City of San Angelo

Public Works

Engineering Services

High Density Mineral Bond

General Notes and Specifications

301 W. Beauregard Avenue

San Angelo, Texas 76903

Assembled 4/8/19

The Seal appearing on this document was authorized by Russell J. Pehl, P.E. 104755 on: April 8, 2019

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GENERAL NOTES

1. All barricades, signs and traffic control for this project shall conform to the latest edition of the Texas Manual on Uniform Traffic Control Devices for Streets and Highways.

2. Proper traffic control is the sole responsibility of the contractor and shall be in accordance with the TMUTCD.

3. Residential streets and minor collectors may be closed during construction; however, access to properties adjacent to the work zone shall be maintained at all times unless otherwise approved by the City. Contractor shall limit the number of consecutive residential and minor collector street closures. A minimum of two travel lanes (one for each direction) shall remain open at all times on all arterial streets.

4. Contractor shall make an examination of the project site and completely familiarize himself with the nature and extent of the work to be accomplished. No extra compensation will be allowed for any work made necessary by unusual conditions or obstacles encountered during the progress of the work, which conditions or obstacles are readily apparent upon a visit to the site. If there are any questions in this regard or if there are any discrepancies between the plans and the actual site conditions, the contractor shall notify the engineer prior to the submission of bids.

5. The Contractor shall cut back vegetation, dirt, and foreign material from the entire surface of the existing asphalt pavement by power brooming or other approved methods. The cost of this work shall be incidental to the project.

6. All construction operations shall be accomplished in accordance with applicable regulations of the U.S. Occupational Safety and Health Administration. Copies of the OSHA Standards may be purchased from the U.S. Government Printing Office; information and related reference materials may be obtained from OSHA; 903 San Jacinto, Austin, Texas.

7. Contractor shall comply with all applicable local, state, and federal requirements regarding excesses and waste material, including methods of handling and disposal.

8. The Contractor shall be responsible for the traffic control plan. The Contractor shall plan and layout the work such that no traffic is allowed on new pavement while the asphalt work is being placed. All traffic control shall be in accordance with TMUTCD standards.

Residential streets and minor collectors may be closed during construction; however, access to properties adjacent to the work zone shall be maintained at all times unless otherwise approved by the City. Contractor shall limit the number of consecutive residential and minor collector street closures. A minimum of two travel lanes (one for each direction) shall remain open at all times on all arterial streets.

9. Care shall be used to create a safe work area, with minimal impact on the flow of traffic.

10. Any existing pavement, curbs, and/or sidewalk damaged or removed by the contractor that are not part of this contract are to be repaired by the by the contractor to at least the preexisting condition at his expense before acceptance of the work.

11. Contractor shall make all due precautions to protect existing facilities from damage. Any damage to existing facilities incurred as a result of these construction operations are to be repaired immediately by the contractor to at least the pre-existing condition at no additional cost to the owner.

12. It shall be the responsibility of the contractor to protect cast iron features from damage which may occur during construction. The Contractor shall replace or repair, as directed by the City, any structures damaged during the life of the contract. No payment will be made for repair or replacement of damaged Items.

13. Contractor is responsible for complying with all applicable environmental laws.

14. The project area and surrounding areas that are utilized by the contractor shall be kept in a neat and orderly manner. Project clean up shall be done on a daily basis. Areas that have been chosen by the contractor for storing of material and equipment shall be out of public access and not create hazardous conditions for the public. These areas shall be kept in a neat and orderly manner and cleaned on a daily basis. Any revegetation of these areas shall be at the contractor's expense.

15. An account of all water usage will be required. The City will provide Contractor with a reasonable amount of water meters, including fire hydrant meters that shall be used to keep track of water usage. City will install fire Hydrant meter at location specified by Contactor. Only COSA personnel may relocate meter.

16. Contractor shall provide and distribute notice to all impacted residents and property owners at least three (3) days prior to beginning work.
    a. Contractor shall indicate application time and when the surface can be used. If necessary, include a map showing closed-off areas.
    b. Provide phone numbers of at least two (2) individuals who represent the CONTRACTOR who can be reached at any time during the work.
    c. Warn of potential vehicle tow away and other construction issues affecting the neighborhood.
    d. Should work not occur on a specified day, contractor shall issue an updated notice.

17. The contractor shall not use any facilities of a private property owner without a written agreement that is furnished to the City of San Angelo. These facilities shall include but not limited to private properties for storage, water, trash receptacles, etc. All City ordinances must be followed.

18. The Contractor shall not place spoils on private property without a written agreement between the contractor and property owner. This written agreement shall be furnished by the contractor to the City.

19. Control of vehicular and pedestrian traffic is of the utmost importance to the City of San Angelo. A traffic control plan designed to meet the sequence of construction established by the contractor shall be submitted to the City of San Angelo's Engineering Services Division no less than 48 hours prior to the beginning of construction. Construction cannot begin without a traffic control plan approved by the City of San Angelo's Traffic Operations Division. The plan shall be detailed for the Sequence of work and not generic. The plan shall be followed at all times. The contractor shall place personnel in charge of the traffic control operation who have been trained in flagging procedures and in barricade and signage operations. In the event the traffic control plan or the traffic operation is not being conducted in the correct manner or according to the approved plan, construction activities shall be stopped until the traffic control procedures are corrected.

20. The Contractor is reminded that this project is located in an urban environment, trees and overhead utility lines are common. The Contractor shall provide the proper equipment to complete the work in the urban environment.

21. All placement and maintenance of temporary pavement marking tabs and installation of permanent pavement markings shall be performed by the Contractor.

HIGH DENSITY MINERAL BOND NOTES

1. All raised pavement markings, buttons and adhesive material within the overlay area shall be removed prior to the application of the overlay. Grind off existing pavement markings and lane stripes. If markings and stripes are to be reestablished, use reflective tabs to mark existing locations before applying surface treatment material. Unless specified otherwise, cost is subsidiary to application.

2. The Contractor shall apply temporary centerline markers as needed for work zone pavement markings as soon as the material cures. These guide markers consist of single white and/or yellow reflective roadway marker tabs at 40 foot spacing. Tabs shall be Type I reflectorized pavement markings in accordance with Item 666 of the Texas Department of Transportation's Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, latest edition.

3. Mask-off all manholes and valves, ends of streets and intersections.

4. Contractor shall only apply the surface treatment if material, air and pavement surface temperatures in the shade are 55°F and rising.
    a. Cease application if air or pavement surface temperatures are projected to fall below 45°F within 48 hours.

5. Contractor shall not apply surface treatment material to a wet surface (no visible standing water or high sheen), during rain, 24 hours prior to forecast of rain, or in unsuitably windy weather.

6. Contractor shall cease work if weather or other conditions prolong opening the pavement surface to traffic.

7. The Contractor is responsible for obtaining all necessary permits and coordinating with the Texas Department of Transportation (TxDOT) for work at all intersections within state highways.

WARRANTY

1. Both the Contractor and Supplier shall provide a two (2) year minimum written warranty when the existing pavement is in an appropriate condition. Warranty covers delaminating, peeling and premature surface wear.
    a. Before placement, notify the Engineering Department if pavement condition or application condition voids the warranty.
    b. The Engineering Department may allow or cancel product application at no cost to OWNER if warranty cannot be given.

2. Acceptable performance after a two (2) year period is no delamination, peeling, or inter- aggregate loss in surface wear. Mechanical disturbances by snowplow chatter, studded tires, etc., are excluded from warranty. Repairing defective coverage shall be at no additional cost to OWNER.

ADDITIONAL NOTES

1. All temporary erosion and sedimentation (e&s) control measures must be properly selected, installed, and maintained in accordance with the manufacturer's specifications and good engineering practices. Erosion controls protection shall also be placed at storm drain inlets in the work zone. If inspection indicates a control has been used inappropriately, or incorrectly, the Contractor must replace or modify the control for site situations. The controls must remain in place until disturbed areas are revegetated and the areas have become permanently stabilized.

2. Litter, construction debris, and construction chemicals exposed to storm water shall be prevented from becoming a pollutant source for storm water discharges (E.G., screening outfalls, picked up daily).

SPECIFICATIONS

HIGH DENSITY MINERAL BOND

1. DESCRIPTION

Construct a mineral aggregate and asphalt binder surface treatment installed as a High Density Mineral Bond over the roadway surface.

2. MATERIALS

A. ASPHALT BINDER

Emulsified Asphalt: Inorganic, non-ionic, thixotropic mineral colloid at 77° Fahrenheit that meets the following requirements. Inorganic is defined as a non-carbon based emulsifier.

Table 1 – Non-Ionic Emulsion Properties

Criterion	ASTM Standard	Min	Max
Brookfield Viscosity at 77°F (Spindle 5, 20 rpm), cPs	D 2196	11,000	20,000
pH	E 70	5.0	7.5
Density, lbs/gal	T 59	8.5	9.0
Asphalt Cement Content, percent by weight	D 2172	45	50
Solids Content, percent by weight	T 59	50	54
Ash Content, percent by weight	T 111	4.0	6.0

B. AGGREGATE

Clean and free from organic matter or other detrimental substances. Composed of sand, clay, slate and corundum. Properties of slate and corundum as follows.

Table 2 –

Criterion	ASTM Standar	Min	Max
Specific Gravity	C 128		2.7
Compression,	C 170	11,000	

Table 3 – Refined Corundum

Criterion	ASTM Standar	Min	Max
Specific Gravity	C 128	3.9	
Knoop 100 Hardness	D 1326	2,00	
Ball Mill Friability (14 grit)	B74.8		50

C. ADDITIVES

- Water is clean, non-detrimental, and free from salts and contaminant.
- Polymers and other additives as necessary to achieve mix design performance.

3. MIX DESIGN

Completed high density mineral bond material, prior to being loaded for install, must meet the following requirements.

Table 4 – Mix Properties

Criterion	ASTM Standar	Min	Max
Asphalt Content, percent by weight	D 2172	17	20
Solids Content, percent by weight	D 1644	55	63
Initial Brookfield Viscosity at 77°F (Spindle 4, 20 rpm), cPs	D 2196	5,500	9,000
Ash Content, percent by weight	T 111	38	
Ash Content of Solids, percent by weight (a)	T 111	65	
Density, lbs/gal	T 59	11	
pH	E 70	6.0	8.0
Total Inorganic Aggregate Content, percent by weight (b)	T 111	37	
Total Sand Content, percent by weight			6.0
Maximum VOC, g/L	D 3960		5
Resistance to Re-emulsification	D 2939	No re-emulsification	
Wear Resistance, percent loss by weight (c)	D 2486		4

NOTES:
(a). Ash content as a percentage of solids content.
(b). Ash content of completed mix minus ash content of base non-ionic emulsion. Total inorganic aggregate content is defined as slate, refined corundum, and sand. (c). ASTM D 2486 (Modified): Prepare sample at 48 wet mils on glass panel. Dry at 77°F for three (3) days. Immerse in water for 24 hours at 77°F. Test scrub resistance with 1,000 gram brass brush for 12,000 cycles. Report percent of dry film lost.

4. CONSTRUCTION REQUIREMENTS

A. EQUIPMENT

1. Use a continuous flow mixing unit.
   - Capable of applying at least 15,000 square yards of material per day.
   - Equipped with full sweep agitation system to assure proper suspension of fine aggregates.
   - Equipped with an operator control station that adjusts material spread rate in accordance with project calibration process.

- Equipped with two separate filters. The primary filter should be at least 200 square inches with a face of 3/8 inch. The secondary filter needs to be at least 1,500 square inches with a filter face of 1/8 inch
- Equipped with a retractable spray bar capable of applying mixture without drilling. The bar should be positioned to meet calibration requirements.

2. Storage Tanks.
   - When delivering mix from the central mixing plant to a job site storage tank, use only storage tanks with a capacity to contain the entire transport load.
   - Ensure that all site storage tanks have internal full sweep mixing mechanisms and mixing capability that can provide at any given point in the tank a homogenous mix.

B. PREPARATION

1. Calibration: On a test strip at least 300 feet long, determine the correct pump settings, spray bar height, and ground speed for the application equipment. Apply material with pump settings at 80 percent of maximum output (plus or minus 5 percent) and a ground speed of 300 to 400 feet per minute.
   - Do not begin or continue application without Engineer's knowledge of the calibration process and equipment settings.
   - Do not deviate from calibration settings without Engineer's knowledge.
2. Surface Repair: Patch any holes, raveled areas, and low areas with hot or warm mix asphalt. Severely raveled or porous pavements may require tack coat of SS or CSS grade. Asphalt concrete inlay may be required in rut deformations.
3. Cleaning: Remove loose material, mud spots, sand, dust, oil, vegetation and other objectionable material. Do not flush water over cracks or apply pressurized water to cracked pavement. Clean the surface prior to installation.

C. APPLICATION

1. Application Rate: Two separate application coats are required. The first application must be thoroughly dry and free of any damp areas before the second application begins. Machine settings must match the following application rates.
   - First application: 0.20 gallons per square yard minimum.
   - Second application: 0.16 gallons per square yard minimum.
2. Spreading. Keep constant delivery rate of material per square yard of surface.
   - Do not reduce application rate along edges or around manhole covers.
   - Apply both applications right to the edge of the pavement. Do not back away from curbs, manhole covers, and edges on either application.
   - Make straight lines at all locations.
   - Use hand squeegees to spread mix in areas that cannot be reached with distribution spray bar.
     - Provide complete and uniform coverage.
     - Avoid unsightly appearance from hand work.

3. Joints:
    - Make transverse joints straight-cut butt type, not over-lap type.
    - Place longitudinal joints on lane lines.
    - Limit overlap to three (3) inches maximum.
    - Stop and correct paving operation if longitudinal or transverse joints have uncovered areas or unsightly appearance.
4. Lines:
    - Make straight lines along lip of gutters, shoulders, end of streets, and in street intersections. No runoff on these areas will be permitted.
    - Vary edge lines no more than one (1) inch per 100 feet.

D. After Application.

1. Leave no streaks caused by plugged nozzle or improper spray bar height.
2. Leave no holes, bare spots, or cracks.
3. Expose and clean Manholes, valve boxes, inlets and other service entrances and Street Fixtures.
4. Raise reflective tabs that were covered over.
5. Do not permit traffic on product until surface has cured.
6. Do not apply permanent pavement markings or striping material until the layout has been determined by the Engineer, and final application of surface treatment has been in place at least 10 days, or as permitted by the Engineer. Layout must be verified by the Engineer prior to application.

E. Repair. Repair and remove at no additional cost to City:

1. Remove delaminated or non-compliant product found after installation and apply acceptable product.
2. Remove spatter, mar and overcoat from curb, gutter, sidewalk, guard rails, guide posts, etc.
3. Remove overcoat from street fixtures.
4. Make edge and end lines straight. Provide a good appearance.
5. Leave no streaks, holes, bare spots, or cracks through which liquids or foreign matter could penetrate to the underlying pavement.
6. Repair collateral damage caused by construction.

F. QUALITY CONTROL

Testing. If density tests (ASTM D2939) show non-compliance, remove the product and halt operations until new material arrives and is shown to be in compliance. Measure the total amounts of material installed, and verify it meets the application rate. Protect surface treatment material from traffic until verification has been made.

5. MEASUREMENT AND PAYMENT

A. Surface Seal. 1-2. The surface seal shall be paid for by the number of square yards of High Density Mineral Bond as measured in-place at the contract unit price; which price shall be full compensation for all surface cleaning, traffic control, erosion control, material preparation and application as well as any labor, tools, equipment and incidentals necessary to complete the work.

B. Striping.

a. 3-4 Shall include all necessary labor and materials to tab and then place thermoplastic lane markings in accordance with TxDOT standard specifications for Item 666, Type l Marking Materials. Unit payment shall be linear foot for each designated marking pattern.

b. 5. Shall include all necessary labor and materials to place thermoplastic pavement markings in accordance with TxDOT standard specifications for Item 666, Type I Marking Materials. Unit payment shall be linear foot for each designated marking pattern.

c. 6-7. Shall include all necessary labor and materials to place thermoplastic pavement markings in accordance with TxDOT standard specifications for Item 666, Type I Marking Materials. Unit measurement shall be for each short-line item placed.

PAY ITEM NOTES

1. Shall include all necessary equipment, labor and materials to provide jobsite safety, erosion protection, and construction signing/traffic control in accordance with TMUTCD standards. Unit payment shall be lump sum.

2. Surface Seal. The surface seal shall be paid for by the number of square yards of High Density Mineral Bond as measured in-place at the contract unit price; which price shall be full compensation for all surface cleaning, traffic and erosion control, material preparation and application as well as any labor, tools, equipment and incidentals necessary to complete the work.

3. Shall include all necessary labor and materials to tab and then place thermoplastic lane markings in accordance with TxDOT standard specifications for Item 666, Type I Marking Materials. Unit payment shall be linear foot for each designated marking pattern.

4. Shall include all necessary labor and materials to place thermoplastic pavement markings in accordance with TxDOT standard specifications for Item 666, Type I Marking Materials. Unit measurement shall be for each short-line item placed

END OF SPECIFICATIONS
SECTION