

WORK AUTHORIZATION NO. 2

PROJECT: Dense-Graded Hot Mix Lab Testing and Engineering Services for Chandler Road Overlay/Striping Project – Road & Bridge Division

This Work Authorization is made pursuant to the terms and conditions of the Williamson County Contract for Engineering Services, being dated February 10, 2015 and entered into by and between Williamson County, Texas, a political subdivision of the State of Texas, (the "County") and PaveTex Engineering and Testing, Inc. (the "Engineer").

Part 1. The Engineer will provide the following Engineering Services set forth in Attachment "B" of this Work Authorization.

Part 2. The maximum amount payable for services under this Work Authorization without modification is \$34,961.00.

Part 3. Payment to the Engineer for the services established under this Work Authorization shall be made in accordance with the Contract.

Part 4. This Work Authorization shall become effective on the date of final acceptance and full execution of the parties hereto and shall terminate on September 30, 2016. The Engineering Services set forth in Attachment "B" of this Work Authorization shall be fully completed on or before said date unless extended by a Supplemental Work Authorization.

Part 5. This Work Authorization does not waive the parties' responsibilities and obligations provided under the Contract.

Part 6. County believes it has sufficient funds currently available and authorized for expenditure to finance the costs of this Work Authorization. Engineer understands and agrees that County's payment of amounts under this Work Authorization is contingent on the County receiving appropriations or other expenditure authority sufficient to allow the County, in the exercise of reasonable administrative discretion, to continue to make payments under this Contract. It is further understood and agreed by Engineer that County shall have the right to terminate this Contract at the end of any County fiscal year if the governing body of County does not appropriate sufficient funds as determined by County's budget for the fiscal year in question. County may effect such termination by giving written notice of termination to Engineer.

Part 7. This Work Authorization is hereby accepted and acknowledged below.

EXECUTED this 11 day of September 2015.

ENGINEER:

PaveTex Engineering and Testing, Inc.

By: Sarah Tahmoressi
Signature

Sarah Tahmoressi
Printed Name

CFO
Title

COUNTY:

Williamson County, Texas

By: [Signature]
Signature

Dan Gattis
Printed Name

County Judge
Title

LIST OF ATTACHMENTS

Attachment A – Services to be Provided by County

Attachment B – Services to be Provided by Engineer

Attachment C – Work Schedule

Attachment D – Fee Schedule

Attachment A – Services to be Provided by County

1. For Mixture Design Verification, County will have Contractor provide two 5-gallon buckets of each aggregate stockpile to be used on the project and three gallons of each PG binder to be used on the project. County will also have Contractor provide sufficient quantities of any other additives that will be used in the HMA mixture.
2. County will have Contractor provide a single point of contact, to be identified upon Notice to Proceed.
3. County will act as liaison between Contractor and Engineer.

Attachment B – Services to be Provided by Engineer

Engineer will provide Dense-Graded Hot Mix Lab Testing and Engineering Services for the Chandler Road project as follows.

1. Prior to allowing production of the trial batch, the Engineer will use the materials provided by the Contractor to perform the following tests to verify the HMA mixture design.
 - a. Indirect Tensile Test in accordance with Tex-226-F
 - b. Hamburg Wheel Test in accordance with Tex-242-F
 - c. Overlay Test in accordance with Tex-248-F
 - d. Cantabro Test in accordance with Tex-245-F
2. For mixtures designed with a Texas Gyrotory Compactor (TGC), the Engineer may require that the target laboratory molded density be raised to no more than 97.5% or may lower the design number of gyrations to no less than 35 for mixtures designed with an SGC if any of the following conditions exist.
 - a. The Indirect Tensile Test results in a value greater than 200 PSI
 - b. The Hamburg Wheel Test results in a value less than 3.0 mm
 - c. The Overlay Test results in a value less than 100 cycles
 - d. The Cantabro Test results in a value of more than 20% loss
3. In lieu of or in addition to evaluating the mixture design prior to allowing a trial batch to be produced, the Engineer may also evaluate the mixture produced during the trial batch for compliance with the 4 tests listed above.
4. Perform construction management and Engineering services.

Attachment C – Work Schedule

Engineer shall provide a work schedule for the assigned tasks. Work shall begin immediately upon receipt of executed agreement between County and Engineer.

PaveTex Engineering and Testing, Inc.

Field Technician	Unit	Unit Cost	
		Reg.	OT
1A	hr.	\$58	\$69
1B	hr.	\$58	\$69
Soils	hr.	\$50	\$61
Concrete	hr.	\$50	\$61
Nuclear Gauge Calibration	hr.	\$75	
Concrete Plant/ Truck Inspection	hr.	\$75	
Asphalt Distributor Calibration	hr.	\$75	
Senior Professional Engineer	hr.	\$195	
Professional Engineer	hr.	\$145	
EIT	hr.	\$85	
Project Manager	hr.	\$98	
Administrative Assistant	hr.	\$45	

Field Testing Equipment	Unit	Unit Cost
(2 Hr Min, Tech Time Not Included)		
HMAC Coring		
Coring Equipment Mobilization	trip	\$75
0"-6" Depth & 6" \varnothing (incl. Patching & Sample Prep)	EA.	\$95
> 6"-10" Depth & 6" \varnothing (incl. Patching & Sample Prep)	EA.	\$110
> 10"-14" Depth & 6" \varnothing (incl. Patching & Sample Prep)	EA.	\$150
> 14" Depth & 6" \varnothing (incl. Patching & Sample Prep)	EA.	\$4/ in. over 14"
Concrete Coring		
Concrete Coring Equipment	hr.	\$55.00
Concrete Core Bit Charges		
3" Diameter Core	in.	\$5
4" Diameter Core	in.	\$6
6" Diameter Core	in.	\$8

Soils & Aggregates (100-E Series)			
Test For	Test Method	Unit	Unit Cost
Sample Preparation	Tex-101-E	EA.	\$50
Moisture Content	Tex-103-E	EA.	\$25
Atterberg Limits	Tex-104-E, 105-E & 106-E	EA.	\$75
Linear Bar Shrinkage	Tex-107-E	EA.	\$75
Sieve Analysis	Tex-110-E, Pt. 1	EA.	\$55
Sieve Analysis	Tex-110-E, Pt. 2	EA.	\$85
Moisture- Density Relationship	Tex-113-E	EA.	\$350
Moisture- Density Relationship	Tex-114-E	EA.	\$250
Wet Ball Mill	Tex-116-E	EA.	\$250
Texas Triaxial Compression	Tex-117-E, Pt. 1	EA.	\$1,100
Full Triaxial Testing *	* See Note	EA.	\$1,700
Soil- Cement Testing	Tex-120-E, Pt. 1	EA.	\$1,100
Soil- Cement Testing	Tex-120-E, Pt. 2	EA.	\$300
Soil- Lime Testing	Tex-121-E, Pt. 1	EA.	\$1,100
Soil- Lime Testing	Tex-121-E, Pt. 2	EA.	\$300
Lime-Fly Ash Compression	Tex-127-E	EA.	\$1,100
Soil pH	Tex-128-E	EA.	\$50
Resistivity	Tex-129-E	EA.	\$300
Tube Suction Test	Tex-144-E	EA.	\$100
Sulfate Content	Tex-145-E	EA.	\$225
Conductivity of Soils	Tex-146-E	EA.	\$25
Hydrometer Analysis	AASHTO T 88	EA.	\$450
California Bearing Ratio	AASHTO T 193/ ASTM C 1883	EA. point	\$300
* Full Triaxial Testing includes the following: Washed Gradation, Atterberg Limits, Moisture- Density Relationship, Wet Ball Mill & Texas Triaxial			

Bituminous (200-F Series)			
Test For	Test Method	Unit	Unit Cost
Dry Sieve Analysis	Tex-200-F, Part I	EA.	\$50
Washed Sieve Analysis	Tex-200-F, Part II	EA.	\$85
Bulk Specific Gravity & % Absorption	Tex-201-F	EA.	\$85
Apparent Specific Gravity	Tex-202-F	EA.	\$85
Sand Equivalent	Tex-203-F	EA.	\$85
Mix Design	Tex-204-F	EA.	\$2,500
Mixing	Tex-205-F	set of 3	\$75
Molding (TGC)	Tex-206-F	set of 3	\$60
Laboratory-Molded Density	Tex-207-F, Part I	set of 3	\$40
In-Place Density (Core Testing)	Tex-207-F, Part I	EA.	\$25
In-Place Density (Nuclear Method)	Tex-207-F, Part III (Min. of 3)	EA.	\$30
In-Place Air Voids (Core Lock)	Tex-207-F, Part VI	set of 2	\$75
Hveem Stability	Tex-208-F	set of 3	\$120
Asphalt Content by Extraction & Gradation	Tex-210-F	EA.	\$175
Asphalt Recovery from Abson Process	Tex-211-F	EA.	\$250
Moisture Content	Tex-212-F	EA.	\$25
Deleterious Material	Tex-217-F	EA.	\$50
Decantation	Tex-217-F, Part II	EA.	\$100
Flakiness Index	Tex-224-F	EA.	\$100
Indirect Tensile Strength	Tex-226-F	EA.	\$50
Theoretical Maximum Specific Gravity	Tex-227-F	EA.	\$60
Drain-down Test	Tex-235-F	EA.	\$75
Asphalt Content by Ignition Oven & Gradation	Tex-236-F	EA.	\$175
Ignition Oven Correction Factors	Tex-236-F	EA.	\$500
Hamburg Wheel-Tracking Test	Tex-242-F	EA.	\$500
Cantabro Loss	Tex-245-F	EA.	\$200
Overlay Test	Tex-248-F	EA.	\$750
Flat and Elongated Particles	Tex-280-F	EA.	\$100

PaveTex Rate Schedule: Page 3 of 5 – January 2015

Concrete (400-A Series)			
Test For	Test Method	Unit	Unit Cost
Sieve Analysis of Fine and Coarse Aggregate & Fineness Modulus	Tex-401-A & Tex-402-A	EA.	\$85
Saturated Surface-Dry Specific Gravity & Absorption of Aggregates	Tex-403-A	EA.	\$85
Unit Weight	Tex-404-A	EA.	\$85
Material Finer than 75 Micrometer (No. 200) Sieve in Mineral Aggregates (Decantation)	Tex-406-A	EA.	\$100
Acid Insoluble Residue for Concrete Aggregate	Tex-406-A, Part III	EA.	\$350
Organic Matter Content	ASTM D 5268	EA.	\$100
Organic Impurities in Fine Aggregate for Concrete	Tex-408-A	EA.	\$100
Los Angeles Abrasion	Tex-410-A	EA.	\$300
Magnesium or Sodium Sulfate Soundness	Tex-411-A	EA.	\$300
Concrete Cylinder Compressive Strength	Tex-418-A	EA.	\$22
Concrete Flexural Beam Compressive Strength	Tex-419-A	EA.	\$22
Pressure Slake	Tex-431-A	EA.	\$250
Freezer Thaw	Tex-432-A	EA.	\$250
24 Hr Water Absorption	Tex-433-A	EA.	\$85
Polish Test for Coarse Aggregate	AASHTO T 278 & 279/ Tex-438-A	EA.	\$1,200
Coarse Aggregate Angularity (Crushed Faces)	Tex-460-A	EA.	\$30
Micro-Deval Abrasion	Tex-461-A	EA.	\$300
Moisture Susceptibility	Tex-530-C	EA.	\$50
Alkali-Silica Reactivity (ASR)	AASHTO T 303 (ASTM C 1260)	EA.	\$1,200
	ASTM C1567		

Asphalt (500-C Series)			
Test For	Test Method	Unit	Unit Cost
Boil Test	Tex-530-C	EA.	\$50
Penetration	AASHTO T 49	EA.	\$50
Ductility	AASHTO T 51	EA.	\$200
Softening Point	AASHTO T 53	EA.	\$150
Distillation of Cutback Asphalt Products	AASHTO T 78	EA.	\$150
Rolling Thin-Film Oven (RTFO)	AASHTO T 240	EA.	\$250
Elastic Recovery	AASHTO T 301	EA.	\$250
Dynamic Shear Rheometer (DSR)	AASHTO T 315	EA.	\$100
-Additional DSR Readings		EA.	\$50
Rotational Viscosity	AASHTO T 316	EA.	\$50
Rubber Property—Resilience by Vertical Rebound	ASTM D 2632	EA.	\$50

PaveTex Rate Schedule: Page 5 of 5 – January 2015

Attachment D, Continued – Basis of Estimate

Testing Budget for Chandler Road

Mix Design Verification:

Item	Description	Test Method	Quantity	Units	Unit Rate	Subtotal
1	Sampling		6	hrs	\$ 58	\$ 348
2	sample prep		4	ea	\$ 50	\$ 200
3	San Equivalent	Tex-203-F	1	ea	\$ 85	\$ 85
4	Mixing Design samples	Tex-205-F	1	ea	\$ 75	\$ 75
5	Mold TGC	Tex-206-F	1	set	\$ 60	\$ 60
6	Max. Theoretical Gravity	Tex-227-F	1	ea	\$ 60	\$ 60
7	Lab Density	Tex-207-F	1	set	\$ 40	\$ 40
8	Hveem Stability	Tex-208-F	1	set	\$ 120	\$ 120
9	Mixing Indirect Tensile samples	Tex-205-F	2	ea	\$ 75	\$ 150
10	Molding Indirect Tensile Samples	Tex-206-F	2	set	\$ 60	\$ 120
11	Indirect Tensile Strength	Tex-229-F	3	ea	\$ 50	\$ 150
12	Hamburg	Tex-242-F	1	ea	\$ 500	\$ 500
13	Cantabro Test	Tex-245-F	1	ea	\$ 200	\$ 200
14	Overlay Test	Tex-248-F	1	ea	\$ 750	\$ 750
15	DSR	AASHTO T315	2	ea	\$ 100	\$ 200
16	Penetration	AASHTO T49	1	ea	\$ 50	\$ 50
17	Elastic Recovery	AASHTO T301	1	ea	\$ 250	\$ 250
18	RTFO	AASHTO T40	1	ea	\$ 250	\$ 250
19	Viscosity	AASHTO T316	1	ea	\$ 50	\$ 50
20	Spot Test	NA	1	ea	\$ 200	\$ 200
21	Coordination and XRF Testing for REOB's PPA		4	hrs	\$ 195	\$ 780
22	Engineering Time, Pre Con and Design Review		4	hrs	\$ 195	\$ 780
						Subtotal \$ 5,418

Trial Batch Verification

1	Trial Batch Sampling and Testing at Plant	Level IA Tech	10	hrs	\$ 58	\$ 580
2	Hveem Stability	Tex-208-F	1	set	\$ 120	\$ 120
3	Mixing Indirect Tensile samples	Tex-205-F	2	ea	\$ 75	\$ 150
4	Molding Indirect Tensile Samples	Tex-206-F	2	set	\$ 60	\$ 120
5	Indirect Tensile Strength	Tex-229-F	3	ea	\$ 50	\$ 150
6	Hamburg	Tex-242-F	1	ea	\$ 500	\$ 500
7	Cantabro Test	Tex-245-F	1	ea	\$ 200	\$ 200
8	Overlay Test	Tex-248-F	1	ea	\$ 750	\$ 750
9	Extraction	Tex-210-F	1	ea	\$ 175	\$ 175
10	Abson Recovery	Tex-211-F	1	ea	\$ 250	\$ 250
11	DSR	AASHTO T315	2	ea	\$ 100	\$ 200
12	Penetration	AASHTO T49	1	ea	\$ 50	\$ 50
13	Elastic Recovery	AASHTO T301	1	ea	\$ 250	\$ 250
14	Viscosity	AASHTO T316	1	ea	\$ 50	\$ 50
15	Spot Test	NA	1	ea	\$ 200	\$ 200
16	Engineering Time, Trial Batch Review		4	hrs	\$ 195	\$ 780
						Subtotal \$ 4,525

Testing During Production

1	Testing at Hot Mix Plant- Regular Time	Level IA Tech	149	hrs	\$ 58	\$ 8,642
2	Testing at Hot Mix Plant- OT	Level IA Tech	29	hrs	\$ 69	\$ 2,001
3	Engineering Oversight/ Report Review		19	hrs	\$ 195	\$ 3,705
						Subtotal \$ 14,348

Weekly Performance Testing

1	Hveem Stability	Tex-208-F	3	set	\$ 120	\$ 360
2	Mixing Indirect Tensile samples	Tex-205-F	3	ea	\$ 75	\$ 225
3	Molding Indirect Tensile Samples	Tex-206-F	3	set	\$ 60	\$ 180
4	Indirect Tensile Strength	Tex-229-F	3	ea	\$ 50	\$ 150

5	Hamburg	Tex-242-F	3	ea	\$ 500	\$ 1,500	
6	Cantabro Test	Tex-245-F	3	ea	\$ 200	\$ 600	
7	Overlay Test	Tex-248-F	0	ea	\$ 750	\$ -	
8	Extraction	Tex-210-F	3	ea	\$ 175	\$ 525	
9	Abson Recovery	Tex-211-F	3	ea	\$ 250	\$ 750	
10	OSR	AASHTO T315	3	ea	\$ 100	\$ 300	
11	Penetration	AASHTO T49	3	ea	\$ 50	\$ 150	
12	Elastic Recovery	AASHTO T301	1	ea	\$ 250	\$ 250	
13	Random Testing for REOB's and PPA		4	hrs	\$ 195	\$ 780	Subtotal \$ 5,770

Project Manager/ Construction Inspection

1	Project Manager		50	hrs	\$ 98	\$ 4,900	Subtotal \$ 4,900
---	-----------------	--	----	-----	-------	----------	-------------------

Total

\$ 34,961