

April 19, 2024

**ADDENDUM NO. 1**

TO: CONTRACT DOCUMENTS  
FOR: 008.23 – CITY WIDE CAPE SEAL PROJECT  
FOR: COTTONWOOD HEIGHTS

- A. REPLACE PROJECT SPECIFICATIONS:
  - a. REMOVE: SECTION 02789 – ASPHALT SLURRY SEAL COAT (UDOT)
  - b. ADD: SECTION 32 01 13.61 – SLURRY SEAL (APWA) – attached

**COTTONWOOD HEIGHTS**

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**SECTION 32 01 13.61**  
**SLURRY SEAL**

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**PART 1 GENERAL**

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**1.1. SECTION INCLUDES**

- A. Stone and an asphalt binder slurry evenly mixed and spread as a seal coat for roadways and thoroughfares.

**1.2 REFERENCES****A. AASHTO Standards:**

- R9 Acceptance Sampling Plans for Highway Construction.

**B. ASTM Standards:**

- C88 Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
- C117 Material Finer Than 0.075 mm Sieve in Aggregate.
- C131 Resistance to Degradation of Small-Size coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- C136 Sieve Analysis of Fine and Coarse Aggregates.
- D5 Penetration of Bituminous Materials.
- D36 Softening Point of Bitumen (Ring-and-Ball Apparatus).
- D242 Mineral Filler for Bituminous Paving Mixtures.
- D1664 Coating and Stripping of Bitumen-Aggregate Mixtures.
- D2170 Kinematic Viscosity of Asphalts (Bitumens).
- D2419 Sand Equivalent Value of Soils and Fine Aggregate.
- D3319 Accelerated Polishing of Aggregates Using the British Wheel.
- D3628 Selection and Use of Emulsified Asphalts.
- D3740 Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
- D3910 Design, Testing, and Construction of Slurry Seal.
- D5821 Determining the percentage of Fractured Particles in Coarse Aggregate.
- D6937 Density of Emulsified Asphalt.

### 1.3 SUBMITTALS

- A. **Mix Design:** Provide the following. Allow ENGINEER 10 days to evaluate the submittal. Do not mix aggregate and emulsions designated for other public or private projects.
1. Date of mix design. If older than 180 days from date of submission recertify mix design.
  2. Target Grading Curve for aggregate.
  3. Percentages of emulsion, aggregate, water and additives in the mix.
  4. Emulsion type and time target for opening up a thoroughfare to traffic.
  5. Slurry application rate.
  6. Aggregate physical properties (this section article 2.4). The information is for suitability of source and not for project control. A new report may be required if aggregate source is changed. Test results shall not be older than 455 days from the date of submission.
- B. **Before Placement:** Submit at least 48 hours before delivery.
1. Traffic control plan, Section 01 55 26.
  2. List of the construction equipment to be used.
  3. Certification from emulsion supplier stating emulsion meets requirements in this section.
- C. **Reports:**
1. Provide daily reports to OWNER's representative including weight of material used, application rate, area covered. Indicate date, type, and project names.
  2. Provide delivery tickets for each emulsion delivery. Include certification from manufacturer that emulsion meets specifications.
  3. Submit oil quantities in CONTRACTOR's emulsion storage tankers prior to transfer, after transfer and at the end of each working day.

### 1.4 QUALITY ASSURANCE

- A. Foreman of paving crew has completed at least three (3) projects of similar scope.
- B. Use a laboratory that follows and complies with ASTM D3740 and Section 01 45 00 requirements.
- C. Verify mixture delivered to site contains the same emulsion specified in the mix design
- D. Do not change source of asphalt emulsion or aggregate without supporting changes in the mix design.
- E. Reject product that does not meet requirements.

### 1.5 WEATHER

- A. Temperature:
1. Apply seal coat when air and pavement surface temperatures in the shade are 45 deg F and rising.

2. Cease application if air or pavement temperatures are below 55 deg F and falling or if the finished product will freeze before 24 hours.
- B. Moisture and Wind:
1. Do not apply seal coat to a wet surface (no visible standing water or high sheen), during rain, if humidity prolongs curing, or in unsuitable windy weather.
  2. Cease work if weather or other conditions prolong opening pavement surface to traffic.

#### 1.6 NOTICE

- A. Follow Laws and Regulations concerning when and to whom notices are to be given at least three (3) days before applying seal coat.
- B. Indicate application time and when new surface can be used. If necessary, include a map showing closed-off areas.
- C. Provide phone numbers of at least two (2) individuals who represent the CONTRACTOR who can be reached at any time during the work.
- D. Warn of potential vehicle tow away and other construction issues affecting neighborhood.
- E. Should work not occur on specified day, issue an updated notice advising when work will be performed.

#### 1.7 ACCEPTANCE

A. **General:**

1. Acceptance is by Lot.
2. If non-complying material has been installed and no price for the material is specified, apply pay adjustment against cost of work requiring complying material as part of its installation, Section 01 29 00.
3. Dispute resolution, Section 01 35 10.
4. Opening surface treatment to traffic does not constitute acceptance.
5. Observation of CONTRACTOR's field quality control testing does not constitute acceptance. Such testing; however, may be used by ENGINEER for acceptance if requirements of Section 01 35 10 are met.

B. **Asphalt Binder:**

1. Lot size is total contracted product placement. Sub-lot size is one (1) day production.
2. Of all sub-lot samples collected, randomly select one sub-lot and test it for the physical properties in this section The lot is acceptable if tests on this sub-lot sample meets requirements. If the sample does not meet requirements, continue testing other samples for a sample that complies.

3. **Pay Reduction:** At ENGINEER's discretion, a lot with a deficient sub-lot test may be accepted if pay for the lot is reduced using one of the following applicable pay factors, or lot may be accepted at 50 percent pay if lot is in Reject

<b>Pay Factor</b>	<b>Number of Non-complying Tests</b>
1.00	0
0.95	1
0.90	2
0.85	3
Reject	4

- C. **Aggregate:** Lot size is one (1) day's production with 300 tons sub-lots. Collect Samples randomly before mixing. Test gradation, ASTM C 136. Test thickness. Lot will be acceptable if:
1. Average gradation of each sieve for the Lot is within the Target Grading Band for that sieve, and
  2. Number of Samples in the Lot with any sieve measurement outside of the Target Grading Band does not exceed two (2), and
  3. Material on 200 sieve does not exceed allowable.
  4. Price Adjustment: Aggregate gradation defects may be accepted if 2.5 percent price reduction is applied against lot for each condition not met. Maximum price reduction for a lot is five (5) percent.
- D. **Placement:**
1. **Mat Appearance:**
    - a. No runoff onto concrete curbs, gutter pans, and shoulders.
    - b. No streaking, drag marks or squeegee marks.
    - c. No light spots.
    - d. No de-bonding.
    - e. Straight longitudinal edges with proper joints.
  2. **Price Adjustment:** Not applicable. Correct deficiencies at no additional cost to OWNER.

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## **PART 2 PRODUCTS**

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### **2.1 ASPHALT BINDER**

- A. **Crack Pouring Asphalt:** Rubberized asphalt or asphalt rubber hot pour, Section 32 01 17.
- B. **Tack Coat:** SS-1 or CSS-1, Section 32 12 13.13. Use a tack coat that is compatible with seal coat application.
- C. **Emulsified Asphalt:** Unless specified elsewhere provide CQS-1h quick traffic type, ASTM D3628 with a two (2) hour return to traffic quickset. Provide the following properties.

Table 1 – Physical Properties				
	Standard	Target	Min	Max
<b>Tests on Emulsion</b>				
Viscosity at 25 deg C, second	D 244	32	15	90
Sieve test, percent		0.01	--	0.30
Settlement, 5 day, percent		3.5	--	5
Storage stability, 1 day, percent		0.6	--	1
Residue by distillation, percent		64.2	60	--
<b>Tests on Residue from Evaporation</b>				
Penetration at 25 <sup>o</sup> C, 0.1 mm	D 5	51	40	90
Softening point, deg. C.	D 36	60	57	--
Kinematic viscosity, cSt/sec	D 2170	--	650	--
Saybolt furoil viscosity at 77 <sup>o</sup> F., seconds		--	--	50
Polymer solids based on mass of residual asphalt, percent	--	3 to 6	3	--
NOTES				
(a) Polymer is a solid synthetic rubber or latex material.				
(b) Cement mixing test waived.				
(c) Polymer solids are to be milled or blended into the asphalt or emulsifier solution before the emulsification process.				

## 2.2 AGGREGATE

- A. **Material:** Stone, slag, or other high quality particle or combination clean and free from organic matter or other detrimental substances with the following properties.

Table 2 – Aggregate Properties				
		Standard	Min	Max
Angularity (fractured faces), percent		D 5821	80	--
Wear (hardness or toughness), percent		C 131	--	35
Soundness (weight loss in 5 cycles), percent		C 88	--	10
Clay content (sand equivalent), percent	SS Type I	D 2419	45	--
	SS Type II	D 2419	55	--
	SS Type III	D 2419	60	--
Polishing, BPN		D 3319	28	--
Water absorption, percent		--	--	1.25
NOTES				
(a) Angularity of aggregate retained on No. 4 sieve with at least one (1) mechanically fractured face or clean angular face. Provide 100 percent (maximum) for thoroughfares with a Road Class III (Section 32 12 05).				
(b) Wear of aggregate retained on No. 12 sieve after 500 revolutions.				
(c) Soundness for combined coarse and fine aggregate measured using five (5) cycles Na <sub>2</sub> SO <sub>4</sub> .				
(d) Clay content before additives.				

- B. **Gradation:** Analysed on a dry weight and percent passing basis.
1. Material passing any sieve and retained on the next consecutive sieve is 45 percent maximum.
  2. Target Grading Curve must lie within one (1) of the following Master Grading Bands. Field Samples shall not vary from the Target Grading Curve by more than the Target Tolerance.

<b>Table 3 – Master Grading Band and Target Tolerance Limits</b>					
<b>Sieve</b>	<b>Standard</b>	<b>Master Grading Band Limits Percent Passing</b>			<b>Target Tolerance</b>
		<b>SS Type I</b>	<b>SS Type II</b>	<b>SS Type III</b>	
3/8 in.		--	100	100	--
No. 4		100	90 - 100	70 - 90	+/- 5
No. 8	C136	90 - 100	65 - 90	45 - 70	+/- 5
No. 16		65 - 90	45 - 70	28 - 50	+/- 5
No. 30		40 - 65	30 - 50	19 - 34	+/- 5
No. 50		25 - 42	18 - 30	12 - 28	+/- 4
No. 100		15 - 30	10 - 21	7 - 18	+/- 3
No. 200	C117	10 - 20	6 - 15	5 - 15	+/- 2
NOTES					
(a) Target tolerance is the allowable variation from the Target Grading Curve.					
(b) Portion retained on the No. 4 sieve clean and free of clay coatings.					
(c) Portion passing No. 200 sieve includes mineral filler.					

### 2.3 ADDITIVES

- A. Use water that is clean, non-detrimental, and free from salts and contaminant.
- B. Mineral Filler: ASTM D242.
- C. Portland cement, hydrated lime, limestone dust, fly ash, or aluminum sulfate to regulate setting time and improve workability.
- D. Limestone dust, fly ash, and rock dust to alter aggregate gradation.

### 2.4 MIX DESIGN

- A. Asphalt Binder: Select type and grade of emulsified asphalt, ASTM D3628.
- B. Proportioning: Use the consistency test of ASTM D3910 to determine optimum ratio of aggregate, filler, water, and emulsion.
- C. Set and Cure Time: Select to meet opening to traffic requirements.
- D. Stripping: More than 90 percent of bituminous-coated particles retain asphalt coating, ASTM D1664.

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## PART 3 EXECUTION

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### 3.1 CONSTRUCTION EQUIPMENT

- A. Paver: Use a continuous-flow mixing unit:
1. Capable of applying at least 15,000 square yards of material per day.
  2. Capable of accurately delivering a predetermined portion of aggregate, water, and asphalt emulsion to the mixing chamber.
  3. Prevent loss of slurry from the distributor by using a mechanical type squeegee distributor equipped with flexible material in contact with the pavement surface.
  4. Has a lateral control device and a flexible strike-off capable of being adjusted to lay the slurry at the mix design application rate.

### 3.2 PREPARATION

- A. **Meter Calibration:** On a test strip at least 500 feet long, determine the correct meter settings on the mixing equipment. The settings are to produce a product that complies with the following:
1. Set time 30 minutes maximum. Initial set occurs when blotting the surface of the material yields only water (no emulsion).
  2. No distress when exposed to traffic two (2) hours after placement.
- B. **Surface Repair:** Method of payment to be determined by ENGINEER if any of the following repairs are required.
1. Raising low areas to grade, lowering high areas to grade, hole patching, inlays.
  2. Providing tack coat on highly absorbent, polished, oxidized, or raveled bituminous pavement or on brick or on Portland cement concrete surfaces.
  3. Crack filling and crack sealing, Section 32 01 17.
  4. Pushing or shoving pavement to be repaired as follows.
    - a. Mill damaged area at least three (3) inches below required surface elevation. Section 32 01 16.71
    - b. Install and compact PG64-22, DM-3/4, 50 blow bituminous concrete in lifts not less than three (3) inches after compaction. See additional requirements in Section 33 05 25.
- C. **Masking:** Mask-off Street Fixtures, end of streets, intersections.
- D. **Traffic Control:**
1. Implement traffic control plan requirements, Section 01 55 26. Provide safe passage for pedestrians and vehicles. Do not proceed without flaggers if work requires maintaining two-way vehicular traffic.
  2. Grind off existing pavement markings and lane stripes. If existing markings and stripes are to be reestablished, use reflective tabs to mark existing locations before applying seal coat. Unless specified otherwise, cost is included in the work of this section.



**E. Cleaning:**

1. Remove loose material that may cause drag marks.
2. Remove mud spots, sand, dust, oil, vegetation, and other objectionable material.
3. Do not flush water, or apply pressurized water over cracked pavement unless ENGINEER allows its' use and a sufficient time is allowed for drying.

**3.3 PROTECTION****A. Trees, Plant, Ground Cover:**

1. Protect trees, plants, and other ground cover from damage.
2. Prune trees to allow equipment passage underneath, Section 32 01 93. Repair tree damage to no additional cost to OWNER.

**B. Protect structures, curb, gutter, sidewalks, guard rails, guide posts, etc. from physical damage.****3.4 APPLICATION****A. General:**

1. Machine meter settings must match mix design. Water and additives may be adjusted (per mix design) for better consistency or set time.
2. Wait at least two (2) hours if an adjacent pass has broken and started to cure.
3. The seal coat, when cured shall present a uniform, skid-resistant appearance with all cracks filled.
4. Do not apply lane marking tape or paint for traffic control until layout and placement has been verified with ENGINEER.

**B. In the Spreader Box:**

1. Do not exceed four (4) minutes total mixing time.
2. No additional water.
3. No lumping, balling or unmixed aggregate.
4. No segregation of the emulsion and aggregate fines from the coarse aggregate.
5. No breaking of emulsion.
6. No overloading. Carry a sufficient amount of slurry in all parts of the spreader box for complete coverage.

**C. Spreading:**

1. Dampen surface immediately before application of surface treatment (prevents premature breaking and improves bonding). All surfaces are to be uniformly damp with no free water standing on the surface or in cracks.
2. Keep material delivery at a constant rate even if forward speed lay-down machine varies.
3. Do not reduce application rate along edges or around manhole

covers.

4. Apply seal coat right to the edge of the pavement. Do not leave uncovered areas near curbs, Street Fixtures, or edges.
5. Make straight lines at all locations.
6. Place seal coat out to right-of-way line on side streets and intersections.
7. Use hand squeegees to spread mix in areas that cannot be reached with distribution spray bar.
  - a. Provide complete and uniform coverage.
  - b. Avoid unsightly appearance from hand work.
8. If coarse aggregate settles to bottom of mix, remove slurry from pavement.

D. Joints:

1. Make transverse joints straight-cut butt type, not over-lap type.
2. Place longitudinal joints on lane lines. Limit overlap to three (3) inches maximum.
3. Tolerance for joint match is 1/4 inch difference in elevation when measured with a 10 feet long straight edge over the joint.
4. Stop and correct paving operation if longitudinal or transverse joints have uncovered areas or unsightly appearance.

E. Lines

1. Make straight lines along lip of gutter, shoulders end of streets, and in street intersections. No runoff on these areas will be permitted.
2. Vary edge lines no more than one (1) inch per 100 feet.

### 3.5 TOLERANCES

- A. Thickness: Measured in pounds per square yard. Standard application rate applies unless specified elsewhere.

<u>Slurry</u>	<u>Standard</u>	<u>Heavy</u>
SS Type I	8 to 12	10 to 13
SS Type II	12 to 16	15 to 18
SS Type III	15 to 18	22 to 25

### 3.6 FIELD QUALITY CONTROL

- A. Emulsion density testing, ASTM D6937. If testing shows material non-compliance, remove installed product and halt operations until new material is delivered and is known to be in compliance.
- B. If an ASTM C136 sieve analysis shows aggregate gradation non-compliance, either remove the material or blend in other aggregates to bring it into compliance. This may require a new mix design. Screening may be required at the stockpile to remove any defective material.
- C. Measure the total amounts of material installed, and verify it meets the application rate. Make all emulsion deliveries in the presence of OWNER's representative.

**3.7 AFTER APPLICATION**

- A. Raise reflective tabs that were covered over by application.
- B. Clean Street Fixtures.
- C. Leave no streaks caused by oversized aggregate particles or buildup on squeegees.
- D. Leave no holes, bare spots, or cracks. The seal coat shall be uniform and skid-resistant when cured.
- E. Do not apply permanent pavement markings or stripe material until layout and method of payment has been determined by ENGINEER and final application of seal coat has been in-place at least 10 days, or as permitted by ENGINEER. Layout must be verified by ENGINEER prior to application.

**3.8 REPAIR**

- A. Remove delaminated or non-compliant product found after installation and apply acceptable product.
- B. Remove spatter, mar and overcoat from curb, gutter, sidewalk, guard rails, guide posts, etc.
- C. Remove overcoat from Street Fixtures.
- D. Make edge and end lines straight. Provide good appearance.
- E. Leave no streaks, holes, bare spots, or cracks through which liquids or foreign matter could penetrate to the underlying pavement.
- F. Repair collateral damage caused by construction.

**3.9 OPENING TO TRAFFIC**

- A. Cure time depends on type of asphalt, mixture characteristics and weather. Keep traffic off of treated surface until seal coat does not track-out.

END OF SECTION