TRANSPORTATION CABINET
Frankfort, Kentucky 40622
www.transportation.ky.gov/

Steven L. Beshear
Governor

Michael W. Hancock, P.E.
Secretary

June 20, 2014

CALL NO. 202
CONTRACT ID NO. 144007
ADDENDUM # 1

Subject: Jefferson County, 056GR14T008-HSIP
Letting June 27, 2014

(1)Revised - High Friction Surface Note - Pages 18-24 of 125

Proposal revisions are available at http://transportation.ky.gov/Construction-Procurement/.

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

Sincerely,

Diana Castle Radcliffe
Director
Division of Construction Procurement

DR:ks
Enclosures

SPECIAL NOTE FOR HIGH FRICTION SURFACE TREATMENT

I. DESCRIPTION

This work shall be performed in accordance with the Department's 2012 Standard Specifications, and applicable Standard Drawings except as hereafter specified. Article references are to the Standard Specifications.

The Contractor shall furnish all materials, labor, and equipment for the following work:

(1) Maintaining and Controlling Traffic; (2) Cleaning and preparing the existing surface; (3) Installing a high friction surface treatment in accordance with the contract documents; and (4) All other work as specified as part of this contract.

II. MATERIALS

Provide for sampling and testing of all materials in accordance with the Department's Materials Field Sampling and Testing Manual. Make materials available for sampling a sufficient time in advance of the use of the materials to allow for the necessary time for testing.

A. Maintain and Control Traffic. See Traffic Control Plan.

B. High Friction Surface Treatment. The high friction surface treatment shall consist of a polymer resin binder and aggregate system chosen from the approved lists in this special note. The Department will obtain one sample of each binder component and one sample of aggregate. The Department will obtain a one gallon (128 ounce) sample of each binder component for testing, and the Department will obtain one 40 to 50 pound sample of aggregate for testing.

List of Approved Materials for High Friction Surface Treatments for Asphalt Pavements

Polymer Resin Binder	Binder Manufacturer	Binder Type	Aggregate
Sher-Endure	Sherwin Williams	MMA	Calcined Bauxite
Sher-Friction	Sherwin Williams	Epoxy	Calcined Bauxite
Tire Grip	Ennis-Flint	Epoxy	Calcined Bauxite
TrafficGrip	Hitex Ltd	Epoxy	Calcined Bauxite
E-Bond 526	Transpo	Epoxy	Calcined Bauxite
PPC HFST	Kwik Bond Polymers	Polyester	Calcined Bauxite
Mark 154	Poly-Carb	Epoxy	Calcined Bauxite

List of Approved Materials for High Friction Surface Treatments for Concrete Pavements

Polymer Resin Binder	Binder Manufacturer	Binder Type	Aggregate
Sher-Endure	Sherwin Williams	MMA	Calcined Bauxite
Sher-Friction	Sherwin Williams	Epoxy	Calcined Bauxite
Mark-154	Poly-Carb	Epoxy	Calcined Bauxite

List of Approved Materials for High Friction Surface Treatments for Concrete Bridge Decks

Polymer Resin Binder	Binder Manufacturer	Binder Type	Aggregate
ProPoxy III	Unitex	Epoxy	Calcined Bauxite
Sikadur 22 Lo Mod	Sika	Epoxy	Calcined Bauxite
Sher-Friction	Sherwin Williams	Epoxy	Calcined Bauxite

a) Binder. The polymer resin binder shall hold the aggregate firmly in position and meet the following requirements:

TWO-PART MODIFIED BINDER REQUIREMENTS		
Property	**Specification Limits**	**Test Method**
Ultimate Tensile Strength	17.0 – 25.0 MPa (19.65 MPa)	ASTM D638
Compressive Strength	5mm min.; > 13 MPa	ASTM D695
Gel Time	50 ml; 10 minutes min. (16 minutes)	ASTM D2471
Elongation at break	30% minimum (54.0%)	ASTM D638
Peak Exothermic Temperature	150°F min.	ASTM D2471
Water Absorption	Less than 0.25%	ASTM D570
Shore Hardness	70 min.	ASTM D2240, Shore D
Cure Rate	3 hours max	ASTM D1640 @ 75°F
Mixing Ratio	Per Manufacturer's Recommendation	n/a

b) Aggregate. Ensure that the aggregate is clean, dry and free from foreign matter and meets the following requirements:

AGGREGATE REQUIREMENTS

Property	Specification Limits	Test Method
SFC – Side Force Coefficient	0.70 min.	ASTM E670
SN – Skid Number	69 min SN40R	ASTM E274
PSV – Polished Stone Value	75.0 mm max. (70 mm)	ASTM E660
Texture Depth – Sand Patch Method	1 mm min. (1.2 mm)	ASTM E965
AAV – Aggregate Abrasion Value	20 max	AASHTO T96
Aggregate Gradation	95.0 – 100.0% Passing No. 6 0.00 – 5.0% Passing No. 16	AASHTO T27

III. CONSTRUCTION METHODS

Prior to beginning work, provide the Engineer with a certification from the manufacturer of the binder stating that all material used in the work will meet the requirements of Section II A. a. in this Special Note. Also provide the Engineer with a certified certificate stating that all aggregates used in the work will meet the requirements of Section II A. b. of this Special Note.

A. Maintain and Control Traffic. See Traffic Control Plan.

B. Site Preparation. Be responsible for all site preparation, including but not limited to the following:

a) Preparation and Restoration. Ensure that a manufacturer's representative is on site to provide technical assistance during the start up operations and as necessary during the surface preparation, material placement and during any necessary remedial work.

b) Protective Coverings. Utilities, drainage structures, curbs, bridge joints, and any other structure within or adjacent to the high friction surface treatment location shall be protected from surface preparation activities and application of the surface treatment materials. Cover and protect all existing pavement markings that are adjacent to the surface treatment location. Pavement markings that conflict with the surface application shall be removed prior to performing the required surface preparation.

c) Surface Preparation. Prepare all surfaces in accordance with the following requirements. Ensure surfaces are dry and meet the requirements of the section immediately prior to installation of the high friction surface treatment. Surfaces contaminated with oils, greases, or other deleterious materials not removed by the required surface preparation shall be washed with a mild detergent solution, rinsed with clean potable water and dried using a hot compressed air lance.

d) Asphalt Pavement. Clean asphalt pavement surfaces using mechanical sweepers and high pressure air wash. Mechanically sweep all surfaces to remove dirt, loose aggregate, debris and deleterious material. Air wash all surfaces using a minimum of 180 CFM clean and dry compressed air. Maintain the air lance perpendicular to the surface and the tip of air lance within 12 inches of the surface. For applications on new asphalt pavement, ensure the surface has cured a minimum of 30 days prior to performing surface preparation and installation of the high friction surface treatment.

e) Concrete Pavement. Clean concrete pavement surfaces by shot blasting and vacuum sweeping. Shot blast all surfaces to remove all curing compound, loosely bonded mortar, surface carbonation and deleterious material. The prepared surface shall comply with the International Concrete Repair Institute (ICRI) standard for surface roughness CSP 5. After shot blasting, vacuum sweep all surfaces to remove all dust, debris and deleterious material.

f) Concrete Bridge Deck. Clean the entire area of the deck surface and vertical faces of curbs, barrier walls, and plinths up to a height of one inch above the top elevation of the overlay, and areas to receive epoxy-sand slurry by shot blasting and vacuum sweeping. Shot blast all surfaces to remove all curing compound, loosely bonded mortar, surface carbonation and deleterious material. Areas to receive epoxy-sand slurry shall be cleaned to a bright, clean appearance. The prepared bridge deck surface to receive high friction surface treatment shall comply with the International Concrete Repair Institute (ICRI) standard for surface roughness CSP 5. After shot blasting, vacuum sweep all surfaces to remove all dust, debris and deleterious material.

g) Pre-Treating. Pre-treat joints and cracks greater than 1/4 inch in width and depth with properly proportioned and mixed polymer resin binder. Once the binder in the pre-treated areas has gelled, the installation of the high friction surface treatment may proceed.

C. Mechanized Application. Do not apply surface treatment on a wet surface, when the ambient air or surface temperature is below 50^{o}F or above 110^{o}F, or when the anticipated weather conditions or surface temperature would prevent the proper application of the surface treatment as determined by the manufacturer.

Apply the polymer resin binder by a truck or trailer mounted application machine that must be capable of continually mixing and delivering the binder components on demand within the temperature range specified in varying widths of up to 12 feet wide at a uniform application thickness. Ensure that the mechanically applied distributing equipment includes accurate measuring devices and/or calibrated containers and thermometers for measuring the binder temperature prior to placement should heating be required. Operations will proceed in such a manner that will not allow the binder material to separate in the mixing lines, cure, dry, or otherwise impair retention bonding of the high friction surfacing aggregate. The application machine shall be equipped with flushing systems such that blockages of lines will not occur, and installation operations are not delayed, stopped, or otherwise compromised. Ensure that mechanical applications are capable of applying binder uniformly at a minimum rate of 10 gallons per minute. The mixed components are mechanically applied onto a prepared surface with a minimum coverage rate of 3.5 square yards per gallon at a minimum uniform thickness of 50 mils onto the surface. In addition, ensure that the application machine complies with the requirements of the binder manufacturer.

The aggregate shall be applied within 120 seconds of the binder application onto the surface. Uniformly spread aggregate immediately without causing excessive overlap of aggregate outside of coverage area. Ensure that the mechanical aggregate spreader is capable of applying a continuous application of varying widths up to 12 feet wide, in a manner to not violently disturb the wet binder film, at a rate of approximately 13-15 lbs per square yard. Complete coverage of the “wet” binder with aggregate is necessary to achieve a uniform surface. No exposed wet spots of the binder shall be visible once the aggregate is installed. The operations should proceed in such a manner that will not allow the mixed binder material to separate, cure, dry, be exposed or otherwise harden in such a way as to impair retention and bonding of the high friction surfacing aggregate. Do not use vibratory or impact type compaction on the aggregate after placement.

D. Hand Application. At the Engineers discretion, corrective work and application to areas such as intersections or areas less than 300 square yards, or where truck mounted application

machines are not applicable to the specified locations because of logistical restrictions, may be performed by hand application of the high friction surface treatment.

Do not apply surface treatment on a wet surface, when the ambient air or surface temperature is below 50°F or above 110°F, or when the anticipated weather conditions or surface temperature would prevent the proper application of the surface treatment as determined by the manufacturer.
The polymer resin binder components Part (A) and Part (B) shall be proportioned to the correct ratio (+/- 2% by volume), mixed using a low speed high torque drill fitted with a helical stirrer.

The mixed components shall be hand applied onto a prepared surface at a minimum coverage rate of 3.5 square yards per gallon at a minimum uniform thickness of 50 mils onto the surface. Hand applied binder will be uniformly spread onto the prepared surface by the use of a continuous V notch serrated edged squeegee.

Immediately after placing the binder, apply the aggregate, in a manner to not violently disturb the wet binder film, at a rate of approximately 13-15 lbs per square yard. Do not use vibratory or impact type compaction on the aggregate after placement.

E. Curing of Installed High Friction Surface Treatment. Allow the installed high friction surface treatment to cure in accordance with manufacturer recommendations (approximately 3 hours at an ambient air temperature of at least 50 degrees Fahrenheit). Protect treated surfaces from traffic and environmental effects until the area has cured.

F. Removal of Excess Aggregate. Remove the excess aggregate from the treatment area and all adjacent surfaces by mechanical sweeping or vacuum sweeping the surfaces a minimum of 3 times before applying additional application and/or opening to traffic. In addition, re-sweep the treatment area and adjacent surfaces using mechanical sweeping or vacuum sweeping 48 hours after opening to traffic to remove all additional loose aggregate and aggregate shed by the action of traffic.

G. Disposal of Waste. All debris, excess aggregate, materials containers, and other waste shall be disposed of off the Right-of-Way at approved sites obtained by the Contractor at no cost to the Department. No separate payment will be made for the disposal of waste and debris from the project, but shall be incidental to the other items of the work.

H. Restoration. Any roadway features disturbed by the work or the Contractor's operations shall be restored in like kind materials and design as directed by the Engineer at no additional cost to the Department.

I. Property Damage. Be responsible for all damage to public and/or private property resulting from the work. Repair or replace damaged roadway features in like kind materials and design as directed by the Engineer at no additional cost to the Department. Repair or replace damaged private property in like kind materials and design to the satisfaction of the owner and the Engineer at no additional cost to the Department.

J. On-Site Inspection. Before submitting a bid for the work, make a thorough inspection of the site and determine existing conditions so that the work can be expeditiously performed after a contract is awarded. The Department will consider submission of a bid to be evidence of this inspection having been made. The Department will not honor any claims for money or time extension resulting from site conditions.

K. Right-of-Way Limits. All work is located within the existing right of way. Limit work activities to the Right-of-Way and work and staging areas secured by the Contractor at no additional cost to the Department. Be responsible for all encroachments onto private lands.

L. Caution. The information in this proposal and shown on the plans and the type of work listed herein are approximate only and are not to be taken as an accurate evaluation of the materials and conditions to be encountered during construction; the bidder must draw his own conclusions. The Department does not give any guarantee as to the accuracy of the data and no claim for money or time extension will be considered if the conditions encountered are not in accordance with the information shown.

M. Control. Perform all work under the absolute control of the Department of Highways. Obtain the Engineer's approval of all designs required to be furnished by the Contractor prior to incorporation into the work. The Department reserves the right to have other work performed by other contractors and its own forces and to permit public utility companies and others to do work during the construction within the limits of, or adjacent to, the project. Conduct operations and cooperate with such other parties so that interference with such other work will be reduced to a minimum. The Department will not honor any claims for money or time extension created by the operations of such other parties.

Should a difference of opinion arise as to the rights of the Contractor and others working within the limits of, or adjacent to, the project, the Engineer will decide as to the respective rights of the various parties involved in order to assure the completion of the Department's work in general harmony and in a satisfactory manner, and his decision shall be final and binding upon the Contractor.

IV. FIELD EVALUATION

At the option of the Engineer, skid testing shall be conducted by the Department on the existing surface within 30 days prior to installation of the high friction surface treatment.

High friction surface treatments shall be evaluated for skid resistance by lock wheel skid testing as per ASTM E274, between 60 and 90 days after installation. Acceptable installed high friction surface treatments shall produce, at a minimum, a skid number (SN) of 69. Surface treatment applications not meeting average minimum skid test results of 69 SN shall be removed and replaced at no cost to the Department.

V. METHOD OF MEASUREMENT

A. Maintain and Control Traffic. See Traffic Control Plan.

B. Site Preparation. Other than the bid items listed, site preparation will not be measured for payment, but shall be incidental to high friction surface treatment.

C. High Friction Surface Treatment. The Department will measure the surface area coverage of High Friction Surface Treatment in Square Yards.

VI. BASIS OF PAYMENT

A. Maintain and Control Traffic. See Traffic Control Plan.

B. High Friction Surface Treatment. Payment for the accepted quantity at the Contract unit price per Square Yard shall be full compensation for furnishing all labor, materials, equipment, and incidentals for furnishing and installing High Friction Surface Treatment. Payment shall not be made prior to the final and accepted sweeping, 48 hours after installation.