

DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES

OFFICE ENGINEER

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January 30, 2015

03-Sac,But-5, 50, 51, 80, 99, 191-VAR

03-4F1304

Project ID 0314000040

ACHSNH-000C(389)

Addendum No. 4

Dear Contractor:

This addendum is being issued to the contract for CONSTRUCTION ON STATE HIGHWAY IN BUTTE AND SACRAMENTO COUNTIES AT VARIOUS LOCATIONS.

Submit bids for this work with the understanding and full consideration of this addendum. The revisions declared in this addendum are an essential part of the contract.

Bids for this work will be opened on Thursday, February 5, 2015.

This addendum is being issued to revise the *Notice to Bidders and Special Provisions* and the ebid *Bid* book to remove the DBE Commitment and Good Faith Efforts Documentation.

In the Special Provisions, Section 37-6, "HIGH FRICTION SURFACE TREATMENT," is replaced as attached.

To *Bid* book holders:

Inquiries or questions in regard to this addendum must be communicated as a bidder inquiry and must be made as noted in the *Notice to Bidders* section of the *Notice to Bidders and Special Provisions*.

Submit the *Bid* book as described in the *Electronic Bidding Guide* at the Bidders' Exchange website.

http://www.dot.ca.gov/hq/esc/oe/electronic_bidding/electronic_bidding.html

Inform subcontractors and suppliers as necessary.

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This addendum, EBS addendum file and attachment are available for the Contractors' download on the Web site:

http://www.dot.ca.gov/hq/esc/oe/project_ads_addenda/03/03-4F1304

If you are not a *Bid* book holder, but request a book to bid on this project, you must comply with the requirements of this letter before submitting your bid.

Sincerely,


AMARJEET BENIPAL
District Director

Attachment

**Add Section 37-6:
37-6 HIGH FRICTION SURFACE TREATMENT**

37-6.01 General

37-6.01A Summary

Section 37-6 includes specifications for placing high friction surface treatment (HFST) on asphalt concrete or portland cement concrete surfaces or both as shown on project plans.

HFST consists of applying multi component resin binder topped with calcined bauxite aggregate.

Use multi component resin binder described.

37-6.01B Definitions

Not Used

37-6.01C Submittals

Submit a HFST Quality Control Plan (QCP). The plan review time is five working days.

The HFST QCP must include detailed information about:

1. Schedule for the trial HFST work and the production HFST work
2. Description of surface preparation for proposed HFST placing
3. Description of equipment such as make and model of Automated Continuous Application Vehicle or The Mechanical Mixer and Aggregate Applicator and for measuring such weigh meter, positive flow meter, mixing, data recording, placing and finishing HFST.
4. Method of protecting areas not to receive HFST
5. Cure time estimates for HFST
6. Safe storage and handling of HFST components
7. Disposal of excess HFST and containers
8. Contingency plans for possible equipment failure and material issues during HFST placing
9. Name of the certified independent testing laboratory.

Have one quart of multi component resin binder and 50 pounds of calcined bauxite aggregate tested at a certified independent testing laboratory and then furnish the test results to the engineer for verification that the materials meet all the requirements specified.

Submit the following two working days before use:

- 1 A Material Safety Data Sheet for each shipment of HFST multi component resin binder
- 2 Certified independent testing laboratory test results for the multi component resin binder and calcined bauxite aggregate

Do not begin trial HFST until authorized.

37-6.01D Quality Control and Assurance

Complete a trial of HFST application at an authorized location before starting HFST production work.

The trial HFST must:

1. Be at least 12 feet wide by 20 feet long
2. Be constructed using the same equipment as the production work
3. Replicate field conditions, including ambient and surface temperatures, anticipated for the production work
4. Demonstrate surface preparation requirements as outlined in the QCP
5. Remove pavement markers and delineation within the area to receive HFST, for the lane and length involved, prior to placing resin binder
6. Document the settings on the applicator equipment, initial quantities of resin and aggregate topping, and unused quantities of resin binder and aggregate remaining in the applicator equipment after applying the HFST
7. Determine the initial set time for the multi cresin binder
8. Test the coefficient of friction using ASTM E1911 on the trial HFST

Do not begin production HFST until authorized after successful completion of the trial HFST.

Take a 1-quart sample of the multi component resin binder from the trial HFST and once during production work. Test under ASTM D638 by a certified independent testing laboratory. Provide the test results within 5 days after taking the sample.

If the trial HFST coefficient of friction is below 0.75, correct or replace the trial HFST until the coefficient of friction is greater than or equal to 0.75.

37-6.02 MATERIALS

37-6.02A General

Not Used

37-6.02B Multi component Resin Binder

Use a two-part exothermic multi component resin binder which holds the aggregate topping firmly in place, and meets the requirements shown in the following table:

Multi component Resin Binder Requirements

Property	Requirement	Test Method
Ultimate Tensile Strength	2650 psi min.	ASTM D 638
Elongation at break point	30% min.	ASTM D 638
Compressive Strength	1600 psi min at 3 hrs.	ASTM D 695
Water Absorption	1.0 % max.	ASTM D 570
Shore D Hardness, min. 77°F	65-75	ASTM D 2240
Viscosity	1000-3000 MPa	ASTM D 2393
Flexural Yield Strength, min psi	2000	ASTM D 790
Cure Rate	3 hrs. max.	ASTM D 1640, 0.2" thickness
Mixing Ratio	As recommended by the manufacturer	N/A

37-6.02C Epoxy Resin Binder

Not Used

37-6.02D Calcined Bauxite Aggregate

Use a blend of calcined bauxite aggregate. The aggregate must be clean, dry, free from clay and any other deleterious matter and meet the requirements shown in the following table:

Calcined Bauxite Aggregate Requirements		
Property	Requirement	Test Method
Aggregate Grading	No. 6 Percentage Passing 95% min No. 16 Percentage Passing 5% max	CTM 202
Aggregate Abrasion Value Loss at 100 rev.	10% max.	CTM 211
Polish Stone Value	Report only	ASTM D 3319
Aggregate Acid Insolubility	Greater than 90%	ASTM D 3042
Aggregate Magnesium Soundness	30% max	ASTM C 88

37-6.03 CONSTRUCTION

37-6.03A Pre-construction conference

Schedule a pre-construction conference with the engineer at a mutually agreed time and place. Make the arrangements for conference facility. Be prepared to discuss trial HFST requirements and hand mixing application areas and application rates.

Attendance at the pre-construction conference is mandatory for:

1. HFST Supplier
2. HFST Foreman
3. Project Superintendent

37-6.03B General

Attendance during construction activities is mandatory for:

1. HFST Supplier
2. HFST Foreman
3. Project Superintendent

37-6.03C Surface Preparation

Surfaces must be clean, dry and free of any dust, oil, debris, organic matter or any material that may interfere with the bond between multi component resin binder and existing surfaces.

Remove pavement markers and delineators to a maximum depth of 0.01 foot from the area receiving HFST. Perform street sweeping before multi component resin binder application. Pre-treat cracks greater than 0.25 inch wide with mixed multi component resin binder. Place HFST after mixed multi component resin binder has gelled.

For portland cement concrete surfaces, steel shot used for abrasive blast must comply with SSPC-AB3 and recycled steel shot must comply with SSPC-AB2.

Before applying HFST treatment on portland cement concrete surfaces, perform following activities in the order listed;

1. Abrasive blast the surface with steel shot
2. Sweep the surface clean
3. Blow the surface clean with pressurized air

The concrete pavement surface must be dry when abrasive blasting is performed. All laitance, contaminants, paint, markers, foreign material etc., must be removed from the concrete surface.

If the concrete pavement surface becomes contaminated before placing the HFST treatment, abrasive blast clean the contaminated area and sweep the concrete pavement clean.

Asphalt concrete pavement surface must be greater than 30 days old for HFST application. If the surface is less than 30 days old, asphalt concrete surface must be sand blasted, swept and vacuumed before applying HFST.

Protect utilities, drainage structures, curbs and other structures within or adjacent to treatment location from HFST materials using methods outlined in the QCP.

37-6.03D HFST Application

Apply HFST under multi component resin manufacturer's recommendations.

Spread multi component resin binder at a minimum rate of 0.32 gal/sq yd.

Spread aggregate at a minimum rate of 18 lb/sq yd.

Cure HFST for a minimum period recommended by the supplier. During curing close the HFST application area to all vehicles and construction equipment.

Multi component resin binder material that has not completely cured on pavement surface within 2 hours of application is considered non performing and must be removed and replaced before opening to traffic.

The surface texture of HFST must be uniform in appearance, with no streaks, bumps, or depressions. Any areas free of HFST must be covered by HFST and cured before opening the area to traffic.

Test the HFST at an interval of 200 ft alternately in both wheel paths such that a minimum of 5 tests are performed per lane under ASTM E 1911. Report the friction test results to the Engineer before opening HFST to traffic.

37-6.03E Mixing & Application Methods

37-6.03E(1) General

Use one of the following methods to apply multi component resin binder and aggregate wearing course under manufacturer's recommendations:

1. Automated continuous application
2. Mechanical mixing and aggregate application
3. Hand mixing and application

Do not use the 2nd application method on areas with a slope greater than 2.5 percent in any direction.

Do not use the 3rd application method on areas greater than 200 square yards, application is restricted to areas where automated application is not possible.

37-6.03E(2) Automated Continuous Application

Automated continuous application must be performed by an applicator vehicle with a minimum capacity of 30,000 lbs of aggregate and a minimum of 1200 gallons of the multi component resin binder. The applicator must continuously mix, meter, monitor and apply the multi component resin binder and aggregate in 1 continuous pass as 1 layer up to a width of 12 feet. Apply additional layers as specified within 4 hours of the previous cured layer.

The applicator vehicle must be equipped with a built-in data management unit which is capable of producing real time data flow showing:

1. The volume of multi component resin binder
2. The multi component resin binder thickness in mils on average throughout the application width
3. The weight of aggregate applied throughout the application width

The automated continuous applicator vehicle must have continuous pumping and proportioning device that blend the binder within a controlled system. The binder must be blended and mixed to the ratio under manufacturer's recommendations ($\pm 2\%$ by volume). The binder must be continuously applied once blended. The applicator vehicle must be capable of applying the minimum binder spread rate. Clean the mix head and delivery lines if application of the mixed multi component resin binder is stopped for more than 30 minutes.

The calcined bauxite aggregate must be applied by the same automated continuous application vehicle that applies the multi component resin binder to the pavement surface. The automatic aggregate spreader must be capable of applying up to a continuous 12 foot width application.

Do not allow the mixed multi component resin binder to do any of the following that may impair retention and bonding of aggregate:

1. Separate
2. Cure
3. Dry
4. Be exposed
5. Harden

Do not contaminate the exposed uncured mixed multi component resin binder by any of the following forms of contact

1. Walking
2. Standing
3. Construction traffic

Replace contaminated areas of multi component resin binder.

37-6.03E(3) Mechanical Mixing and Application

Mix resin multi component binder with equipment capable of mixing, metering, monitoring and applying while maintaining the designed proper mix ratio. Uniformly spread the multi component resin binder onto the surface using a serrated edge squeegee. Mechanically apply the aggregate. Cover exposed areas of wet multi component resin binder by hand immediately before the binder gels.

37-6.03E(4) Hand Mixing and Application

For authorized low volume areas and areas less than 200 square yards, hand mix the multi component resin binder under manufacturer's recommendations. Uniformly spread the multi component resin binder onto the surface using a serrated edge squeegee. Immediately apply the aggregate until refusal.

37-6.03F Excess Aggregate Removal and Reuse

The excess aggregate may be reused. The aggregate must be reclaimed by a mechanical sweeper. The recovered calcined bauxite aggregate must be clean, uncontaminated and dry. Recovered aggregate must be used only once. Blend the recovered aggregate with new calcined bauxite aggregate at a rate of 2 to 1 by volume (2 super sacks of new calcined bauxite aggregate blended with one super sack of recovered calcined bauxite aggregate). The installer must provide a record of all recovered calcined bauxite aggregate. The super sacks containing recovered calcined aggregate must clearly be marked "Recovered Calcined Bauxite Aggregate" with the project number.

Remove excess and loose aggregate from the traveled way and shoulders by sweeping. Application of HFST on highway ramps requires a second street sweeping 24-48 hours after application on the ramp before placement of pavement markers and delineation.

37-6.04 PAYMENT

Not Used