

COMMONWEALTH OF KENTUCKY TRANSPORTATION CABINET www.transportation.ky.gov/

Andy Beshear Governor Jim Gray Secretary

August 12, 2020

CALL NO. 200 CONTRACT ID NO. 201028 ADDENDUM # 1

Subject: HARDIN-BULLITT COUNTIES, 121GR20D028-NHPP Letting August 21, 2020

(1)Revised - Cover Page - Page 1 of 260
(2)Revised - Stationing Information Sheets - Pages 19-25 of 260
(3)Revised - Special Notes - Pages 163-173 of 260

Proposal revisions are available at <a href="http://transportation.ky.gov/Construction-Procurement/">http://transportation.ky.gov/Construction-Procurement/</a>.

If you have any questions, please contact us at 502-564-3500.

Sincerely,

Kachel Mille

Rachel Mills, P.E. Director Division of Construction Procurement

RM:mr Enclosures

eProposal Jan-2009 REVISED ADDENDUM #1: 8-12-20



CALL NO. <u>200</u> CONTRACT ID. <u>201028</u> <u>HARDIN - BULLITT COUNTIES</u> FED/STATE PROJECT NUMBER <u>121GR20D028-NHPP</u> DESCRIPTION <u>1-65</u> WORK TYPE <u>JPC PAVEMENT REPAIRS</u> PRIMARY COMPLETION DATE <u>11/15/2021</u>

LETTING DATE: August 21,2020

Sealed Bids will be received electronically through the Bid Express bidding service until 10:00 am EASTERN DAYLIGHT TIME August 21,2020. Bids will be publicly announced at 10:00 am EASTERN DAYLIGHT TIME.

### NO PLANS ASSOCIATED WITH THIS PROJECT.

**DBE CERTIFICATION REQUIRED - 11.50%** 

**REQUIRED BID PROPOSAL GUARANTY:** Not less than 5% of the total bid.

#### REVISED ADDENDUM #1: 8-12-20



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#### SPECIAL NOTE FOR 3/8" EPOXY-URETHANE WATERPROOFING OVERLAY FOR BRIDGE DECKS

#### 1. **DESCRIPTION**

- **1.1** This specification describes the Pre-treatment and Overlay consisting of multiple layers of hybrid polymer systems and a special blend of extremely hard aggregate designed to provide a minimum of a 3/8" thick application for the purpose of complete waterproofing as well as providing a non-skid surface to withstand continuous heavy traffic and extreme changes in weather conditions.
- **1.2** Unless otherwise noted, Section references herein are to the Department's *Standard Specifications for Road and Bridge Construction*. All applicable portions of the Department's *Standard Specifications* apply unless specifically modified herein.

#### 2. MATERIALS

#### **Pre-treatment:**

#### 2.1 Hairline cracks

This two part hybrid polymer shall be free of any fillers, volatile solvents and shall be formulated to provide simple volumetric ratio of two components such as one to one or two to one by volume.

This hybrid polymer system shall be formulated to provide a unique combination of extremely low viscosity and low surface tension coupled with a built in affinity for concrete and steel.

#### **Overlay:**

**2.2** The two-part epoxy-urethane co-polymer system shall be free of any fillers volatile solvents and shall be formulated to provide simple volumetric mixing ratio of two components such as one to one or two to one by volume.

The epoxy-urethane co-polymer system shall be formulated to provide flexibility in the system without any sacrifice of the hardness, chemical resistance or strength of the epoxy-urethane co-polymer system. Use of external/conventional flexibilizers are not acceptable. Flexibility shall be introduced by interaction of elastomers to chemically link in the process of curing so that the flexibility of the molecule is least affected during the low temperature conditions that are confronted in actual use.

#### 2.3 Material Requirements

**2.3.1** Physical Requirements of Cured *Pretreatment for Cracks* System. When Components A and B are mixed in the appropriate ratio, the cured resin shall conform to the requirements of Table 1. (Test methods are discussed in detail in Item 3 of this specification.)

TABLE 1			
PHYSICAL PROPERTIES OF THE CURED PRETREATMENT			
SYSTEM			
Property	Value		
Compressive Strength, min. psi	5000		
Tensile Strength, min. psi	2500		
Elongation at Break, min percent	30		
Water Absorption, percent by wt. max.	0.5%		
Shore D hardness, min., 25°C (77°F)	65		
Gel Time, min, minutes	15 (100gms)		
Adhesion to Concrete	100% failure in concrete		
Percent Solids	100		

**2.3.2** Physical requirements of Epoxy-Urethane Copolymer Overlay System. When Components A and B are mixed in the appropriate ratio, the cured resin shall conform to the requirements of Table 2. (Test methods are discussed in detail in Item 3 of this specification.)

TABLE 2			
PHYSICAL PROPERTIES OF THE CURED OVERLAY SYSTEM			
Property	Value		
Compressive Strength, min. psi	5000		
Tensile Strength, min. psi	2000		
Elongation at Break, min. percent	30		
Water Absorption, percent by wt. max.	1.0%		
Shore D hardness, min, 25°C (77°F)	65		
Gel Time, min, minutes	15		
LA Abrasion, max. percent	35		
Adhesion to Concrete	100% failure in concrete		
Flexural Yield Strength, min. psi	5000		
Percent Solids	100		
Thermal Compatibility	Visual – No Delamination/Cracking		
Permeability to Chloride Ion at 28 days	100 Coulombs		

### 2.4 Aggregate

- 2.4.1 Aggregate used for all layers shall be non-friable, non-polishing, clean and free from surface moisture. It shall be durable and sound and have a proven record of performance in applications of this type. The aggregate shall be 100 percent fractured, thoroughly washed and kiln dried to a maximum moisture content of 0.2 percent by weight, measured in accordance with ASTM C566. The recommended sources of aggregate are **Washington Stone** or **Oklahoma Flint or an approved equivalent**
- **2.4.2** Aggregate for all layers shall have a minimum Mohs scale hardness of 7.
- **2.4.3** The grading of the aggregate shall conform to the requirements of Table 3

TABLE 3			
AGGREGATE GRADATION			
Sieve Size	Percent Passing		
No. 4	60 - 100		
No. 8	0 - 40		
No. 16	0 - 10		

### 3. METHOD OF TESTING

- **3.1** Tests shall be conducted in accordance with the following methods:
  - **3.1.1 Compressive Strength:** ASTM C579 Method B, *Compressive Strength of Chemical Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes.* The two components of the resin are to be thoroughly mixed in their appropriate ratios specified by the manufacturer. The samples shall then be prepared according to the conditioning requirements of ASTM C579 and allowed to cure for 7 days at  $23 \pm 2^{\circ}$ C.
  - **3.1.2 Tensile Strength and Elongation:** ASTM D638, *Tensile Properties of Plastics,* Specimen Type I or Type II. Samples shall be cured at  $23 \pm 2^{\circ}$ C (73.4  $\pm$  3.6°F) and 50  $\pm$  5% relative humidity. Speed of testing shall be at 0.5 in/min.
  - **3.1.3 Water Absorption:** ASTM D570, *Water Absorption of Plastics.* Sample specimens shall be prepared according to section 4.1 and allowed to cure at  $23 \pm 2^{\circ}$ C (73.4  $\pm$  3.6°F) and 50  $\pm$  5% relative humidity. Tests are then to be carried out as per section 6.1.

- **3.1.4** Shore D Hardness: ASTM D2240, Rubber Property Durometer Hardness. Specimen shall be prepared as per ASTM D570 section 4.1 and allowed to cure at  $23 \pm 2^{\circ}$ C (73.4  $\pm$  3.6°F).
- **3.1.5** Gel Time: The following procedure shall be used to determine gel time. Measure 4 oz. of Part A and 2 oz. of Part B each at 25°C (77°F), into an unwaxed paper cup and record the time and mix immediately. 100 gms of this mixture shall be poured into a 6 oz. unwaxed paper cup and placed on a wooden bench top. Starting twenty minutes from the time recorded above, the mixture shall be probed every two minutes with a small stick until a small ball forms in the center of the container. The total time, including mixing, required for the ball to form shall be regarded as the gel time. The test shall be performed in a room or enclosed area maintained at  $25 \pm 2^{\circ}$ C (77  $\pm 3.6^{\circ}$ F) and  $50 \pm 5\%$  relative humidity.
- **3.1.6 LA Abrasion, AASHTO T96** 35% Max
- 3.1.7 Adhesion to Concrete: ACI-503-R; Pull Out Test.
- 3.1.8 Flexural Yield Strength: ASTM D-790.
- **3.1.9 Thermal Compatibility:** ASTM C884, Determination if specimens are susceptible to debonding when subjected to temperature changes.

#### 4. CONSTRUCTION PRACTICE

#### 4.1 Surface Preparation

- **4.1.1** Perform full depth patching in accordance with the requirements of Section 606.03.05. All patching materials shall be in accordance with the requirements of Section 601 and be free of Magnesium Phosphate.
- **4.1.2** Patching shall be scheduled so that the bridge can be open to traffic during all non-working hours.
- **4.1.3** Partial depth patching system shall be approved by resin manufacturer and be completed prior to the polymer overlay. Completion of Partial Depth Patching including removal of concrete, cleaning, and placing the material will not be measured for payment and shall be considered incidental to "Epoxy-Urethane Waterproofing Overlay". The pay item includes additional quantity for partial depth patching.
- **4.1.4** The entire concrete deck shall be cleaned by shot blasting to remove any oil, dirt, rubber or any other potentially detrimental material such as curing compound and laitances which, in the manufacturer and engineer's opinion, would prevent proper bonding to and curing of the material. Ensure the shot blasting has obliterated all pavement markings.

Produce a surface relief that meets the International Concrete Repair Institute (ICRI) Surface Preparation CSP 5-7.

- **4.1.5** In areas that the shot blasting equipment cannot reach (i.e., along curbs and median walls) or cannot remove (pavement marking, asphalt, etc.), sandblasting and walk behind grinders are permitted to an extent satisfactory to the manufacturer and engineer. This should be performed prior to the shotblasting whenever applicable and practical.
- **4.1.6** Protect the bridge deck expansion joints, armored edges, drains, etc... with a bond breaker that can adequately seal the joints from the epoxy.
- **4.1.7** The overlay application equipment is allowed to drive on the deck surface during application provided precautions have been taken to insure that the deck surface will not become contaminated. For any reason traffic is to be allowed on the deck after surface preparation, or between layers, a visual inspection by the manufacturer and state engineer will be required to determine if additional surface preparation is needed before applying material.
- **4.1.8** All surfaces to be treated shall be dry at the time of application. Immediately before the application of any liquids, all prepared surfaces shall be cleaned with compressed air (or vacuumed) to remove dust and debris.
- **4.1.9** The application of the system shall not be made when it has rained 24 hours before application or rain is forecast (greater than 50%) within eight hours after application or as determined by the manufacturer (fog and high humidity will not impede the application of or affect the performance of the overlay). If waiting for 24 hours is impractical, then the moisture content in concrete substrate shall not exceed 4.5% when measured by an electronic moisture meter. Any exception shall be determined by the moisture content present in the deck which shall not exceed 75% of air entrainment in the mix design.
- **4.1.10** Materials shall be placed when the ambient air and bridge deck surface temperatures are greater than 55 deg F and less than 90 deg F.

#### 4.2 Application of Overlay System

4.2.1 The manufacturer of the epoxy-urethane overlay material shall have a representative on the jobsite at all times who has proven experience with the resin system and with guiding and assisting installers in the polymer overlay system installation. Who, upon consultation with the engineer, may suspend any item of work that is suspect and does not meet the requirements of this specification. Resumption of work will occur only after the manufacturer's representative and the engineer are satisfied that appropriate remedial action has been taken by the contractor.

- **4.2.2** The overlay shall be applied on all deck areas using metering, mixing and distribution machinery **approved by the manufacturer of the epoxy-urethane overlay system.** Ratio check verification at the pump outlets as well as cycle counting capabilities to monitor output will be standard features.
- **4.2.3** The number of layers (a minimum of two), excluding the pre-treatment if required and the application rates of the liquid in the various layers shall be as recommended by the manufacturer in order to achieve an average overlay thickness of 3/8".

#### 4.2.4 Hand mixing of material is not permitted.

#### 4.2.5 Application of Pre-treatment

#### Crack Filling (Pre-treatment as required)

**Application of the Liquid:** After mechanically measuring and mixing of the components, the liquid shall be evenly distributed on the clean, dry deck surface at the rate/process recommended by the manufacturer. The overlay application equipment may drive on this layer (prior to being cured) when applying the overlay system. If the overlay application is going to be applied after 6-8 hours of the pretreatments application, a medium size coarse silica sand shall be broadcasted evenly into the pretreatment system (prior to it curing) as directed by the manufacturer.

#### 4.2.6 Overlay (First and Second Layers )

**Application of Liquid:** Prior to the application, if there exists any excess or loose aggregate from the previous coat, such excess aggregate shall be completely removed by vacuum or with compressed air. After mixing of the components via the mechanical application equipment, the liquid shall be evenly distributed on the clean, dry deck surface at the rate recommended by the manufacturer.

**4.2.7** After the application of the liquid in the first and second coats, the maximum time allowed before broadcasting of the aggregate is as follows:

Above 90°F	 10 minutes
80°F to 90°F	 15 minutes
70°F to 80°F	 20 minutes
60°F to 70°F	 25 minutes
55°F to 60°F	 35 minutes

# 4.2.8 <u>No vehicle shall be allowed on the overlay during the curing period.</u>

- **4.2.9** Broadcasting on decks shall be by truck-mounted equipment capable of dispensing the aggregate onto the deck in a uniform manner as directed or otherwise approved by the manufacturer of the epoxy-urethane overlay.
- **4.2.10** The aggregate shall be broadcast as described below in a manner to cover the surface so that no wet spots appear and before the co-polymer begins to gel (see section 3.1.5). The aggregate must be dropped vertically in such a manner that the level of the liquid is not disturbed. Reclaimed aggregate is prohibited.
  - **4.2.10.1** In the first and second layers of **the polymer overlay system**, **the** aggregate conforming to table 3 shall be broadcast to saturation.
- **4.2.11 Removal of Excess Aggregate:** After the overlay has hardened, removal of all loose and excess aggregate with a power vacuum or other method shall be made prior to the application of subsequent coats.
- **4.2.12 Joints in the Overlay:** (i.e., between two adjacent lanes) shall be staggered 6 to 12 inches and overlapped between successive coats so that no ridges will appear. Prior to applying the first or second layer, duct tape shall be used to ensure a straight edge is created. The use of chalk lines can be used when applying the first layer only.
- **4.2.13 Traffic may be allowed** on the final layer (or in between layers) <u>after</u> the resin has cured (as determined by the manufacturer) and after removal of all excess, loose aggregate.
- **4.2.14** The prepared surface may be opened to traffic for no more than 24 hours. A light shot blast will be required prior to applying the pretreatment or first layer. A visual inspection by the inspector and manufacturer shall occur to ensure no additional prep is necessary to remove oil, tar, brake/tire residue, etc. After 24 hours, prep shall be per section 4.1.4.
- **4.2.15** The pretreatment with aggregate or first layer may be opened to traffic for no more than 24 hours. Prior to application of second layer, the inspector and manufacturer rep shall inspect the pretreatment with aggregate or first layer to ensure no additional surface prep is required to remove oil, brake/tire residue, etc. After 24 hours, prep shall be per section 4.1.4.

**4.2.16** Seams in the Overlay shall not be present between lanes. Driving lanes next to shoulders must be done in the same application pass so no additional seams/joints in overlay are created.

#### 5. STORAGE AND HANDLING

- **5.1 Liquid Material:** All material shall be transported and stored in their original containers inside a dry, temperature controlled facility and maintained at a manufacturer recommended temperature.
- **5.2** Job Site Storage: The materials shall be stored on the jobsite in a dry, weather protected facility away from moisture and within the temperature range of 60°F to 90°F. When the materials are transported or stored on the job in the application machine tanks, the material must also be maintained at a temperature of 60°F to 90°F. Outdoor storage is permitted with manufacturer's approval.
- **5.3 Handling of Liquid Materials on the Job:** Protective gloves, clothing, and goggles shall be provided to workers and inspectors directly exposed to the material if required. Product safety data sheets shall be provided to all workers and inspectors as obtained from the manufacturer.
- **5.4 Packing Requirement:** All materials must be packaged in strong, substantial containers. The containers shall be identified as Part A and Part B and shall be plainly marked with the name and address of the manufacturer, name of the product, mixing proportions and instructions, lot and batch numbers, date of manufacture, and quantity contained therein.
- **5.5 Aggregate:** All aggregate shall be stored in a dry, moisture-free atmosphere. The aggregate shall be fully protected from any contaminants on the jobsite and shall be stored so as not to be exposed to rain or other moisture sources.

#### 6. SAMPLING AND ACCEPTANCE

6.1 **Product Acceptance:** The manufacturer of the system shall provide evidence of field performance, lab performance with infrared spectra in order to obtain state approval of the overlay system for use on the project:

#### 6.1.1 Independent Lab Performance

A nationally recognized independent lab must verify that the material:

1. Has the capability of preventing the ingress of essentially all the chloride ions into the concrete at 1" depth when tested according to NCHRP-244 method.

- 2. Has the capability to de-activate the existing chloride ions present in the concrete specimen so that the corrosion of steel rebars embedded in the concrete stop corroding.
- 3. When tested as per Tables 1 and 2 fully comply with the test results specified for cured system.
- **6.1.2** Infrared Spectrograph: In addition to the initial certification process each manufacturer shall furnish the state an infrared spectra of each component of system for its permanent record and for individual installation verification.
- **6.1.3** Field Performance: The selected polymer overly system must have at least two years of satisfactory performance for non-interstate use and four years of satisfactory performance for interstate use in similar environmental conditions as the project in which it will be used.
- **6.2 Certification for Compliance:** At the pre-construction conference, the contractor shall notify the state project engineer of the source of material.
  - **6.2.1 Independent Test Lab Report:** Test results certified and verified by a nationally recognized independent testing laboratory verifying properties of the cured system as per Table 1 & 2 shall be submitted to the engineer for approval prior to the pre-construction conference. This certification shall be provided on each lot number to be used on the project.
  - **6.2.2 Infrared Spectra:** Infrared spectra of each component from each lot/batch number (to be used on the project) shall be submitted with the independent lab certification.
  - **6.2.3 Test Sample for DOT Laboratory:** The manufacturer shall furnish at least a one-quart sample of each component from each lot/batch to the DOT laboratory to verify material supplied by the manufacturer. Material shall be taken at job site.

#### 6.3 **Performance Acceptance**

**6.3.1** Thickness Verification: At the end of each day, the contractor will submit to the inspector/project engineer a signed project report stating the number of square yards applied, number of gallons used (for pretreatment and overlay) and number of pounds of aggregate estimated to have been used. In addition, the contractor shall verify to the State that the overlay is an average of at least 3/8" thick at three random locations agreed upon by the state engineer and material manufacturer representative. If 3/8" average is not achieved, a retest shall be performed in adjoining areas. Thin areas shall be re-coated as described above by the contractor and re-verified at no additional cost to the State. This verification may consist of cores, holes, etc., but in all cases, any

destructively tested areas shall be repaired by the contractor before final acceptance by the engineer.

#### 7. MEASUREMENT

- 7.1 **Epoxy-Urethane Waterproofing Overlay.** The Department will measure the overlay application in Square Feet.
- **7.2 Shotblasting**. The Department will measure "Blast Cleaning" in Square Yard. The Department will only measure this quantity once for any area to be shotblast. Additional blast cleaning to meet the requirements of this note shall be performed at the Contractor's expense.
- **7.3 Full Depth Patching**. The Department will measure "Concrete Class M Full Depth Patching" in Cubic Yard.

#### 8. PAYMENT

- 8.1 Epoxy-Urethane Waterproofing Overlay. The Department will pay for the measured quantities at the Contract unit bid price for "Epoxy-Urethane Waterproofing".
- **8.2** Shotblasting. The payment at the contract unit price for the pay item "Blast Cleaning" shall include all labor, equipment and material needed to complete the task as described in paragraphs 4.1.4 and 4.1.5.
- **8.3 Full Depth Patching.** The payment at the contract unit price shall include all labor, equipment and material needed to complete this task. The Department will not measure material removal, forming, blast cleaning, or retying steel reinforcement in the patches and will consider this work incidental to the pay item "Concrete Class M Full Depth Patching".

Code	Pay Item	<u>Pay Unit</u>
23331EC	Epoxy-Urethane Waterproofing	SQFT
08549	Blast Cleaning	SQYD
08526	CONC Class M Full Depth Patch	CUYD

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