer with 10-years experience in production of specified products.
- B. Installer Qualifications: An installer with years 5 experience with work of similar scope and quality.
- C. Comply with the requirements of ACI 301.
- D. Obtain each specified material from same source and maintain high degree of consistency in workmanship throughout Project.
- E. Notification of manufacturer's authorized representative shall be given at least 1-week before start of Work.
- F. Integrally Colored Concrete Mockups:
 - 1. Provide mockups as discussed below until Owner and Engineer are satisfied with the resulting sample.
 - 2. At location on Project selected by Engineer, place and finish 8 feet by 8 feet mockup area.
 - 3. For accurate color, the quantity of concrete mixed to produce the sample should not be less than 3 cubic yards (or not less than 1/3 the capacity of the mixing drum on the ready-mix truck) and should always be in full cubic yard increments. Excess material shall be discarded according to local regulations.
 - 4. Construct mockups using processes and techniques intended for use on permanent work, including curing procedures. Include samples of control, construction, and expansion joints in sample panels. Mockup shall be produced by the individual workers who will perform the work for the Project.

5. Retain samples of cements, sands, aggregates and color additives used in mockup for comparison with materials used in remaining work.
6. Accepted mockup provides visual standard for work of Section.
7. Mockup shall remain through completion of the work for use as a quality standard for finished work.
8. Remove mockup when directed.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Colored Admixture: Comply with manufacturer's instructions. Deliver colored admixtures in original, unopened packaging. Store in dry conditions.

1.06 PROJECT CONDITIONS

- A. Integrally Colored Concrete Environmental Requirements:
 1. Schedule placement to minimize exposure to wind and hot sun before curing materials are applied.
 2. Avoid placing concrete if rain, snow, or frost is forecast within 24-hours. Protect fresh concrete from moisture and freezing.
 3. Comply with professional practices described in ACI 305R and ACI 306R.
- B. Schedule delivery of concrete to provide consistent mix times from batching until discharge. Mix times shall meet manufacturer's written recommendations.

1.07 PRE-JOB CONFERENCE

- A. One week prior to placement of integrally colored concrete, a meeting shall be held to discuss the Project and application methods.
- B. It is suggested that the Owner, Engineer, General Contractor, Subcontractor, Ready-Mix Concrete Representative, and a Manufacturer's Representative be present.

1.08 STAMPING/IMPRINTING TOOLS

- A. Stamps used for imprinting the stamped/colored concrete shall become property of the City at the completion of construction. Stamps shall be cleaned and in good condition or new stamps shall be provided to the City at the Contractor's expense.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Colored Admixture for Integrally Colored Concrete
 - 1. Color admixture shall be a powdered integral color manufactured by BRICKFORM.
 - 2. Admixture shall be a colored, water-reducing, admixture containing no calcium chloride with coloring agents that are lime proof and UV resistant.
 - 3. Colored admixture shall conform to the requirements of ACI 303.1, ASTM C979, ASTM C494, and AASHTO M194.
- B. Stamping/Imprinting Tools and Materials
 - 1. Powder antiquing release agent shall be manufactured by BRICKFORM.
 - 2. Stamp pattern shall be BRICKFORM London Cobble.
- C. Curing and Sealing Compound: Curing and sealing compound shall comply with ASTM C309 and be of same manufacturer as colored admixture, for use with integrally colored concrete.

2.02 COLORS AND PATTERNS

- A. Cement: Color shall be gray.
- B. Sand: Color shall be locally available natural sand.
- C. Aggregate: Concrete producer's standard aggregate complying with specifications.
- D. Colored Admixture: Mauve from BRICKFORM
- E. Stamp/Imprinting Pattern: BRICKFORM London Cobble
- F. Powder Antiquing Release Agent: Medium Gray Powder Release from BRICKFORM

2.03 CONCRETE MIX DESIGN

- A. Minimum Cement Content: 5 sacks per cubic yard of concrete.
- B. Slump of concrete shall be consistent throughout Project at 4-inches or less. At no time shall slump exceed 5-inches.
- C. Do not add calcium chloride to mix as it causes mottling and surface discoloration.
- D. Supplemental admixtures shall not be used unless approved by manufacturer.
- E. Do not add water to the mix in the field.

- F. Add colored admixture to the mix according to manufacturer's written instructions in premeasured bags, not by weight of cement content.
- G. Do not include fly ash or slag in the mix as it causes discoloration.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install concrete according to requirements of Section 0330 Cast-In-Place Concrete.
- B. Do not add water to the mix in the field.
- C. Surfaces shall be finished uniformly with the following finish:
 - 1. Stamped/Imprinted: Apply pattern according to tool manufacturer's instructions. Touch-up pattern and finish edges with hand tools as necessary.

3.02 CURING

- A. Integrally Colored Concrete: Apply curing and sealing compound for integrally colored concrete according to manufacturer's instructions using manufacturer's recommended application techniques. Apply curing and sealing compound at consistent time for each pour to maintain close color consistency.
- B. Curing compound shall be same color as the colored concrete and supplied by same manufacturer of the colored admixture.
- C. Precautions shall be taken in hot weather to prevent plastic cracking resulting from excessively rapid drying at surface as described in CIP 5 *Plastic Shrinkage Cracking* published by the National Ready Mixed Concrete Association.
- D. Do not cover concrete with plastic sheeting.

3.03 TOLERANCES

- A. Minor variations in appearance of colored concrete, which are similar to natural variations in color and appearance of uncolored concrete, are acceptable.

END OF SECTION 03360

SECTION 03370 - CONCRETE CURING AND SEALING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Initial and final curing of horizontal and vertical concrete surfaces.

1.02 RELATED SECTIONS

- A. Section 03300 - Cast-In-Place Concrete.

1.03 REFERENCES

- A. ACI 301 - Structural Concrete for Buildings.
- B. ACI 302 - Recommended Practice for Concrete Floor and Slab Construction.
- C. ACI 308 - Standard Practice for Curing Concrete.
- D. ASTM C171 - Sheet Materials for Curing Concrete.
- E. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.
- F. ASTM D2103 - Polyethylene Film and Sheeting.
- G. Federal specification - CEGS 03300 4-79 - Chemical Hardeners.

1.04 SUBMITTALS

- A. Submit under provisions of Division 1.
- B. Product Data: Provide data on curing compounds, mats, paper, film, compatibilities, and limitations.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 301 and ACI 302.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site in a manner which does not damage materials

- B. Deliver curing materials in manufacturer's packaging including application instructions.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
- B. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
 - 1. Waterproof paper.
 - 2. Polyethylene film.
 - 3. Polyethylene-coated burlap.
- C. Liquid Membrane-Forming Curing Compound: Liquid type membrane-forming curing compound complying with Federal Specifications TT-C-800, Type 1, unless otherwise acceptable to Engineer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify substrate conditions under provisions of Division 1.
- B. Verify that substrate surfaces are ready to be cured.

3.02 EXECUTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
- C. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.
- D. Curing Methods: Perform curing of concrete by curing and sealing compound, by moist curing, by moisture-retaining cover curing, and by combinations thereof, as herein specified.
- E. Provide moisture curing by following methods.
 - 1. Keep concrete surface continuously wet by covering with water.
 - 2. Continuous water-fog spray.
 - 3. Covering concrete surface with specified absorptive cover, thoroughly saturating

cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.

- F. Provide moisture-cover curing as follows:
 - 1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

- G. Provide curing and sealing compound to exposed interior slabs and to exterior slabs, walks and curbs, as follows:
 - 1. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

- H. Provide concrete sealer/hardener where indicated. Cure slabs per manufacturers recommendations.

- I. Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, flooring (such as ceramic or quarry tile, glue-down carpet), painting, and other coatings and finish materials, unless otherwise acceptable to Engineer.

- J. Curing Formed Surfaces: Cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

- K. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of appropriate curing method.

- L. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.

- M. Application of Sealer:
 - 1. Apply one coat as a cure as soon after final troweling as possible: One gal/400 SF floor.
 - 2. Apply second coat after completion of construction and final clean-up: One gal/500-600 SF floor.

- N. Application of Sealer/Hardener:
 - 1. Apply one coat after concrete has cured per manufacturers recommendations: One gal/150 SF floor.
 - 2. Apply second coat if recommended by manufacturer.

END OF SECTION 03370

SECTION 16500 - ELECTRICAL

PART 1

1.01 GENERAL

- A. Drawings and general provisions of contract, including general and supplementary conditions apply to this section.
- B. This part of specifications includes furnishing, installing, testing, and placing into satisfactory operation the proposed lighting and electrical systems shown on the drawings and specified herein.
- C. Contractor shall submit detailed drawings, specifications and photometric calculations for any materials or equipment proposed to be provided by alternate manufacturers for approval.

1.02 MATERIALS

- A. Street Lighting: Aluminum poles with ground fault interrupter duplex receptacle and cover (see plans for details). Luminaries shall contain Finial, Band and Medallions (black) with 150 Watt HPS lamp, 240 V HPF ballast, and Type III distribution. GFI receptacles shall be located on the sidewalk side of the pole 8' above the top of the base of the pole. Pole fixtures and accessories shall come from the same manufacture.
 - 1. Acceptable Poles
 - a. King Luminaire: The Florentine Jr. Millennium Series
 - 2. Acceptable Luminaries
 - a. King Luminaire: K118 Washington Luminaire
- B. Wind load rating of street light poles shall be greater than or equal to twice the total effective projection area (EPA) rating of the fixture at a minimum of 90 mph.
- C. Provide reflectors/refractors as recommended by manufacture to ensure maximum light is directed down and toward the street.
- D. Clamp or banner arms shall be from the same manufacturer as light poles and made of same material and finishing as light poles. Clamp on mountings shall clamp around the post, and secured with four hex head bolts. Pipe arm shall be 1" in diameter and 24" long. All hardware shall be stainless steel.
- E. Clamp on flagpole holders shall be from the same manufacturer as light poles and shall be made of the same material and finishing as light poles. Flagpole holder shall hold a 1" flagpole. Clamp on mounting shall clamp around the post and be secured with four hex head bolts. Hardware shall be stainless steel.

PART 2

2.01 INSTALLATION

- A. Use belt slings or non-chafing ropes to raise and set pre-finished poles.
- B. Re-lamp luminaries which have failed lamps at completion of work.
- C. Align luminaries and clean lenses and diffusers at completion of work. Clean paint splatters, dirt and debris from installed luminaries.
- D. Touch up luminaries and pole finish at completion of work. Provide matching touch-up paint to City.

2.02. QUALITY ASSURANCE

- A. Only products of reputable manufacturers as determined by the Engineer will be acceptable.
- B. All electrical work for project to be performed by a licensed electrician.

2.03. CODES, LAWS, ORDINANCES

- A. This Contractor shall conform to all requirements of the City of Rock Port, Missouri Codes, Laws, Ordinances, and other regulations having jurisdiction over this installation.
- B. In the event there are no local codes having jurisdiction over this job, the current issue of the National Electrical Code shall be followed.
- C. If the Contractor notes at the time of bidding any parts of the drawings and specifications which are not in accord with the applicable codes or regulations, he shall inform the City in writing, requesting a clarification. If there is insufficient time to follow this procedure, he shall submit with his proposal a separate price required to make the system shown on the drawings comply with the codes and regulations.
- D. All changes to the system made after the letting of the contract, in order to comply with the applicable codes or the requirements of the Inspector, shall be made by the Contractor without cost to the City.

2.04 PERMITS AND FEES

- A. Procure all applicable permits and licenses.
- B. Abide by all applicable laws, regulations, ordinances, and other rules of the State or Political Subdivision wherein the work is done, or as required by any duly constituted public authority.

- C. Pay all applicable charges for such permits or licenses that may be required.
- D. Pay all charges arising out of required inspections due to codes, permits, licenses, or as otherwise may be required by an authorized body.
- E. Pay all charges arising out of required contract document reviews associated with the project and as initiated by the Owner or authorized independent agency/consultant.
- F. All fixtures, equipment, and materials shall be as approved or listed by the following: (unless approval or listing is not applicable to an item by all acceptable manufacturers).

Underwriters' Laboratories, Inc.

2.05 SUBMITTALS

- A. Submittals shall include all manufacturers' standard drawings; schedules; descriptive literature, catalogs and brochures; performance and test data; wiring and control diagrams; and all other drawings and descriptive data of materials of construction as may be required to show that the materials, equipment, or systems and the location thereof conform to the requirements of the contract documents.
- B. The Contractor shall submit three (3) copies of each shop drawing for review by the City BEFORE releasing any equipment for manufacture or shipment.

PART 3

3.01 CONCRETE BASES

- A. Concrete bases for poles shall be poured to form a monolithic foundation and shall conform to the dimensions shown on the plans. Excavations for these bases shall be made in a neat and quality manner. The bottom of all foundations shall rest securely on firm, undisturbed ground. The material for the forms shall be of sufficient thickness to prevent warping or other deflections from the specified pattern. The forms shall be set level or sloped slightly to blend with the adjacent ground level and means shall be provided for holding them rigidly in place while the concrete is being deposited. All conduits shall be installed and held rigidly in place before concrete is deposited in the forms. A ground rod shall be placed at each pole as shown on the plans. Anchor bolts for the poles shall be set in place by means of a template constructed to space the anchor bolts in accordance with the manufacturer's requirements. The center of the template and the center of the concrete base shall coincide unless the City directs otherwise. Concrete shall be consolidated by vibration during placement.
- B. The top of the base shall be finished level and the top edges shall be rounded with an edger having a chamfer of 3/4 inch. The exposed surface of the base shall have a rubbed surface finish.

- C. After the foundation or base has been poured, absolutely no modification of any sort may be made. If the anchor bolts, conduit, or any part of the foundation or base is installed in an incorrect manner as determined by the City, the entire foundation or base shall be removed and a new foundation or base installed at the Contractor's expense.
- D. Prior to setting poles, the anchor bolts shall be covered in such a manner as to protect them against damage and to protect the public from possible injury. The foundations must be given a minimum of seven days to cure before poles are erected.

END OF SECTION 16500