U.S. Department
of Transportation
Federal Highway Administration

Memorandum

Project: UT PFH 39-(4)
Sevenmile – Gooseberry Road
Gates Lake Pit Asphalt Mix

To: Prospective Contractors

Date: December 4, 2012

From: Chris Longley
Project Manager

Attached is a trial Superpave Asphalt Concrete Mix Design that was performed by Central Federal Lands Laboratory to investigate the quality of the materials available at the Gates Lake Pit. This Design is provided for information purposes only. The contract will require a mix design using the actual materials to be used on this Project. For example, this trial mix design uses a California PG 64-28. The actual mix design will require replacement with locally available asphalt at the specified grade.

The aggregates produced from this pit meet the quality requirements for inclusion in an acceptable Superpave Asphalt Concrete Mixture. However, actual crushing operations may affect aggregate shape changing the actual properties of the combined mixture. No estimate of crushing waste is available since this mix design involved controlled laboratory aggregate crushing.

All questions concerning this mix design will be handled through the normal bidding process.

cc: Ron Andresen, Materials Engineer
Charles Luedders, Pavements Team Lead
Darrell Harding, Laboratory Manager

U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division Laboratory

An AASHTO and ISO Accredited Laboratory

AASHTO R18 ISO/IEC 17025

Report of Superpave Asphalt Concrete Mix Design

Project: Utah PFH 39-1(2) Sevenmile-Gooseberry

Submitted By: Mark Lloyd & Rick Marquez

Date Reported: 12/6/2010

Aggregate Source: Gates Lake Pit, 16+000 Left

Design Type: Preliminary Superpave Hot Asphalt Concrete Pavement

Aggregate Nominal Maximum Size: 1/2"

Asphalt Cement Source and Grade: Valero, Benicia, CA; PG 64-28

Lab Number		10-3245-AGG					10-3245-AGG				
Field Number		HMA JMF									
Description		Base Course As Received					Processed With 1.0% Lime		Specs	T.V.	(D)
Bin Combination%											
1"	25.0 mm	97		Note the sample was crushed in a jaw-type laboratory crusher. The gradation and particle shape may not be representative of that produced by a contractor's crushing operation.							
3/4"	19.0 mm	90					100		100		
1/2"	12.5 mm	70					91		90-100		
3/8"	9.5 mm	59					81			81	4
#4	4.75 mm	41					51			51	7
#8	2.36 mm	29					32			32	5
#16	1.18 mm										
#30	600 µm	17					15			15	3
#40	425 µm	15									
#50	300 µm	13					13			12	3
#100	150 µm										
#200	75 µm	8.3					7.4		3-8	6.5	2
Liquid Limit		NV					NV				
Plasticity Index		NP					NP				

Design Parameters, AASHTO R 35	Specs.	
Optimum AC by Total Mix Weight, %		5.6
Maximum Density, pcf		150.1
Air Voids, %	3-5	4.0
VFA, %	65-78	71.8
VMA, %	14.0 Min.	14.2
Lab Mixing Temperature, °C		155
Dust-to-Binder Ratio	0.8-1.6	1.4
Hveem, s-value		39
Hveem Air Viods,%		3.2
Antistrip, %, Type		1.0, Lime

Moisture Induced Damage, AASHTO T 283	Specs.			
Asphalt Content, %	5.6	5.6		
Additive Type	Lime	Lime		
Additive, %	1.0	1.0		
Cond. Strength, psi		90.2		
Dry Strength, psi		112.2		
TSR, %	0.80 Min.	0.80		
Avg. Air Voids, %	7.0 ± 0.5	6.6		
Saturation, %	70-80	72.5		
Crack/Broke Agg, %				

Aggregate Quality		Specs.	
L.A. Abrasion, Grading C, %	AASHTO T 96	35 Max.	26
Micro-Deval Abrasion, % Loss	AASHTO T 327	---	
$NaSO_4$ Soundness, % Loss	AASHTO T 104	12 Max.	1
Fractured Faces, 1 or more, %	ASTM D 5821	75 Min.	100
Sand Equivalent, Ref. Alt. 2	AASHTO T 176	45 Min.	50
Uncompacted FA Voids, A %	AASHTO T 304	45 Min.	47.1
F & E Particles, 1:5 ratio, %	ASTM D 4791	10 Max.	4

Design Gyratory Compactive Effort				
Design High Air Temp, Centigrade	ESAL's	Ninit	Ndesign	Nmax
		85.7	96.0	---
Specification (% of Maximum Density)	0.3-<3	< 90.5	96.0	< 98.0

Specific Gravity & Absorption, AASHTO T 84 & T 85			
Reported values are one place more than AASHTO specifies	+#4	-#4	Combined
Apparent Specific Gravity	2.709	2.715	2.712
Bulk Specific Gravity	2.574	2.519	2.546
Absorption, %	1.93	2.86	2.40
Effective Specific Gravity			2.624

Distribution:

Num/ Project File	
Laboratory	Darrell Harding
Construction	Mark Lloyd/Rick Marquez
Project Manager	Chris Longley
Materials	Mike Peabody

Remarks: The material consists of 18 splits of base course sampled between 7/29/10 and 9/2/10.

The processed gradation was achieved by wasting 50% of the "as received" -#4 then crushing a portion of the coarse aggregate.

Reported By:

Darrell Harding
Laboratory Manager

U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division Laboratory

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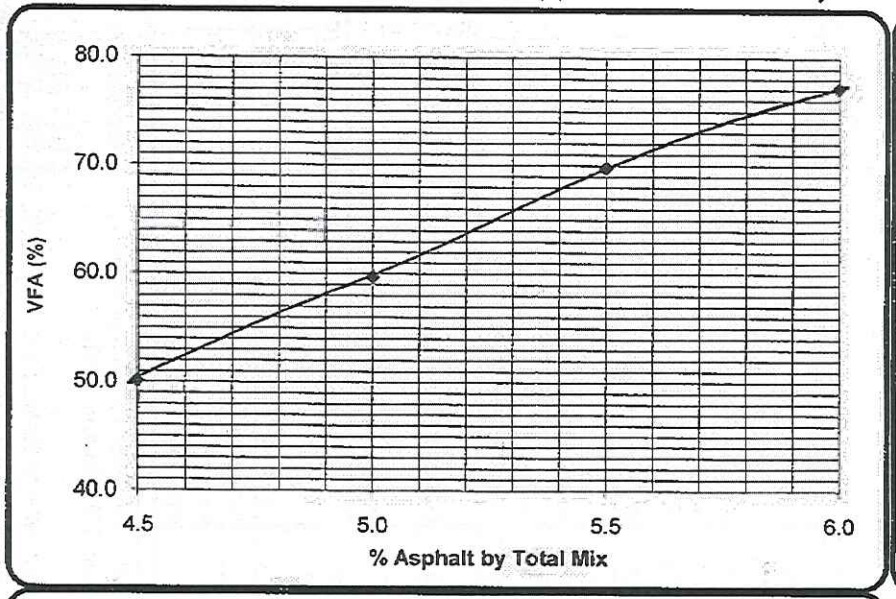
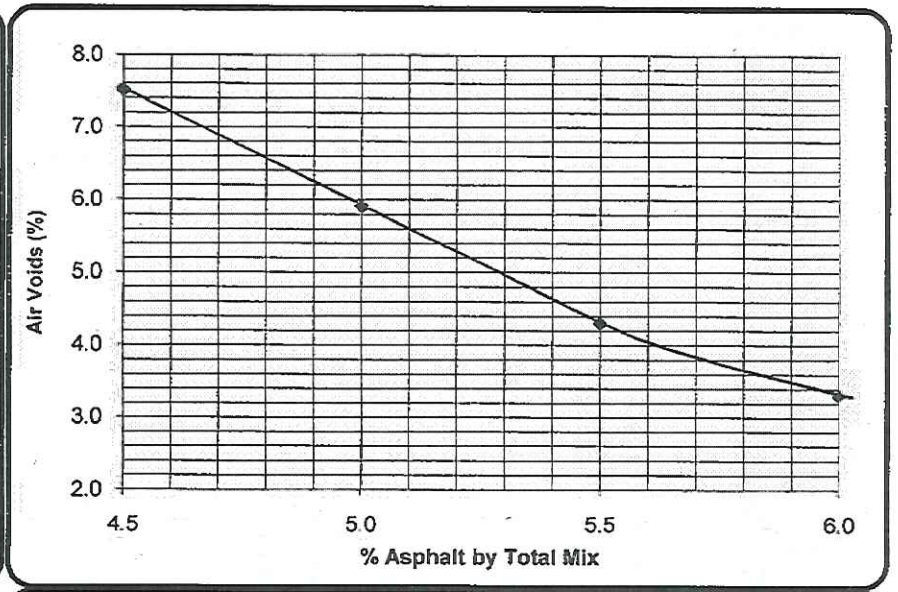
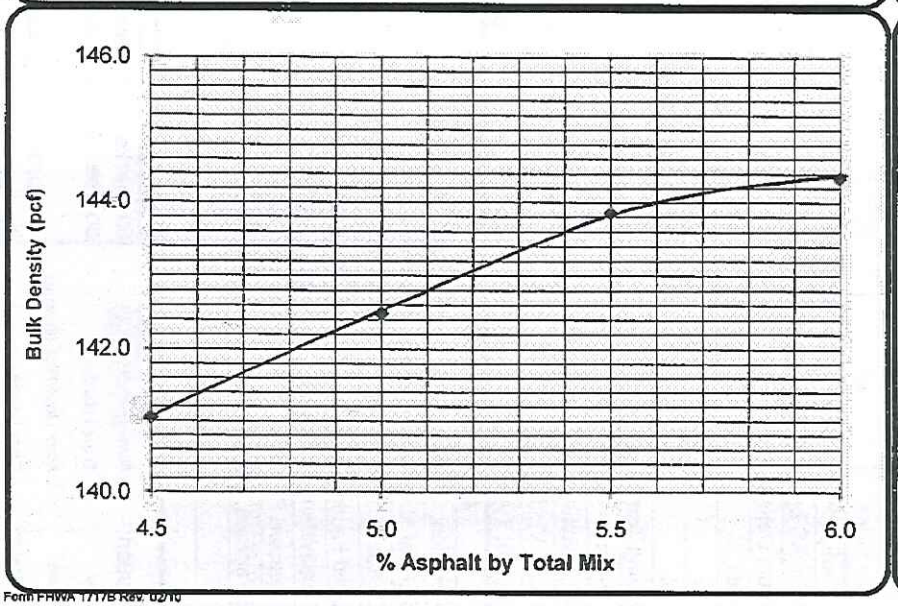
AASHTO R18 ISO/IEC 17025

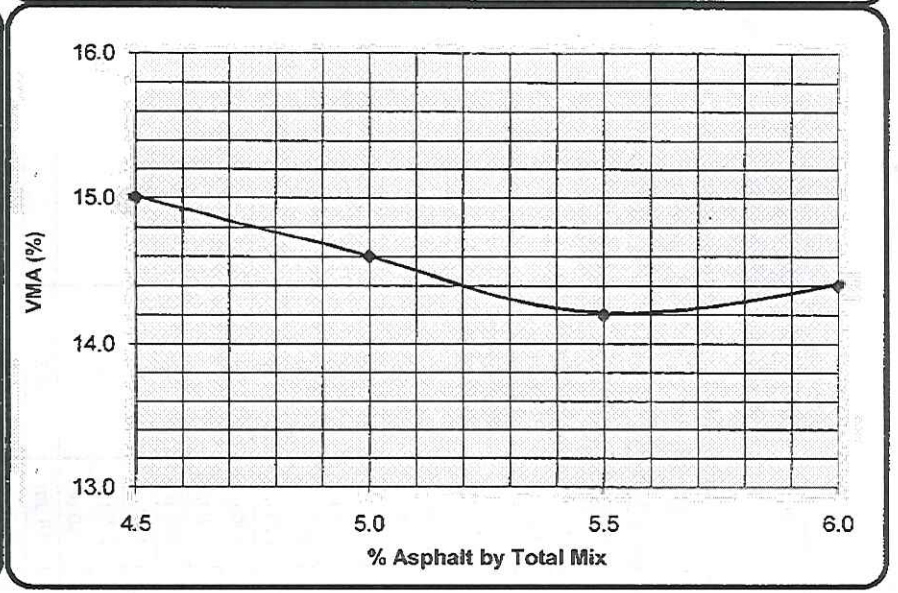
Superpave Mix Design

Project: UT PFH 39-1(2) Sevenmile-Gooseberry **Lab No:** 10-3245-AGG **Date:** 12/6/2010





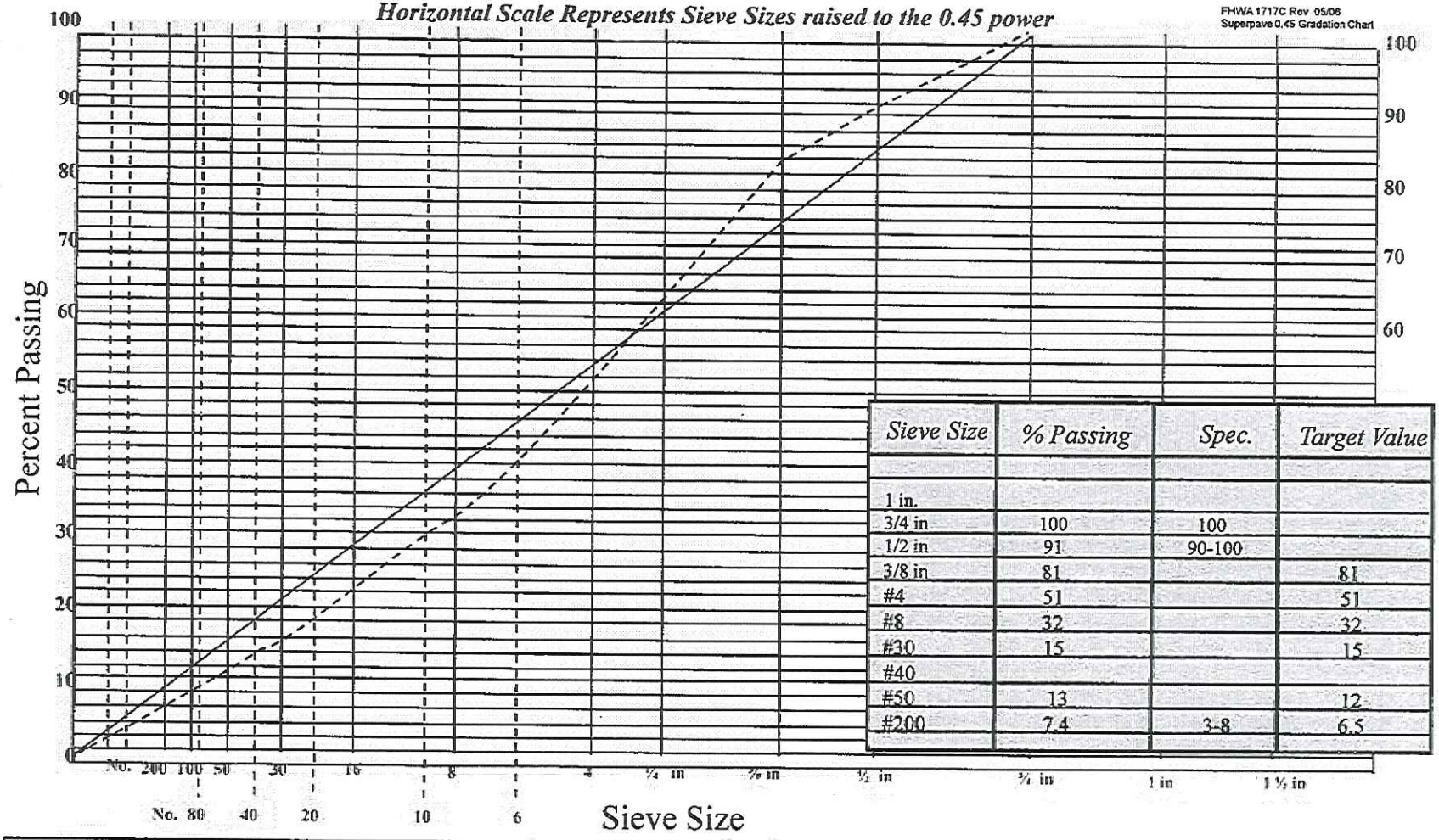




Gradation Chart

Horizontal Scale Represents Sieve Sizes raised to the 0.45 power

FHWA 1717C Rev 05/06
Superpave 0.45 Gradation Chart



Sieve Size	*% Passing*	*Spec.*	*Target Value*
1 in.			
3/4 in	100	100	
1/2 in	91	90-100	
3/8 in	81		81
#4	51		51
#8	32		32
#30	15		15
#40			
#50	13		12
#200	7.4	3-8	6.5

State: Utah	Project: PFH 39-1(2) Sevenmile-Gooseberry	Lab No: 10-3245-AGG	Date: 12/4/2010	Prepared By: PMK
Type, Source, Producer of Aggregate: Gates Lake Pit, 16+000 Left. The gradation was achieved by wasting 50% of the "as received" gradation on page 1 of 3 -#4 then crushing a portion of the coarse aggregate.	Material Description: Superpave Hot Asphalt Concrete Pavement		Item: 401	Grading: 1/2"
	Remarks:			