

**DEPARTMENT OF TRANSPORTATION**

DIVISION OF ENGINEERING SERVICES

OFFICE ENGINEER

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*Flex your power!  
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November 4, 2011

11-SD,Imp-8-R0.0/R10.0

11-266104

Project ID 1100020185

Addendum No. 1

Dear Contractor:

This addendum is being issued to the contract for CONSTRUCTION ON STATE HIGHWAY IN SAN DIEGO AND IMPERIAL COUNTIES FROM SAN DIEGO COUNTY LINE TO ROUTE 98/8 SEPARATION.

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 November 10, 2011.

This addendum is being issued to revise the Project Plans, the Notice to Bidders and Special Provisions, and the Bid book.

Project Plan Sheets 22 and 23 are revised. Copies of the revised sheets are attached for substitution for the like-numbered sheets.

In the Special Provisions, Section 10-1.09, "MAINTAINING TRAFFIC," Charts 1, 2, and 3 are revised as attached.

In the Special Provisions, Section 10-1.19, "EXISTING HIGHWAY FACILITIES," subsection "COLD PLANE ASPHALT CONCRETE PAVEMENT," subsection "GENERAL," sub-subsection "Sequencing and Scheduling," is revised as follows:

"Schedule cold planing activities to ensure hot mix asphalt (HMA) or warm mix asphalt (WMA) is placed over cold planed area during the same work shift before opening to traffic. If you cannot place HMA or WMA over the entire cold planed area before opening it to traffic

1. Construct a temporary HMA taper to the level of the existing pavement
2. Place HMA or WMA during the next lane or shoulder closure for that area.
3. Submit a corrective action plan that shows that you are able to cold plane and place HMA or WMA in the same work shift. Do not perform cold planing work until the Engineer approves the corrective action plan."

In the Special Provisions, Section 10-1.21, "ASPHALT RUBBER SEAL COAT," is revised as attached.

In the Special Provisions, Section 10-1.22, "RUBBERIZED HOT MIX ASPHALT (GAP GRADED WITH WARM MIX ASPHALT TECHNOLOGIES," subsection "CONSTRUCTION," sub-subsection "RHMA-G with WMA Additive production and placement," is revised as follows:

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"Produce an asphalt mixture with the temperature range of 275°F and 300°F. If the atmospheric temperature is below 60°F, cover loads in trucks with tarpaulins. The tarpaulins must completely cover the exposed load until you transfer the mixture to the paver's hopper or to the pavement surface."

In the Special Provisions, Section 10-1.22, "RUBBERIZED HOT MIX ASPHALT (GAP GRADED WITH WARM MIX ASPHALT TECHNOLOGIES," subsection "PAYMENT," the second paragraph is revised as follows:

"The contract price paid per ton for Rubberized Warm Mix Asphalt (Gap Graded) includes full compensation for furnishing all labor, materials, tools, equipment, WMA additives and technical representation and incidental for doing all the work involved in constructing RHMA-G with WMA Technologies, complete in place as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer,"

In the Special Provisions, 10-1.40, "TWO-COMPONENT PAINT TRAFFIC STRIPE," is revised as attached.

In the Bid book, in the "Bid Item List," Item 22 is revised as attached.

To Bid book holders:

Replace the entire page 4 of the "Bid Item List" in the Bid book with the attached revised page 4 of the Bid Item List. The revised Bid Item List is to be used in the bid.

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.

Indicate receipt of this addendum by filling in the number of this addendum in the space provided on the signature page of the Bid book.

Submit bids in the Bid book you now possess. Holders who have already mailed their book will be contacted to arrange for the return of their book.

Inform subcontractors and suppliers as necessary.

This addendum and attachments are available for the Contractors' download on the Web site:

[http://www.dot.ca.gov/hq/esc/oe/project\\_ads\\_addenda/11/11-266104](http://www.dot.ca.gov/hq/esc/oe/project_ads_addenda/11/11-266104)

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,



REBECCA D. HARNAGEL *for*  
Chief, Office of Plans, Specifications & Estimates  
Office Engineer  
Division of Engineering Services

Attachments

<b>Chart No. 1 Freeway/Expressway Lane Requirements</b>																										
County: IMP					Route/Direction: 8/EB										PM: R77.52/R10.18											
					8/ WB										R10.53/ R0.00											
Closure Description: 0.25 Mi. W. of San Diego County/Imperial County Line to 0.11 Mi. W. of Jct. Rte. 98																										
0.25 Mi. E. of Jct. Rte. 98 to San Diego County/Imperial County Line																										
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays		1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Fridays		1	1	1	1	1		1	1	1	1	1	1	1	1	1	1									
Saturdays								1	1	1	1	1	1	1	1	1	1	1	1	1	1					
Sundays								1	1	1	1	1	1	1	1	1	1						1	1	1	
Legend:																										
1		Provide at least one through freeway lane open in direction of travel																								
		Work permitted within project right of way where shoulder or lane closure is not required.																								
REMARKS:																										

**Chart No. 2  
Complete Connector Closure Hours**

County: IMP	Route/Direction: 8/EB  8/ WB	PM: R10.178  R10.279
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Closure Description: EB 8 Connector to EB 98  
  
WB 8 Connector from WB 98

FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C			C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Fridays	C	C	C	C	C			C	C	C	C	C	C	C	C	C									
Saturdays								C	C	C	C	C	C	C	C	C	C	C	C	C					
Sundays								C	C	C	C	C	C	C	C	C							C	C	C

Legend:

C Connector may be closed completely

Work permitted within project right of way where shoulder or lane closure is not required.

REMARKS:  
No other closure that conflicts with or shares any elements of the following detours will be permitted.

**Detour EB 8 Connector to EB 98**  
Detour EB 8 Conn. to EB 98 traffic via easterly on Rte. 8 to Imperial Hwy. thence southerly on Imperial Hwy. to EB Rte. 98

When the Conn. is closed, place a PCMS (Portable Changeable Message Sign) on EB 8, 0.5 Mi. W. of Rte. 98. Warning the traffic of the closure ahead.

**Detour WB 8 Connector from Rte. 98**  
Detour WB 98 Conn. to WB 8 traffic via westerly on Rte. 98 to Imperial Hwy. thence northerly on Imperial Hwy. to WB 8 On-ramp from Imperial Hwy.

When the Connector is closed, place a PCMS (Portable Changeable Message Sign) on WB 98, 0.5 Mi. E. of Imperial Hwy. warning the traffic of the closure ahead.

**Chart No. 3  
Complete Ramp Closure Hours**

County: IMP	Route/Direction: 8/EB-WB	PM: R0.026 R2.976 R3.206 R3.730  R3.151 R2.916
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Closure Limits: EB On-ramp from In Ko Pah  
 EB Off-ramp to Mountain Springs Rd.  
 EB On-ramp from Mountain Springs Rd.  
 EB Off-ramp to Truck Escape Ramp  
  
 WB Off-ramp to Mountain Springs Rd.  
 WB On-ramp from Mountain Springs Rd.

FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C		C	C	C	C	C	C	C	C	C	C	C	C	C	C		C	C	C	
Fridays	C	C	C	C	C		C	C	C	C	C	C	C	C	C										
Saturdays							C	C	C	C	C	C	C	C	C	C	C	C	C						
Sundays							C	C	C	C	C	C	C	C	C							C	C	C	

Legend:

- C Ramp may be closed completely
- Work permitted within project right of way where shoulder or lane closure is not required.

REMARKS:  
 NOTE: When an Off-ramp is closed completely, place a PCMS (Portable Changeable Message Sign) in the direction of travel allowing the traffic the option to use the preceding Off-ramp and warning them of the ramp closure ahead.

### 10-1.21 ASPHALT-RUBBER SEAL COAT

Asphalt-rubber seal coat shall consist of an application of asphalt-rubber binder and screenings precoated with paving asphalt. Asphalt-rubber seal coat shall conform to the provisions specified for seal coats in Section 37-1, "Seal Coats," of the Standard Specifications and to these special provisions.

#### GENERAL

Attention is directed to "Order of Work" and "Damage Claims" of these special provisions regarding placement of asphalt-rubber seal coat.

The Contractor shall furnish a Certificate of Compliance to the Engineer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for each material used in the asphalt-rubber binder and the asphalt-rubber binder mixture. When requested by the Engineer, the Contractor shall also submit samples with the Certificates of Compliance. The Contractor shall provide the Engineer a Material Safety Data Sheet (MSDS) for each of the constituent components of the asphalt-rubber binder and for the completed mixture of the asphalt-rubber binder.

The Contractor shall provide a Certificate of Compliance for each truck load of crumb rubber modifier (CRM), paving asphalt, and asphalt modifier delivered to the project. The Quality Control Program used by the manufacturer of each ingredient shall include a sampling and testing frequency as shown below:

- A. CRM shall be tested except for the grading requirement, at least once for every 250 tons with a minimum of once per project. CRM shall be tested for grading for every truck load delivered to the project.
- B. Paving asphalt shall be tested at least once for every 200 tons of production with a minimum of once per project.
- C. Asphalt modifier shall be tested at least once for every 25 tons of production with a minimum of once per project.
- D. A copy of the laboratory test results for the test parameters specified in these special provisions for CRM, paving asphalt, and asphalt modifier shall be submitted to the Engineer with the Certificate of Compliance for each truck load of individual material delivered to the project.

Certified volume or weight slips shall be delivered to the Engineer for materials supplied.

#### PAVING ASPHALT

Paving asphalt to be used in the asphalt-rubber binder shall be Grade 64-16 and shall conform to the provisions in Section 92, "Asphalts," of the Standard Specifications and these special provisions.

The paving asphalt for use in asphalt-rubber binder shall be modified with asphalt modifier. Paving asphalt shall not be polymer modified.

#### ASPHALT MODIFIER

The asphalt modifier shall be a resinous, high flash point, aromatic hydrocarbon compound and shall conform to the following requirements:

Asphalt Modifier

Test Parameter	ASTM Designation	Requirement
Viscosity, m <sup>2</sup> /s (10 <sup>-6</sup> ) at 100°C	D 445	X ±3*
Flash Point, C.L.O.C. °C	D 92	207 min.
Molecular Analysis		
Asphaltenes, percent by mass	D 2007	0.1 max.
Aromatics, percent by mass	D 2007	55 min.

- \* The symbol "X" is the viscosity of the asphalt modifier the Contractor proposes to furnish. The value "X" which the Contractor proposes shall be between the limits 19 and 36 and shall be submitted in writing to the Engineer. Any proposed change, requested by the Contractor, in the value "X" shall require a new asphalt-rubber binder design.

The asphalt modifier shall be proportionately added to the paving asphalt at the production site where the asphalt-rubber binder is blended and reacted. Asphalt modifier shall be added at an amount of 2.5 percent to 6.0 percent by weight of the paving asphalt based on the recommendation of the asphalt-rubber binder supplier. The paving asphalt shall be at a temperature of not less than 375 °F nor more than 440 °F when the asphalt modifier is added. If the asphalt modifier is combined with the paving asphalt, before being blended with the CRM, the combined paving asphalt and asphalt modifier shall be mixed by circulation for a period of not less than 20 minutes. This premixing of asphalt modifier and paving asphalt will not be required when all ingredients of the asphalt-rubber binder are proportioned and mixed simultaneously. Asphalt modifier and paving asphalt shall be measured for proportioning with meters conforming to the provisions in Section 9-1.01, "Measurement of Quantities," of the Standard Specifications.

**CRUMB RUBBER MODIFIER (CRM)**

Crumb rubber modifier (CRM) shall consist of a combination of scrap tire CRM and high natural CRM. The scrap tire CRM shall consist of ground or granulated rubber derived from any combination of automobile tires, truck tires or tire buffings. The high natural CRM shall consist of ground or granulated rubber derived from materials that utilize high natural rubber sources.

Steel and fiber separation shall be accomplished by any method. Cryogenic separation, if utilized, shall be performed separately from and prior to grinding or granulating.

CRM shall be ground or granulated at ambient temperature. Cryogenically produced CRM particles that pass through the grinder or granulator without being ground or granulated, respectively, shall not be used.

CRM shall not contain more than 0.01 percent wire (by weight of CRM) and shall be free of other contaminants, except fabric. Fabric shall not exceed 0.05 percent by weight of CRM. A certificate of compliance certifying these percentages shall be furnished to the Engineer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The test and method for determining the percent by weight of wire and fabric will be furnished to interested persons upon request and is available at:

Transportation Laboratory  
Office of Pavement Consulting Services  
Sacramento, California  
Telephone (916) 227-7300.

The length of an individual CRM particle shall not exceed 3/16 inch.

The CRM shall be sufficiently dry so that the CRM will be free flowing and will not produce foaming when combined with the blended paving asphalt and asphalt modifier mixture. Calcium carbonate or talc may be added at a maximum amount of 3 percent by weight of CRM to prevent CRM particles from sticking together. The CRM shall have a specific gravity of between 1.1 and 1.2 as determined by California Test 208. Scrap tire CRM and high natural CRM shall be delivered to the production site in separate bags and shall be sampled and tested separately. CRM material shall conform to the following requirements as determined by ASTM Designation: D 297:

Test Parameter	Scrap Tire CRM Percent		High Natural CRM Percent	
	Minimum	Maximum	Minimum	Maximum
Acetone Extract	6.0	16.0	4.0	16.0
Rubber Hydrocarbon	42.0	65.0	50.0	—
Natural Rubber content	22.0	39.0	40.0	48.0
Carbon Black Content	28.0	38.0	—	—
Ash Content	—	8.0	—	—

The CRM for asphalt-rubber binder shall conform to the gradations specified below when tested in conformance with the requirements in ASTM Designation: C 136, except as follows:

- A. Split or quarter 100 g±5 g from the CRM sample and dry to a constant mass at a temperature of not less than 57°C nor more than 63°C and record the dry sample mass. Place the CRM sample and 5 g of talc in a 0.5-L jar. Seal the jar, then shake the jar by hand for a minimum of one minute to mix the CRM and the talc. Continue shaking or open the jar and stir until particle agglomerates and clumps are broken and the talc is uniformly mixed.

- B. Place one rubber ball on each sieve. Each ball shall have a mass of 8.5 g  $\pm$ 0.5 g, have a diameter of 24.5 mm  $\pm$ 0.5 mm, and shall have a Shore Durometer "A" hardness of 50  $\pm$ 5 in conformance with the requirements in ASTM Designation: D 2240. After sieving the combined material for 10 minutes  $\pm$ 1 minute, disassemble the sieves. Material adhering to the bottom of a sieve shall be brushed into the next finer sieve. Weigh and record the mass of the material retained on the 2.36-mm sieve and leave this material (do not discard) on the scale or balance. Observed fabric balls shall remain on the scale or balance and shall be placed together on the side of the scale or balance to prevent the fabric balls from being covered or disturbed when placing the material from finer sieves onto the scale or balance. The material retained on the next finer sieve (2.00-mm sieve) shall be added to the scale or balance. Weigh and record that mass as the accumulative mass retained on that sieve (2.00-mm sieve). Continue weighing and recording the accumulated masses retained on the remaining sieves until the accumulated mass retained in the pan has been determined. Prior to discarding the CRM sample, separately weigh and record the total mass of fabric balls in the sample.
- C. Determine the mass of material passing the 75- $\mu$ m sieve (or mass retained in the pan) by subtracting the accumulated mass retained on the 75- $\mu$ m sieve from the accumulated mass retained in the pan. If the material passing the 75- $\mu$ m sieve (or mass retained in the pan) has a mass of 5 g or less, cross out the recorded number for the accumulated mass retained in the pan and copy the number recorded for the accumulated mass retained on the 75- $\mu$ m sieve and record that number (next to the crossed out number) as the accumulated mass retained in the pan. If the material passing the 75- $\mu$ m sieve (or mass retained in the pan) has a mass greater than 5 g, cross out the recorded number for the accumulated mass retained in the pan, subtract 5 g from that number and record the difference next to the crossed out number. The adjustment to the accumulated mass retained in the pan is made to account for the 5 g of talc added to the sample. For calculation purposes, the adjusted total sample mass is the same as the adjusted accumulated mass retained in the pan. Determine the percent passing based on the adjusted total sample mass and record to the nearest 0.1 percent:

Scrap Tire CRM Gradations

Sieve Size	Percentage Passing		
	Gradation Limit	Operating Range	Contract Compliance
No. 8	100	100	100
No. 10	98-100	95-100	90-100
No. 16	45-75	35-85	32-88
No. 30	2-20	2-25	1-30
No. 50	0-6	0-10	0-15
No. 100	0-2	0-5	0-10
No. 200	0	0-2	0-5

The Department deducts \$250.00 for each gradation test for scrap tire CRM not within the "Operating Range" but meets the "Contract Compliance" requirement. Each test represents 10,000 pounds of scrap tire CRM or the amount used in that day's production, whichever is less.

The Department deducts \$1,100.00 for each gradation test for scrap tire CRM not within the "Contract Compliance" requirement. Each test represents 10,000 pounds of scrap tire CRM or the amount used in that day's production, whichever is less.

High Natural CRM Gradations

Sieve Size	Percentage Passing		
	Gradation Limit	Operating Range	Contract Compliance
No. 10	100	100	100
No. 16	95-100	92-100	85-100
No. 30	35-85	25-95	20-98
No. 50	10-30	6-35	2-40
No. 100	0-4	0-7	0-10
No. 200	0-1	0-3	0-5

The Department deducts \$250.00 for each gradation test for high natural CRM not within the "Operating Range" but meets the "Contract Compliance" requirement. Each test represents 3,400 pounds of high natural CRM or the amount used in that day's production, whichever is less.

The Department deducts \$600.00 for each gradation test for high natural CRM not within the "Contract Compliance" requirement. Each test represents 3,400 pounds of high natural CRM or the amount used in that day's production, whichever is less.

**ASPHALT-RUBBER BINDER**

Asphalt-rubber binder shall consist of a mixture of paving asphalt, asphalt modifier, and crumb rubber modifier.

At least 15 days before its intended use, the Contractor shall furnish the Engineer four 1-quart cans filled with the asphalt-rubber binder proposed for use on the project. The Contractor shall supply the Engineer, for approval, a binder formulation and samples of all materials to be used in the asphalt-rubber binder, at least 15 days before construction is scheduled to begin. The binder formulations shall consist of the following information:

A. Paving Asphalt and Modifiers:

1. Source and grade of paving asphalt.
2. Source and identification (or type) of modifiers used.
3. Percentage of asphalt modifier by weight of paving asphalt.
4. Percentage of the combined blend of paving asphalt and asphalt modifier by total weight of asphalt-rubber binder to be used.
5. Laboratory test results for test parameters shown in these special provisions.

B. Crumb Rubber Modifier (CRM):

1. Source and identification (or type) of scrap tire and high natural CRM.
2. Percentage of scrap tire and high natural CRM by total weight of the asphalt-rubber blend.
3. If CRM from more than one source is used, the above information will be required for each CRM source used.
4. Laboratory test results for test parameters shown in these special provisions.

C. Asphalt-Rubber Binder:

1. Laboratory test results of the proposed blend for test parameters shown in these special provisions.
2. The minimum reaction time and temperature.

The method and equipment for combining the paving asphalt, asphalt modifier, and CRM shall be so designed and accessible that the Engineer can readily determine the percentages by weight for each material being incorporated into the mixture.

The proportions of the materials, by total weight of asphalt-rubber binder, shall be 79 percent  $\pm$ 1 percent combined paving asphalt and asphalt modifier and 21 percent  $\pm$ 1 percent CRM. However, the minimum amount of CRM shall not be less than 20.0 percent. Lower values shall not be rounded up. The CRM shall be combined at the production site and shall contain 76 percent  $\pm$ 2 percent scrap tire CRM and 24 percent  $\pm$ 2 percent high natural CRM, by weight.

The paving asphalt and asphalt modifier shall be combined into a blended mixture that is chemically compatible with the crumb rubber modifier to be used. The blended mixture shall be considered to be chemically compatible when the mixture meets the requirements for asphalt-rubber binder (after reacting) found in these special provisions.

The blended paving asphalt and asphalt modifier mixture and the CRM shall be combined and mixed together at the production site in a blender unit to produce a homogeneous mixture.

CONTRACT NO. 11-266104

REVISED PER ADDENDUM NO. 1 DATED NOVEMBER 4, 2011

The temperature of the blended paving asphalt and asphalt modifier mixture shall not be less than 375 °F nor more than 440 °F when the CRM is added. The combined materials shall be reacted for a minimum of 45 minutes after incorporation of the CRM at a temperature of not less than 375 °F nor more than 425 °F. The temperature shall not be higher than 10 °F below the actual flash point of the asphalt-rubber binder.

After reacting, the blended asphalt-rubber binder shall conform to the following requirements:

Blended Asphalt-Rubber Binder

Test Parameter	ASTM Test Method	Requirement	
		Minimum	Maximum
Cone Penetration @ 25°C, 1/10 mm	D 217	25	60
Resilience @ 25°C, Percent rebound	D 5329	18	40
Field Softening Point, °C	D 36	55	88
Viscosity @190°C, Pa • s (x10 <sup>-3</sup> )	See Note	1500	2500

**NOTE:**

The viscosity test shall be conducted using a hand held Haake Viscometer Model VT-02 with Rotor 1, 24 mm depth x 53 mm height, or equivalent, as determined by the Engineer. The accuracy of the viscometer shall be verified by comparing the viscosity results obtained with the hand held viscometer to 3 separate calibration fluids of known viscosities ranging from 1000 to 5000 Pa • s (x10<sup>-3</sup>). The viscometer will be considered accurate if the values obtained are within 300 Pa • s (x10<sup>-3</sup>) of the known viscosity. The known viscosity value shall be based on the fluid manufacturer's standard test temperature or the test temperature versus viscosity correlation table provided by the fluid manufacturer. All viscometers used on the project shall be verified to be accurate. The test method for determining the viscosity of asphalt-rubber binder using a hand held viscometer is available at the Transportation Laboratory, Office of Pavement Consulting Services, Sacramento, California, Telephone (916) 227-7300. The accuracy verification results shall be provided to the Engineer and shall be certified by a Certificate of Compliance. The Certificate of Compliance shall be furnished to the Engineer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications.

The Contractor shall provide a Haake Viscometer, or equivalent, at the production site during the combining of asphalt-rubber binder materials. The Contractor shall take viscosity readings of asphalt-rubber binder from samples taken from the reaction vessel a minimum of 45 minutes after incorporation of the CRM. Readings shall be taken at least every hour with not less than one reading for each batch of asphalt-rubber binder. The binder shall not be applied to the pavement surface until at least two consecutive descending readings are within the viscosity range for asphalt-rubber binder required in these special provisions. The Contractor shall log these results, including time and asphalt-rubber binder temperature. A copy of the log shall be submitted to the Engineer on a daily basis. As determined by the Engineer, the Contractor shall either notify the Engineer at least 15 minutes prior to each test or provide the Engineer a schedule of testing times. If required by the Engineer, the Contractor shall perform viscosity testing prior to application.

The reacted asphalt-rubber binder shall be maintained at a temperature of not less than 375 °F nor more than 415 °F.

If any of the material in a batch of asphalt-rubber binder is not used within 4 hours after the 45-minute reaction period, heating of the material shall be discontinued. If the asphalt-rubber binder cools below 375 °F and is then reheated, it shall be considered a reheat cycle. The total number of reheat cycles shall not exceed 2. The material shall be uniformly reheated to a temperature of not less than 375 °F nor more than 415 °F prior to use. Additional scrap tire CRM may be added to the reheated binder and reacted for a minimum of 45 minutes. The cumulative amount of additional scrap tire CRM shall not exceed 10 percent of the total binder weight. Reheated asphalt-rubber binder shall conform to the requirements for blended asphalt-rubber binder.

**SCREENINGS**

Screenings shall conform to the provisions in these special provisions and in Section 37-1.02, "Materials," of the Standard Specifications, except that the third, fourth, eighth, and ninth paragraphs of Section 37-1.02 shall not apply.

Stockpiling of screenings after preheating and precoating with paving asphalt will not be permitted.

If the ambient temperature is below 65 °F or the haul time exceeds 30 minutes, canvas or similar covers that completely cover each load of precoated screenings shall be used during hauling to minimize temperature drop of the precoated screenings.

Screenings shall conform to the following grading requirements prior to precoating with paving asphalt:

Screening Grading Requirements 3/8-inch Maximum	
Sieve Sizes	Percentage Passing
3/4"	100
1/2"	95 - 100
3/8"	70 - 85
No. 4	0 - 15
No. 8	0 - 5
No. 200	0 - 1

Screenings shall conform to the following quality requirements immediately prior to preheating:

Screenings Quality Requirements		
Test Parameters	California Test	Requirements
Los Angeles Rattler Loss (100 Revolutions)	211	10 Max.
Los Angeles Rattler Loss (500 Revolutions)	211	40 Max.
Film Stripping	302	25 Max.
Cleanness Value	227	80 Min.
Durability	229	52 Min.

Screenings for asphalt-rubber seal coat shall be preheated to between 260 °F and 325 °F and uniformly coated at a rate of 0.5 percent to 1.0 percent by weight of dry aggregate with any of the asphalts specified in the table "Performance Graded Asphalt Binder" in Section 92, "Asphalts," of the Standard Specifications. Screenings shall be coated at a hot mix asphalt concrete plant that has been approved in conformance with the requirements in California Test 109 and the Department's material plant quality program. The exact rate will be determined by the Engineer.

#### EQUIPMENT

The Contractor shall utilize the following equipment for asphalt-rubber seal coat operations:

- A. Self-propelled power brooms that clean the existing pavement and remove loose screenings without dislodging screenings set in the asphalt-rubber binder. Gutter brooms or steel-tined brooms shall not be used;
- B. Pneumatic tired rollers conforming to the provisions in Section 39-3.03, "Spreading and Compacting Equipment," of the Standard Specifications, except that the rollers shall have an air pressure of 100 pounds per square inch and maintained so that the air pressure will not vary more than  $\pm 5$  pounds per square inch in each tire or the tires shall be foam filled. A sufficient number of rollers shall be used so that one complete coverage will be provided in one pass;
- C. A self-propelled screenings spreader, equipped with a screenings hopper in the rear and belt conveyors to carry the screenings to the front of a spreading hopper. The screenings spreader shall be capable of providing a uniform screening spread rate over the entire width of the traffic lane in one application;
- D. An asphalt heating tank equipped to heat and maintain the blended paving asphalt and asphalt modifier mixture at the necessary temperature before blending with the CRM. This unit shall be equipped with a thermostatic heat control device and a temperature reading device and shall be accurate to within  $\pm 5$  °F and shall be of the recording type;

- E. A mechanical mixer for the complete, homogeneous blending of paving asphalt, asphalt modifier, and CRM. Paving asphalt and asphalt modifier shall be introduced into the mixer through meters conforming to the provisions in Section 9-1.01, "Measurement of Quantities," of the Standard Specifications. The blending system shall vary the rate of delivery of paving asphalt and asphalt modifier proportionate with the delivery of CRM. During the proportioning and blending of the liquid ingredients, the temperature of paving asphalt and the asphalt modifier shall not vary more than  $\pm 25$  °F. The paving asphalt feed, the asphalt modifier feed, and CRM feed shall be equipped with devices by which the rate of feed can be determined during the proportioning operation. Meters used for proportioning individual ingredients shall be equipped with rate-of-flow indicators to show the rates of delivery and resettable totalizers so that the total amounts of liquid ingredients introduced into the mixture can be determined. The liquid and dry ingredients shall be fed directly into the mixer at a uniform and controlled rate. The rate of feed to the mixer shall not exceed that which will permit complete mixing of the materials. Dead areas in the mixer, in which the material does not move or is not sufficiently agitated, shall be corrected by a reduction in the volume of material or by other adjustments. Mixing shall continue until a homogeneous mixture of uniformly distributed and properly blended asphalt-rubber binder of unchanging appearance and consistency is produced. The Contractor shall provide a safe sampling device that delivers a representative sample of the completed asphalt-rubber binder of sufficient size to permit the required tests;
- F. An asphalt-rubber binder storage tank equipped with a heating system to maintain the proper temperature of the asphalt-rubber binder and an internal mixing unit that maintains a homogeneous mixture of blended paving asphalt, asphalt modifier, and CRM;
- G. A self-propelled truck or trailer mounted distributor, equipped with an internal mixing unit that maintains a homogeneous mixture of blended paving asphalt, asphalt modifier and CRM. The distributor shall have a pump or pumps that sprays asphalt-rubber binder within  $\pm 0.05$  gallon per square yard of the specified rate. The distributor shall have a fully circulating spray bar that applies the asphalt-rubber binder without a streaked or otherwise irregular pattern. The distributor shall be equipped with a tachometer, pressure gages, volume measuring devices, and thermometer. The distributor shall have a platform on the rear of the vehicle and an observer shall accompany the distributor. The observer shall ride in such a position that all spray nozzles are in full view and readily accessible for unplugging plugged nozzles, should plugging occur; and
- H. Tailgate discharge trucks for hauling screenings shall be equipped with a device to lock onto the hitch at the rear of the screenings spreader. Haul trucks shall be compatible with the screenings spreader so that the dump bed will not push down on the spreader when fully raised or have too short a bed which results in screenings spilling while dumping into the receiving hopper.
- I. Under supports for scale bearing points for scale structures where the total load, live plus dead load, is less than 17 tons, shall be as follows:
1. Structure shall be supported on at least 4 legs. The total load on any one leg shall not be greater than 14.5 psi.
  2. Undersupport shall be structural grade steel with a minimum cross sectional dimension of 20 inches and a minimum thickness of 1.5 inch.
  3. Entire scale structure including supports shall be constructed so no movement or deflection is possible during production operations. Only metal shall be used in the scale support structure.
  4. Scale structure shall be level during device calibration and material production.
  5. Adequate drainage shall be provided to prevent saturation of the ground under the scale. The ground under the scale shall remain in a condition which will support 14.5 psi at each support.
  6. At the option of the Contractor, the scale structure shall be installed using concrete under supports in conformance with the provisions in Section 9-1.01, "Measurement of Quantities," of the Standard Specifications may be used.

Equipment shall be approved by the Engineer prior to use.

## **APPLYING ASPHALT-RUBBER BINDER**

Asphalt-rubber binder shall be applied in conformance with these special provisions and with the provisions for applying asphaltic emulsion in Section 37-1.05, "Applying Asphaltic Emulsion," of the Standard Specifications, except that the first, second, third, fourth, fifth, ninth, and twelfth paragraphs of Section 37-1.05 shall not apply.

Asphalt-rubber binder for asphalt-rubber seal coat shall be applied where shown on the plans at a rate of 0.55 gallon to 0.65 gallon per square yard. If a variable application rate apparatus is implemented and the Engineer approves, the rate in the wheel paths may be reduced to 0.50 gallon per square yard. The exact rate will be determined by the Engineer.

Attention is directed to Section 7-1.11, "Preservation Of Property," of the Standard Specifications and "Existing Highway Facilities" of these special provisions regarding protecting highway facilities from seal coat.

Asphalt-rubber binder shall be placed upon a clean, dry surface. The pavement surface temperature shall be a minimum of 55 °F where asphalt-rubber binder is to be applied. The atmospheric temperature shall be a minimum of 60 °F and a maximum of 105 °F.

Distributor bar height, distribution speed, and shielding materials shall be utilized to reduce the effects of wind upon spray distribution as directed by the Engineer. The Engineer will delay or reschedule work when high, gusting or dirty winds prevent or adversely affect binder or screening application operations. Necessary equipment shall be in position and ready to commence placement operations before starting.

The Contractor shall comply with Federal, State, and Local environmental laws, rules, regulations, and ordinances including, but not limited to, air quality requirements.

The asphalt-rubber binder shall be applied to the roadway immediately following mixing and reacting and shall be applied at a temperature not less than 385 °F nor more than 415 °F. Asphalt-rubber binder application shall not be in excess of that which can be covered with screenings within 2 minutes.

When placing asphalt-rubber seal coat at intersections, left turn lanes, gore points, and other irregular areas, asphalt-rubber application shall not be in excess of that which can be covered with screenings within 15 minutes.

When joining edges against areas with screenings, the joint shall be swept clean of excess screenings prior to the adjacent application of asphalt-rubber binder. Transverse joints of this type shall be constructed by placing roofing paper across and over the end of the previous asphalt-rubber seal coat application. Once the spraying has progressed beyond the paper, the paper shall be removed immediately.

The longitudinal joint between adjacent applications of screenings shall coincide with the line between designated traffic lanes. Longitudinal joints shall be overlapped for complete coverage. The overlap shall not exceed 4 inches, except with the approval of the Engineer the overlap may be up to 8 inches.

At longitudinal joints with screenings, the edge shall be broomed back and blended to eliminate differences in elevation. The joints shall be free from ridges and depressions and shall have a uniform appearance consistent with the adjacent sealed surface. Defects shall be corrected at the Contractor's expense.

Joints between areas of asphalt-rubber binder without screenings shall be made by overlapping asphalt-rubber binder distributions. The excess material shall be properly dispersed by spreading with a squeegee or rake over a larger area of freshly applied asphalt-rubber binder.

The application of asphalt-rubber binder to areas not accessible with the distributor bar on the distributor truck shall be accomplished by a squeegee, rake, or other means approved by the Engineer.

## **SPREADING SCREENINGS**

Screenings for asphalt-rubber seal coat shall be spread in conformance with the provisions specified for spreading screenings on asphaltic emulsion in these special provisions and in Section 37-1.06, "Spreading Screenings," of the Standard Specifications, except that the first, fifth, sixth, and seventh paragraphs of Section 37-1.06 shall not apply.

Following the application of the asphalt-rubber binder, screenings shall be placed over areas receiving asphalt-rubber binder.

Screenings for asphalt-rubber seal coat shall be applied at a temperature not less than 225 °F and not more than 325 °F after applying asphalt-rubber binder.

The Contractor shall prevent any vehicle, including construction equipment, from driving on the asphalt-rubber binder prior to application of screenings.

Screenings shall be applied at a rate of 28 pounds to 40 pounds per square yard. The exact rate will be determined by the Engineer. The completed spread rate shall be within 10 percent of the rate determined by the Engineer. The completed surface shall be free of gaps, ridges, depressions or other irregularities caused by the application of the asphalt-rubber seal coat.

## **FINISHING**

Asphalt-rubber seal coat shall be finished in conformance with the provisions for finishing screenings spread on asphaltic emulsion in these special provisions and in Section 37-1.07, "Finishing," of the Standard Specifications, except that the second, third, fourth, sixth, seventh, eighth, and ninth paragraphs of Section 37-1.07 shall not apply.

Initial rolling of the asphalt-rubber seal coat shall consist of a minimum of one complete coverage with one or more pneumatic-tired rollers and shall begin within 90 seconds following the placement of the screenings.

The distance between the rollers and the screenings spreader shall not exceed 200 feet at any time during the spreading of the screenings operations.

A minimum of 3 complete coverages with pneumatic tired rollers, after the initial coverage must be made on the asphalt-rubber seal coat. Coverages shall conform to the provisions in Section 39-3.04, "Transporting, Spreading, and Compacting," of the Standard Specifications. When permitted by the Engineer, the final roller coverage may be made with one steel wheel roller weighing 8 tons minimum and 10 tons maximum. If a steel wheel roller is used, the roller shall be operated in the static mode only.

Sweeping shall be a multi-step operation following final rolling of the screenings. Loose screenings shall be removed from the roadway surface and abutting adjacent areas. Loose screenings shall be disposed of at least 150 feet from the nearest waterway.

Final sweeping shall be done and loose screenings shall be removed without dislodging the screenings set in the asphalt-rubber binder prior to acceptance.

## **MEASUREMENT AND PAYMENT**

Quantities of asphalt-rubber binder for asphalt-rubber seal coat will be measured in the same manner specified for asphalt in Section 92-1.04, "Measurement," of the Standard Specifications.

Quantities of screenings for asphalt-rubber seal coat to be paid for by the ton will be determined after preheating and precoating with paving asphalt in the same manner specified for hot mix asphalt in Section 39-5.01, "Measurement," of the Standard Specifications.

The contract price paid per ton for asphalt-rubber binder shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in furnishing and applying asphalt-rubber binder, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract price paid per ton for screenings (hot-applied) shall include full compensation for furnishing all labor, materials (including paving asphalt for precoating screenings), tools, equipment, and incidentals and for doing all the work involved in furnishing and applying screenings, complete in place, including preparation for seal coat and preheating and precoating screenings, furnishing, placing, maintaining, and removing C6 (Loose Gravel) and W6 (35 MPH) signs and temporary supports or barricades for the signs, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

#### 10-1.40 TWO-COMPONENT PAINT TRAFFIC STRIPE

Two-component paint traffic stripes (traffic lines) shall be applied in accordance with Section 84, "Traffic Stripes and Pavement Markings," of the Standard Specifications and these special provisions.

Two-component paint traffic stripes consist of one coat of paint and two applications of retroreflective glass beads of two gradations.

The two-component paint shall be fast curing epoxy traffic paint selected from the list titled "Qualified Products List of Two-Component Traffic Striping Paints and Large Gradation Retroreflective Glass Beads" which is available from the Transportation Laboratory. The two-component paint shall be free of lead, chromium, barium and heavy metals. The large gradation glass beads shall be selected from the Qualified Products List. The small gradation glass beads shall conform to the requirements in AASHTO Designation: M247, Type 1. Both gradations of glass beads shall be coated with an adhesion promoting and water repellant coating as recommended by the paint manufacturer. Alternative types of glass beads may be used if recommended by the paint manufacturer and approved by the Engineer in writing.

Within 14 days of applying a two-component painted traffic stripe, the retroreflectivity of the traffic stripe shall be a minimum of 250 millicandelas per square meter per lux for white, and 150 millicandelas per square meter per lux for yellow. The Contractor must test the retroreflectivity under ASTM E 1710.

Daytime and nighttime color of the two-component paint traffic stripes with beads shall conform to the requirements in ASTM Designation: D 6628-01.

The Contractor shall furnish to the Engineer a Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for the paint and glass beads furnished. The certificate shall specify the name, batch number, and manufactured date of the products. The Contractor shall provide the Engineer a Material Safety Data Sheet (MSDS) for the paint and beads upon the Engineer's request.

New pavement surfaces to receive two-component paint shall be prepared in conformance with the provisions in Section 84-2.04, "Application," of the Standard Specifications.

The Contractor shall not begin application of the two-component traffic paint stripes without approval of the Engineer.

Two-component paint traffic stripes shall be applied only to clean and completely dry surfaces and when pavement surface temperature is above 39° F and the atmospheric temperature is above 36° F. During application, the temperature of the two-component paint shall be as recommended by the paint manufacturer.

Two-component paint traffic stripes shall be applied at a minimum thickness of 0.02-inch  $\pm$  0.002-inch and a minimum application rate of 80 ft<sup>2</sup>/gal. The application rate is based on the actual area of the paint. During application of the two-component paint and glass beads, the striping machine shall not travel faster than 10 mph.

Two-component paint traffic stripes shall be applied in one pass. The two-component paint shall be applied first, followed by the large gradation glass beads and then the small gradation glass beads. Glass beads shall be applied using two separate applicator guns.

Glass beads shall be uniformly distributed in the traffic stripes. The large glass beads shall be applied at a minimum rate of 11.7 pounds of large beads per gallon of two-component paint. The smaller glass beads shall be applied at a minimum rate of 8.3 pounds per gallon of two-component paint. The combined weight of the two gradations of glass beads shall be greater than 20 pounds per gallon of two-component paint.

Prior to beginning application, in the presence of the Engineer, the Contractor shall apply a test section of the two-component paint stripe on roofing felt or other suitable material to demonstrate the Contractor's abilities to properly apply the two-component paint traffic stripes. The test section shall be at least 50 feet in length.

Two-component paint traffic stripes will be measured and paid for in the same manner specified for thermoplastic traffic stripes and thermoplastic pavement marking in Sections 84-2.05, "Measurement," and Section 84-2.06, "Payment," of the Standard Specifications. Full compensation for placing test stripes shall be considered as included in the contract price paid per linear foot for two-component paint traffic stripe and no additional compensation will be allowed therefor.

## BID ITEM LIST

11-266104

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
21	374002	ASPHALTIC EMULSION (FOG SEAL COAT)	TON	54		
22	375030	SCREENINGS (HOT-APPLIED)	TON	5,380		
23	390136	MINOR HOT MIX ASPHALT	TON	10,300		
24	390140	RUBBERIZED HOT MIX ASPHALT (GAP GRADED)	TON	10,400		
25	021707	RUBBERIZED WARM MIX ASPHALT (GAP GRADED)	TON	46,500		
26	394051	SHOULDER RUMBLE STRIP (HMA,ROLLED-IN INDENTATIONS)	STA	2,070		
27	394060	DATA CORE	LS	LUMP SUM	LUMP SUM	
28	394071	PLACE HOT MIX ASPHALT DIKE	LF	102,000		
29	394090	PLACE HOT MIX ASPHALT (MISCELLANEOUS AREA)	SQYD	30,100		
30	397005	TACK COAT	TON	30		
31 (F)	510502	MINOR CONCRETE (MINOR STRUCTURE)	CY	12		
32	560248	FURNISH SINGLE SHEET ALUMINUM SIGN (0.063"-UNFRAMED)	SQFT	210		
33	560249	FURNISH SINGLE SHEET ALUMINUM SIGN (0.080"-UNFRAMED)	SQFT	430		
34	560251	FURNISH SINGLE SHEET ALUMINUM SIGN (0.063"-FRAMED)	SQFT	37		
35	560252	FURNISH SINGLE SHEET ALUMINUM SIGN (0.080"-FRAMED)	SQFT	260		
36	566011	ROADSIDE SIGN - ONE POST	EA	2		
37	568017	INSTALL ROADSIDE SIGN PANEL ON EXISTING POST	EA	71		
38	800321	CHAIN LINK FENCE (TYPE CL-4, VINYL-CLAD)	LF	4,720		
39	820107	DELINEATOR (CLASS 1)	EA	490		
40	820110	MILEPOST MARKER	EA	40		