


UPGRADES TO CHESTNUT ROAD PUMP STATION

DDC Engineers Inc.

From: Eric Sanford 

Project No. 14947E

ADDENDUM NO. 1 – December 3, 2015

This Addendum forms a part of the Bidding Documents and modifies the original Bidding Documents, dated November 2015, Bid Date December 10, 2015.

Acknowledge receipt of this Addendum in the space provided on the PROPOSAL. Failure to do so may subject Bidder to disqualification.

The following items clarify, modify, change, delete from or add to the Bidding Documents. When any paragraph, subparagraph, or sub-subparagraph, thereof is modified or deleted by this Addendum, the unaltered provisions of that paragraph, subparagraph, or sub-subparagraph shall remain in effect. When any portion of a drawing is modified or deleted, the unaltered provisions of that drawing shall remain in effect.

- 1.0 The contract time has been extended by 60 days. The contract calendar days will be 180 calendar days instead of 120 calendar days as listed under Section 0200-Instructions to Bidder, 2.03 Contract Time and Liquidated Damages.
 - A. Contractor shall complete all work within the project within 180 consecutive calendar days. Liquidated damages of \$2,500 per day will be assessed for each consecutive calendar day worked after the completion date.
- 2.0 Under Section 16300 – Sewage Electrical VFD Control Panel - page number 6 is missing.

Answer: Attached is Page 6 of Section 16300 – Sewage Electrical VFD Control Panel.
- 3.0 In the wetwell the new suction legs shall be coated the same as the wall with the wetwell lining material. Please use Tnemec 66 primer on all DIP pipes in the wetwell.
- 4.0 All ductile iron piping and fittings to be P-401 lined or approved equal.
- 5.0 There is an existing 4" DIP abandoned pipe line in existing wetwell. This line is to be removed and wall is to be patched as part of the wetwell rehab work.
- 6.0 The proposed catch basin can be concrete, concrete brick or nyloplast.
- 7.0 Attached, please add this specification to the project on the rehabilitation and protective coating of existing concrete structures.
- 8.0 The size of the generator set is being down sized to only run three (3) of the four (4) pumps in the station. Please reduce the size of the generator from 400 kw to 300 kw along with the proper size of the transfer switch to run the three (3) pumps. The control panel will be set up to lock out the fourth pump from running when the station is under an emergency power condition.

- 9.0 A suction gauge and a discharge gauge are required for each pump in feet of head. Plus a pump drain kit for each pump.
10. The City of Myrtle Beach will be responsible for the cleaning the sludge out of the wetwell and disposing of it.
11. Section 02790 – Building Construction, Page 13 - Item C. Concrete Wetwell and Access Paragraph 1, the word miles has been revised to read MILS not miles. The corrected page is attached.

REHABILITATION & PROTECTIVE COATING OF
EXISTING CONCRETE STRUCTURES
TECHNICAL REQUIREMENTS AND SPECIFICATIONS FOR
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FORWARD

This specification covers work, materials, and equipment required for protecting and/or rehabilitating concrete and masonry manholes, wetwells, and other underground structures and vaults by monolithic spray-application of a high-build, solvent-free epoxy coating to provide corrosion protection, eliminate infiltration, repair voids, and enhance structural integrity. Procedures for surface preparation, cleaning, application, and testing are described herein.

PART 1 – GENERAL

1.01 SECTION INCLUDES

Requirements for surface preparation, repairs, and solvent-free epoxy coating application to specified surfaces.

1.02 RELATED SECTIONS

- A. Concrete Repair
- B. Environmental, Health, and Safety

1.03 REFERENCES

- A. ASTM D638 Tensile Properties of Plastics
- B. ASTM D790 Flexural Properties of Un-Reinforced and Reinforced Plastics
- C. ASTM D695 Compressive Properties of Rigid Plastics
- D. ASTM D4541 Pull-Off Strength of Coatings Using a Portable Adhesion Tester
- E. ASTM D2584 Volatile Matter Content
- F. ASTM D2240 Durometer Hardness, Type D
- G. ASTM D543 Resistance of Plastics to Chemical Reagents
- H. ASTM C109 Compressive Strength Hydraulic Cement Mortars
- I. ACI 506.2-77 Specifications for Materials, Proportioning, and Application of Shotcrete
- J. ASTM C579 Compressive Strength of Chemically Setting Silicate and Silica Chemical Resistant Mortars
- K. ASTM The published standards of the American Society for Testing and Materials, West Conshohocken, PA
- L. NACE The published standards of National Association of Corrosion Engineers (NACE International), Houston, TX
- M. SSPC The published standards of the Society of Protective Coatings, Pittsburgh, PA

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1.04 SUBMITTALS

A. The following items shall be submitted:

- 1- Technical data sheet on each product used, including ASTM test results indicating the product conforms to and is suitable for its intended use per these specifications.
- 2- Submittals on products other than those specified must: (a) be received by the Owner/Engineer no later than ten (10) work days prior to the bid opening in order to be considered for possible "approved equal" status; and (b) Applicator qualifications listed below in 5a-5e must be submitted with the proposed products(s) information no later than ten (10) days prior to the bid opening in order to be considered.
- 3- Material Safety Data Sheets (MSDS) for each product used.
- 4- Project specific guidelines and recommendations.
- 5- Applicator Qualifications
 - a- Manufacturer certification that Applicator has been trained and approved in the handling, mixing, and application of the products to be used.
 - b- Certification that the equipment to be used for applying the products has been manufactured or approved by the protective coating manufacturer and application personnel have been trained and certified for proper use of the equipment.
 - c- Five (5) recent references of Applicator (projects of similar size and scope) indicating successful application of a high-build, solvent-free epoxy coating by plural component spray application.
 - d- Written documentation of having installed: (1) a minimum of 40,000 s.f. of cementitious (buildback) rehabilitation mortar similar to that specified in Part 2.03 B(3), within the last two (2) years; and (2) installed a minimum of 40,000 s.f. of protective coating similar to that specified in Part 2.04 A, within the last two (2) years.
 - e- Proof of any necessary federal, state, and/or local permits or licenses necessary for the project.
- 6- Design details for any additional ancillary systems and equipment to be used in site and surface preparation, application, and testing.

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1.05 QUALITY ASSURANCE

- A- Applicator shall initiate and enforce quality control procedures consistent with applicable ASTM, NACE, and SSPC standards and the protective coating manufacturer's recommendations.
- B- The inspector, whether a Manufacturer Technical Representative or SSPC Coatings Inspector, will provide the owner with a written report confirming the adherence to these specifications, to include proper procedure and equipment usage for preparation, application, and material handling.
- C- A final visual inspection shall be made by the Owner's representative and/or inspector, and manufacturer's representative. Any deficiencies in the finished coating shall be marked and repaired, according to the procedures set forth here, by Applicator.

1.06 DELIVERY, STORAGE, AND HANDLING

- A- All materials are to be kept dry, protected from weather, and stored under cover.
- B- Protective coating materials are to be stored according to manufacturer's recommendations. Do not store near flame, heat, or strong oxidants.
- C- Repair and protective coating materials are to be handled according to their material safety data sheets.

1.07 SITE CONDITIONS

- A- Applicator shall conform with all local, state, and federal regulations including those set forth by OSHA, RCRA, EPA, and any other applicable authorities.
- B- Method statements and design procedures are to be provided by the Owner when confined space entry, flow diversion, or bypass is necessary in order for Applicator to perform the specified work.

1.08 WARRANTY

- A- Applicator shall warrant all work against defects in materials and workmanship for a period of three (3) years, unless otherwise noted, from the date of final acceptance of the project. Applicator shall, within a reasonable timeframe after receipt of written notice thereof, repair defects in materials or workmanship which may develop during said three (3) year period, and any damage to other work caused by such defects or the repairing of same, at his own expense and without cost to the Owner.

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PART 2 – PRODUCTS

2.01 EXISTING STRUCTURE

- A- Standard Portland cement or new concrete (not quick setting, high strength cement) must be well cured prior to application of the protective coating. Generally, 28 days is adequate cure time for standard Portland. If earlier application is desired, compressive or tensile strength of the concrete can be tested to determine if acceptable cure has occurred. (Note: Bond strength of the coating to the concrete surface is generally limited to the tensile strength of the concrete itself. Engineer may require Elcometer pull tests to determine suitability of concrete for coating.)
- B- Cementitious patching and repair materials should not be used unless their manufacturer provides information as to its suitability and procedures for top coating with an epoxy coating. Project specific submittals should be provided including application, cure time, and surface preparation procedures which permit optimum bond strength with the epoxy coat.
- C- Remove existing coatings prior to application of the new protective coating. Applicator is to maintain strict adherence to applicable NACE and SSPC recommendations with regard to proper surface preparation and compatibility with existing coatings.

2.02 MANUFACTURER

- A- Raven Lining Systems, Broken Arrow, Oklahoma – 800-324-2810 or 918-615-0020 – Fax: 918-615-0140.
- B- Quadex, Inc. Sewer Rehabilitation Products, Little Rock, Arkansas – 888-831-1650 or 501-945-3424 – Fax: 501-945-3544.

2.03 APPROVED REPAIR MATERIALS

- A- Repair materials shall be used to fill voids, structurally reinforce, and/or rebuild substrate surfaces, etc. as determined necessary by the engineer and protective coating applicator. Factory blended, rapid setting, high early strength, fiber reinforced, non-shrink repair mortar that can be trowelled or pneumatically spray applied; must be compatible with the specified epoxy coating; and shall be applied in accordance with the manufacturer's recommendations.
- B- The following products are accepted and approved as compatible repair basecoat materials for epoxy top coating for use with the specifications:

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1- Infiltration Control

All fast setting materials furnished shall be designed to be applied in dry powder form, with no prior mixing of water, directly to active leaks under hydrostatic pressure in manholes or related structures. Materials shall consist of rapid setting cements, silicious aggregates, and various accelerating agents. Material shall not contain chlorides, gypsum, or metallic particles. Approved infiltration control material shall be Quadex Hydra-Plug as manufactured by Quadex, Inc., Little Rock, Arkansas.

2- Invert Repair and Patching

All material furnished shall be designed to fill large voids in manhole walls and to repair or reconstruct inverts where no hydrostatic pressure exists. Material shall consist of rapid setting cements, NSG aggregates, and various accelerating agents. Material shall not contain chlorides, gypsum, or metallic particles. Approved invert repair and patching material shall be Raven 700 as manufactured by Raven Lining Systems, Broken Arrow, OK or Quadex Hyperform as manufactured by Quadex, Inc., Little Rock, Arkansas.

3- Cementitious Coating (Buildback) Materials for Manhole Walls and Benches

All cementitious coating (buildback) materials shall be specifically designed for the rehabilitation of manholes and other related wastewater structures. Liner materials shall be manufactured from 100% pure calcium aluminate cement and enhanced with high density chemically stable aggregates. Materials shall contain poly fiber reinforcement and chemical admixtures. Liner materials shall be mixed with water per manufacturer's written specifications and applied using equipment specifically designed for low pressure spray application of cement mortars. The cement liner material must be at a minimum thickness of one-half inch ($\frac{1}{2}$ ") and up to four inches (4"), and in one-half inch ($\frac{1}{2}$ ") increments are most commonly specified in monolithic application. Approved materials shall be Raven 705 CA as manufactured by Raven Lining Systems, Broken Arrow, OK or Quadex Aluminaliner as manufactured by Quadex, Inc., Little Rock Arkansas.

2.04 PROTECTIVE COATING MATERIAL

- A- Raven Lining Systems' Ultra High Build Epoxy Coating System – a 100% solids, solvent-free, two-component epoxy resin system, thixotropic in nature, and filled with select fillers to minimize permeability and provide sag resistance acceptable to these specifications.

Product Type
Color

Amine Cured Epoxy
Light Blue is Standard

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Solids Content (Vol%)	100
Mix Ratio	3:1 ratio; <i>Raven 405</i>
Compressive Strength	18,000 psi
Tensile Strength	7,600 psi
Tensile Elongation	1.53%
Flexural Strength	13,000 psi
Hardness, Shore D	88
Bond Strength – Concrete	> Tensile Strength of Concrete

2.05 REPAIR MORTAR SPRAY APPLICATION EQUIPMENT (If Spray Applied)

A- Spray applied repair mortars shall be applied with manufacturer approved equipment.

2.06 PROTECTIVE COATING APPLICATION EQUIPMENT

A- Manufacturer approved heated plural component spray equipment shall be used in the application of the specified protective coating.

PART 3 – EXECUTION

3.01 ACCEPTABLE APPLICATORS

A- Repair mortar must be applied by manufacturer trained and approved applicators. The cementitious mortar shall be applied according to manufacturer's recommendations.

B- Protective coating must be applied by a Certified Applicator of the protective coating manufacturer and according to manufacturer specifications.

3.02 EXAMINATION

A- All structures to be coated shall be readily accessible to Applicator.

B- Appropriate actions shall be taken to comply with local, state, and federal regulatory and other applicable agencies with regard to environment, health, and safety.

C- Any active flows shall be dammed, plugged, or diverted as required to ensure that the liquid flow is maintained below the surfaces to be coated. Flows should be totally plugged and/or diverted when coating the invert. All extraneous flows into the manhole or vaults, at or above the area coated, shall be plugged and/or diverted until the epoxy has set hard to the touch. As an option, hot air may be added to the manhole to accelerate set time of the coating.

D- Installation of the protective coating shall not commence until the concrete substrate has properly cured in accordance with these specifications.

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- E- Temperature of the surface to be coated should be maintained between 40° F & 120° F during application. Prior to and during application, care should be taken to avoid exposure of direct sunlight or other intense heat sources to the structure being coated. Where varying surface temperatures do exist, care should be taken to apply the coating when the temperature is falling versus rising (ie., late afternoon into evening vs. morning into afternoon).

3.03 SURFACE PREPARATION

- A- Applicator shall inspect all surfaces specified to receive a protective coating prior to surface preparation. Applicator shall notify Owner of any noticeable disparity in the surfaces which may interfere with the proper preparation or application of the repair mortar and protective coating.
- B- All contaminants including oils, grease, incompatible existing coatings, waxes, form release, curing compounds, efflorescence, sealers, salts, or other contaminants shall be removed.
- C- All concrete or mortar that is not sound or has been damaged by chemical exposure shall be removed to a sound concrete surface or replaced.
- D- Surface preparation method(s) should be based upon the conditions of the substrate, service environment, and the requirements of the epoxy protective coating to be applied.
- E- Surfaces to receive protective coating shall be cleaned and abraded to produce a sound surface with adequate profile and porosity to provide a strong bond between the protective coating and the substrate. At a minimum, this will be achieved with a high pressure water cleaning equipment using a 0° rotating nozzle at 5,000 psi and 4 gpm. Other methods such as high pressure water jetting (refer to NACE Standard No. 5/SSPC-SP12), abrasive blasting, shotblasting, grinding, scarifying and/or acid etching may also be used. In addition, detergent water cleaning and hot water blasting may be necessary to remove oils, grease, or other hydrocarbon residues from the concrete. The methods(s) used shall be performed in a manner that provides a uniform, sound clean, neutralized surface that is not excessively damaged.
- F- Infiltration shall be stopped by using a material which is compatible with the specified repair mortar and is suitable for top coating with the specified epoxy protective coating.
- G- Test prepared surfaces after cleaning, but prior to application of the epoxy coating, to determine if a specific pH or moisture content of the concrete is required according to manufacturer's recommendations.

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3.04 APPLICATION OF REPAIR MATERIALS

- A- Areas where structural steel has been exposed or removed shall be repaired in accordance with the Project Engineer's recommendations.
- B- Repair materials shall meet the specifications herein. The materials shall be trowel or spray applied utilizing proper equipment on to specified surfaces. The material thickness shall be specified by the Project Engineer according to Owner's requirements and manufacturer's recommendations.
- C- If using approved cementitious repair materials, such shall be trowelled to provide a smooth surface with an average profile equivalent to coarse sandpaper to optimally receive the protective coating. No bugholes or honeycomb surfaces should remain after the final trowel procedure of the repair mortar.
- D- The repair materials shall be permitted to cure according to manufacturer recommendations. Curing compounds should not be used unless approved for compatibility with the specified protective coating.
- E- Application of the repair materials, if not performed by the coating certified applicator, should be inspected by the protective coating certified applicator to ensure proper finishing for suitability to receive the specified coating.
- F- After abrasive blast and leak repair is performed, all surfaces shall be inspected for remaining contamination or laitance shall be removed by additional abrasive blast, shotblast, or other approved method. If repair materials are used, refer to these specifications for surface preparation. Areas to be coated must also be prepared in accordance with these specifications after receiving a cementitious repair mortar and prior to application of the epoxy coating.

3.05 APPLICATION OF PROTECTIVE COATING

- A- Application procedures shall conform to the recommendations of the protective coating manufacturer, including material handling, mixing, environment controls during application, safety, and spray equipment.
- B- The spray equipment shall be specifically designed to accurately ratio and apply the specified protective coating materials, and shall be regularly maintained and in proper working order.
- C- The protective coating material must be spray applied by a Certified Applicator of the protective coating manufacturer.

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WETWELLS, AND/OR UNDERGROUND VAULTS
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- D- Specified surfaces shall be coated by spray application of a moisture tolerant, solvent-free, 100% solids, epoxy protective coating as further described herein. **Spray application shall be to an average dry film thickness of 120 to 125 mils.**
- E- If necessary, subsequent topcoating or additional coats of the protective coating should occur as soon as the basecoat becomes tack free, ideally within 12 hours, but no later than the recoat window for the specified products. Additional surface preparation procedures will be required if this recoat window is exceeded.

3.06 TESTING AND INSPECTION

- A- During application, a wet film thickness gauge, such as those available through Paul N. Gardner Company, Inc. meeting ASTM D4414 – Standard Practice for Measurement of Wet Film Thickness of Organic Coatings by Notched Gauges, shall be used to ensure a monolithic coating and uniform thickness during application.
- B- After the protective coating has set hard to the touch, it shall be inspected with high-voltage holiday detection equipment. The spark tester shall be initially set at 100 volts per 1 mil (25 microns) of film thickness applied. All detected holidays shall be marked and repaired by abrading the coating surface with grit disk paper or other hand tooling method. After abrading and cleaning, additional protective coating material can be hand applied to the repair area. All touch-up/repair procedures shall follow the protective coating manufacturer's recommendations.
- C- A final visual inspection shall be made by the Inspector and manufacturer's representative, SSPC Concrete Coating Inspector, or NACE Inspector. Any deficiencies in the finished coating shall be marked and repaired according to the procedures set forth herein by Applicator.

3.07 PAYMENT

- A- Final payment shall not be released to the Contractor until the written quality assurance report, as required in Section 1.05 B, has been received by the owner.

END OF SECTION

immediately start the Lead RSP and continue to control it in the normal automatic control mode.

The PLC shall initiate a "Pump Fail to Start" Alarm to the Telemetry system if Pump 1 and/or Pump 2 and/or Pump 3 and/or Pump 4 are required to start, the PLC energizes the Pump Start Output and no run status indication input is receive to the PLC.

The pumping station shall be provided with secondary float switch controls. These controls will be hard-wired to the bypass motor control circuit independent of the PLC. RSP Number 1 will start and run at full speed if the wet well level activates the high level float. Pumps shall run continuously until the level is below the low level float or the alarm acknowledged is pressed. Both RSPs will be locked out of operation when the wet well level is below the Low Level float. A discrete input will be provided to the PLC to notify the activation of either backup float.

All PLC generated delay timers shall be adjustable from within the PLC logic. Initial timer value settings shall be coordinated with the City at start up and noted in the Operations and Maintenance Manuals.

E. Breakers:

1. All Breakers shall be Square "D" and be sealed by the manufacturer.
2. Provide power disconnect operator handle on each circuit breaker through the exterior of the panel.
 - a. Include interlock permitting the door to be opened only when circuit breakers are in the "OFF" position.
3. Provide "HOA" switches for each motor.
 - a. Provide "UL" rated, heavy duty, 600 VAC, oil -tight switches.
 - b. "HAND" position will not override the motor overload shutdown.
4. Provide power disconnect operator handle on each circuit breaker through the exterior of door panel.
5. A proper sized heavy duty air circuit breaker shall be installed for each 100 hp pump motor, and have a symmetrical RMS interrupting property size AMP ratings at 480 volts.
6. All circuit breakers shall be sealed by the manufacturer after calibration to prevent tampering. A padlock device shall be on each motor circuit breaker.
7. Odor control system 30 AMP 3-phase breaker for Zabco.

- 2) Two coats alkyd enamel, gloss.
- b. Concrete, Concrete Block, & Pump Room
 - 1) One coat Hydro-Gard II by Crete Gard.
 - 2) Two coats Alkyd Enamel Gloss.
 - 3) In accordance with the manufacturer's Instructions to the walls and ceiling.
- c. Concrete Wetwell and Access
 - 1) Apply minimum 120 MILS of Raven 405 or Spectra Shield in accordance with the manufacturer's Instructions to the walls and ceilings.
- d. Steel - Unprimed
 - 1) One coat zinc Chromate primer.
 - 2) Two coats alkyd enamel gloss.
- e. Steel - Primed
 - 1) Touch-up with original primer.
 - 2) Two coats alkyd enamel gloss.
- f. Steel - Galvanized
 - 1) One coat zinc chromate primer.
 - 2) Two coats alkyd enamel gloss.
- 3. Schedule Colors
 - a. Concrete Wetwell – Grey
 - b. Concrete Block Pump Room - White
 - c. All Piping and Fittings in Pump Room - White
 - d. Pump Frames - White
 - e. Pumps - White
 - f. Motors - Do Not Paint
 - g. Belt Guards - Orange