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Ryan Eldredge
Engineering Associate
Municipal Programs-Bureau of Water
Kansas Department of Health and Environment
1000 SW Jackson, Suite 420
Topeka, KS 66612

August 9, 2018

Re: Availability Waiver Request for Rausch USA Quicklock End Sleeve

Dear Mr. Ryan Eldredge:

The Rausch USA Quicklock End Sleeve is in plans and specifications to be used in the City of Humboldt, KS for their Sanitary Sewer System Improvements Project to rehabilitate their entire collection system. One of the main priorities of this project is to reduce/eliminate groundwater infiltration. Excess infiltration in a sanitary sewer system can cause excessive run time and wear on lift station pumps, decrease treatment time at the WWTF, and sanitary sewer overflows. The Rausch End Sleeve will be used to seal the CIPP liner at the entrances of the manhole on pipe segments that have been previously lined without hydrophilic O-rings. There will be 91 of the Rausch End Sleeves installed for this project.

Based on our research during the design of this project, we did not find another product available to solve the problem of fixing groundwater infiltration on previous lined pipe segments at the entrance of the manholes that were installed without hydrophilic O-rings. Hydrophilic O-Rings are installed between the newly installed liner and the existing host pipe at the upstream and downstream manholes to create a water tight seal thus preventing groundwater from entering at the manhole connections and the collection system. The Rausch Quicklock End Sleeve will serve as the hydrophilic O-ring in the pipe segments that have been previously lined without a hydrophilic O-ring. The Rausch Quicklock End Sleeve provides a mechanical coupling with an EPDM Rubber and additionally a hydrophilic O-ring can be applied to create a water tight seal at the manhole entrance. Based on our research and knowledge, we haven't found a similar or an equal product to the Rausch Quicklock End Sleeve.

We are requesting an availability waiver for the Rausch USA Quicklock End Sleeve under the American Iron and Steel Certification Act as we have not found a domestic equivalent to the Rausch USA Quicklock End Sleeve. Attached are specifications, relevant plan sheets, manufacture information, and other related items. Also included in this packet is Prime Contractors and Suppliers documentation efforts in finding an equivalent domestic product. Please let us know if you need any additional information for this waiver request. The City of Lyndon, KS will also be using the same product and will also be coming in for a waiver request.

Sincerely,

Craig Ronnebaum

Craig Ronnebaum
Intern Engineer

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SECTION 33 01 30.73

MANHOLE REHABILITATION

PART 1 – GENERAL

1.01 SCOPE OF WORK

A. This Section includes furnishing all work, materials, and equipment required for substrate rehabilitation for the purpose of eliminating infiltration, providing corrosion protection, repair of voids, and restoration of the structural integrity of the specified manholes as a result of applying a monolithic cementitious liner to the interior manhole wall and bench surfaces of brick, concrete, or any other masonry structures as identified in the project drawings.

B. The Contractor is responsible for all on site coordination of Work with the Owner, Engineer, Residents and Sub-Contractors. Therefore, the Contractor shall provide an experienced foreman on-site for all subcontracted manhole rehabilitation activities described in this specification.

C. Described are procedures for cleaning, preparation, application and testing. The applicator shall furnish all labor, equipment and materials for applying a cementitious mix to form a monolithic liner with machinery specially designed for the application. All aspects of the installation shall be in accordance with the manufacturer's recommendation and per the following specifications which includes:

1. The removal of any loose and unsound material.

2. Cleaning of the area to be sprayed with high pressure water.

3. The elimination of active infiltration prior to making the application.

4. The repair and filling of voids.

5. The repair and sealing of the invert and benches.

6. The spray application of a cementitious mix to form a structural enhanced monolithic liner.

1.02 RELATED WORK

A. Section 03 41 00 – Precast Structural Concrete

B. Section 33 01 30.50 Maintenance of Sewer Flows

1.03 SUBMITTALS

A. Manufacturer's Data: Manufacturer's technical literature on coating material, and description of installation method that includes the following:

1. Written description of construction procedures including bypass methods.

2. Compressive strength, bond strength and set time.

3. Environmental requirements for application and worker safety, including ventilation, humidity, and temperature ranges.

4. Maximum storage life and storage requirements.

5. Mixing and proportioning requirements as applicable.

6. Application film thickness per coat of primer and finish coat.

7. Curing time required.

1.04 QUALITY ASSURANCE

A. Product application shall be performed by trained workman and who have a minimum of 10 years' experience applying cementitious liner material under similar project conditions. Upon request by the Engineer, work experience shall be provided.

B. Contractor shall be certified by the manufacturer and have a minimum of three projects with similar applications of specified material.

1.05 GUARANTEE

A. All manholes that are rehabilitated shall have a one year warranty on the seal. No visual leaks shall be found and if found shall be repaired at no additional cost to the Owner. Those repairs shall also have a one year warranty after the repair date.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Product shall be manufactured by Strong-Seal Systems Corporation, Pine Bluff Arkansas

B. Patching Material: QSR

1. A quick setting corrosion resistant cementitious material shall be used as a patching material and is to be mixed and applied according to the manufacturer's recommendations and shall have the following minimum

requirements:

Compressive Strength (ASTM C109)	1800 psi, 1 hours 2600 psi 24 hours
Bond Strength (ASTM C321)	1600 psi at 28 days
Setting Times Initial (ASTM C293)	15-18 Minutes
Setting Times Final (ASTM C266)	22-25 Minutes
Cement	sulfate resistant
Freeze Thaw Durability (ASTM C666)	300 cycles not weight loss
Shrinkage (ASTM C596)	0%

C. Infiltration Control Material (Strong-Plug)

1. All visible leaks must be plugged prior to application of the cementitious monolithic liner. A rapid setting cementitious product specifically formulated for leak control shall be used to stop minor water infiltration and shall be mixed and applied according to manufacturers recommendations and shall have the following minimum requirements:

Compressive Strength (ASTM C109)	1000 psi at 1 hour 2500 psi at 24 hours
Sulfite Resistance (ASTM C267)	15 cycles no weight loss
Set Time	1 minute
Freeze Thaw Durability (ASTM C666)	100 cycles not weight loss

D. Pipe Sealant

1. Severe leaking around pipe entries shall be sealed around the exterior of the pipe with chemical grout. Chemical grout shall attain minimum tensile strength and elongation as follows:

Tensile Strength ASTM D-1564	21-30 psi
Elongation ASTM D-1564	150-250%

E. Liner Material

1. Cementitious-based liner products shall be used to form a structural/structurally enhanced monolithic liner covering all interior substrate surfaces of the manhole. All cementitious coating material shall be specifically designed for the rehabilitation of sanitary sewer precast or brick structures.

2. Material shall be applied by either low pressure spray or centrifugal spin cast equipment ensuring a monolithic application. Liner materials shall be applied per manufactures recommendations at a uniform thickness of 3/4 inch minimum. The material shall be troweled smooth following initial monolithic application to ensure proper bonding.

3. For mild sulfide conditions where pH is 3.0 or higher, or exterior lining conditions, Strong-Seal MS-2A shall be used. Material shall be made of Type 1 or 3 Portland cement and enhanced with silica fume, poly fiber

reinforcement.
Liner material shall have the following minimum characteristics:

Compressive Strength (ASTM C109)	9000 psi
Tensile Strength (ASTM C496)	800 psi
Flexural Strength (ASTM C293)	1200 psi
Bond Strength (ASTM C882)	2000 psi
Shrinkage (ASTM C596)	0%
Dry Bulk Density	82-85 pcf

4. For harsh sulfide conditions where pH is less than 3.0, Strong-Seal High Performance shall be used. Material shall be made of calcium aluminate cement and chemically stable aggregates

Compressive Strength (ASTM C109)	9000 psi
Tensile Strength (ASTM C496)	800 psi
Flexural Strength (ASTM C293)	1500 psi
Bond Strength (ASTM C882)	2000 psi
Shrinkage (ASTM C596)	0%
Dry Bulk Density	100-102 pcf

5. Liner material shall be factory blended requiring only the addition of water at job site. The cement content shall be 50%-60% of total bag weight.

6. Liner materials should meet or exceed industry standards and shall not have any basic ingredient that exceeds EPA maximum allowable limit for any heavy metal.

F. Water

1. Water used to mix product shall be clean and potable. Questionable water shall be tested by a laboratory in accordance per ASTM C-94 procedure. Potable water need not be tested.

G. Other Materials

1. No other material shall be used with the mixes as described without prior approval or recommendations from material manufacturer.

2.02 EQUIPMENT

A. Applicator must use approved equipment designed specifically for the application of cementitious liners in sanitary sewer system manholes.

B. Equipment shall be as recommended by the manufacturer to ensure proper mixing and pumping of the mortar and shall be clean and in good working order according to its recommendations for safe operation. Only factory certified workers shall operate the equipment. A high speed centrifugal spraying device with a controllable retrieval method shall be used to produce a uniform and dense application.

PART 3 – EXECUTION

3.01 PREPARATION

A. The manhole rehabilitation shall not be started until all pipe work is completed in the manhole.

B. All steps shall be removed by cutting and grinding flush to manhole walls.

C. Place covers over invert to prevent extraneous material from entering the sewer lines.

D. All foreign material shall be removed from the manhole wall and bench using a high pressure water spray (minimum 3500 psi). Unusual conditions such as heavy grease build-up or residues of industrial or processing wastes may require hydro-blasting or chemical cleaning which shall be subsidiary to other rehabilitation work. Loose and protruding brick, mortar, and concrete shall be removed using a mason's hammer and chisel and/or scraper. Fill any large voids with quick setting patching mix.

E. Active leaks shall be stopped using quick setting, specially formulated mixes according to manufacturer's recommendations. Some leaks may require weep holes to localize the infiltration during the application after which the weep holes shall be plugged with the quick setting mix prior to the final liner application.

Leaking around manhole pipe entries shall be sealed using rapid setting grout. For severe leakage a minimum of three holes will be drilled through the manhole wall around pipe entry larger in diameter than applicator probe. A chemical grout will be injected into the exterior around the pipe. Insert applicator in the lowest drilled hole. Pump chemical grout until voids are filled, soil or backfill is permeated, back pressure is encountered and grout re-enters through cracks. Repeat procedure in each drilled hole.

3.02 INVERT REPAIR

A. After all preparations have been completed, remove all loose material and wash wall again.

B. Any bench, invert, or service line repairs shall be made at this time using the quick setting patching mix and shall be used per manufacturer's recommendations.

C. Invert repair shall be performed on all inverts with visible damage or infiltration. After blocking flow through the manhole, and thoroughly cleaning invert, the quick setting patch mix shall be applied to the invert in an expeditious manner. The mix shall be troweled uniformly onto the damaged invert extending out onto the base of the manhole sufficiently to tie into the structural / structurally enhanced monolithic liner to be applied. The finished invert surfaces shall be smooth and free of ridges. The flow may be reestablished in the manhole within 30 minutes after placement of the mix.

D. Inverts that do not channel flow across the manhole shall be modified to function properly. This work shall include all labor, equipment, and materials necessary to reshape the existing invert and apply the patch mix described in this section.

3.03 MIXING OF LINER MATERIALS

A. For each bag of product, use the amount of water or water settings required per manufacturer's recommendations following mixing procedures noted on product bag and using the approved equipment for mixing and application.

B. Prepared mix shall be discharged into a hopper and mixing shall continue to occur in such a manner as to allow spraying continuously without interruption until each application is complete.

3.04 APPLICATION

A. Brick corbels and flat tops that have ledges shall be pre-sprayed by a hand held spray nozzle prior to centrifugal spraying to insure a complete monolithic liner transition. Material used shall be liner mix.

B. The wall surface shall be clean and free of all foreign material and shall be damp without noticeable free water droplets or running water, but totally saturated, just prior to application of each coat.

C. The wall liner shall be spray applied either by hand sprayer or by a centrifugal spraying device from the bottom of the wall to the top, using one pass for a uniform thickness of 3/4 inch. Trowel applying of the liner material will not be allowed. Trowel finishing after spray application is allowed.

D. The bench liner shall be spray applied in such a manner that a gradual slope is produced from the walls to the invert. The thickness at the edge of the invert shall be no less than 1/2 inch. The wall/bench intersection shall be rounded to a uniform radius the full circumference of the intersection. Bench lining shall be performed on every manhole.

E. When indicated on drawings, exterior cementitious lining shall be applied on exposed brick surfaces to a depth at least 6 inches below finish grade.

F. When indicated on drawings, application of a Strong Plug will be required as joint treatment in existing precast manholes that show visible signs of infiltration staining. The existing defective joint shall be ground out to a minimum depth of ½ inch and minimum width of 1/4 inch with right angle cuts. All debris will be power washed away prior to material application.

3.05 CURING

A. Caution should be taken to minimize exposure of applied product to sunlight and air movement. At no time should the finished product be exposed to sunlight or air movement for longer than 15 minutes before replacing the manhole cover.

B. In extremely hot and arid climates the manhole should be shaded while

reconstruction is in progress.

C. Exterior cementious lining shall be sprayed with a curing compound following application as recommended by the manufacturer and covered with plastic tarp or burlap sacks for a minimum duration of 7 days.

D. Traffic shall not be allowed over substrates for 24 hours after reconstruction is complete.

3.06 WEATHER

A. No application shall be made to frozen surfaces or if freezing is expected to occur inside the substrate within 24 hours after application.

B. If ambient temperatures are in excess of 95 degrees F, precautions shall be taken to keep the mix temperature at time of application below 90 degrees F. Mix water temperature shall not exceed 85 degrees F. Chill with ice if necessary.

3.07 FIELD TESTING AND ACCEPTANCE

A. Four two-inch cubes shall be cast each day or from every 50 bags of product used and shall be properly labeled and sent to manufacturer for testing in accordance with the owner's or manufacturers directions for compression strength testing as described in ASTM C109 procedure.

B. At the direction of the Owner and Engineer, the rehabilitated manholes shall be tested by the following methods:

1. Visually verify the absence of leaks.

2. Test each manhole in accordance with Manhole Vacuum Testing procedures as outlined in ASTM C 1244.

3.08 RAUSCH USA QUICKLOCK END SLEEVE

A. Install according to manufactures recommendations.

B. Incorporate hydrophilic waterstops with installation of Rausch USA QuickLock End Sleeve according to Rausch USA manufactures recommendations.

3.09 BASIS OF PAYMENT

A. The amount of completed and accepted work shall be paid for at the contract unit prices described in the itemized unit price schedule, which shall include all labor, materials, equipment, cleaning, preparation, tools and incidentals necessary for the proper and workmanlike completion of the work.

B. Payment for Manhole Cementitous Lining shall be paid as Vertical Foot and based on the field measurement from the bottom of manhole ring to the intersection of invert and bench of manhole. Accurate measurements will be

made to the nearest inch by the Contractor and witnessed by the Site Representative.

C. Bench lining shall be subsidiary to every manhole receiving Cementitous Lining.

D. Payment for Manhole Bench Repair shall be paid as Each.

E. Payment for New Bench shall be paid as Each.

F. Raise Manhole Ring and Cover shall be paid as Each

G. Remove Steps shall be subsidiary to manhole lining activities.

H. Reset Ring and Cover shall be paid as Each

I. Joint Treatment shall be paid for by the Linear Loot of joint repaired.

J. Rausch USA QuickLock End Sleeve shall be paid as Each.

END OF SECTION