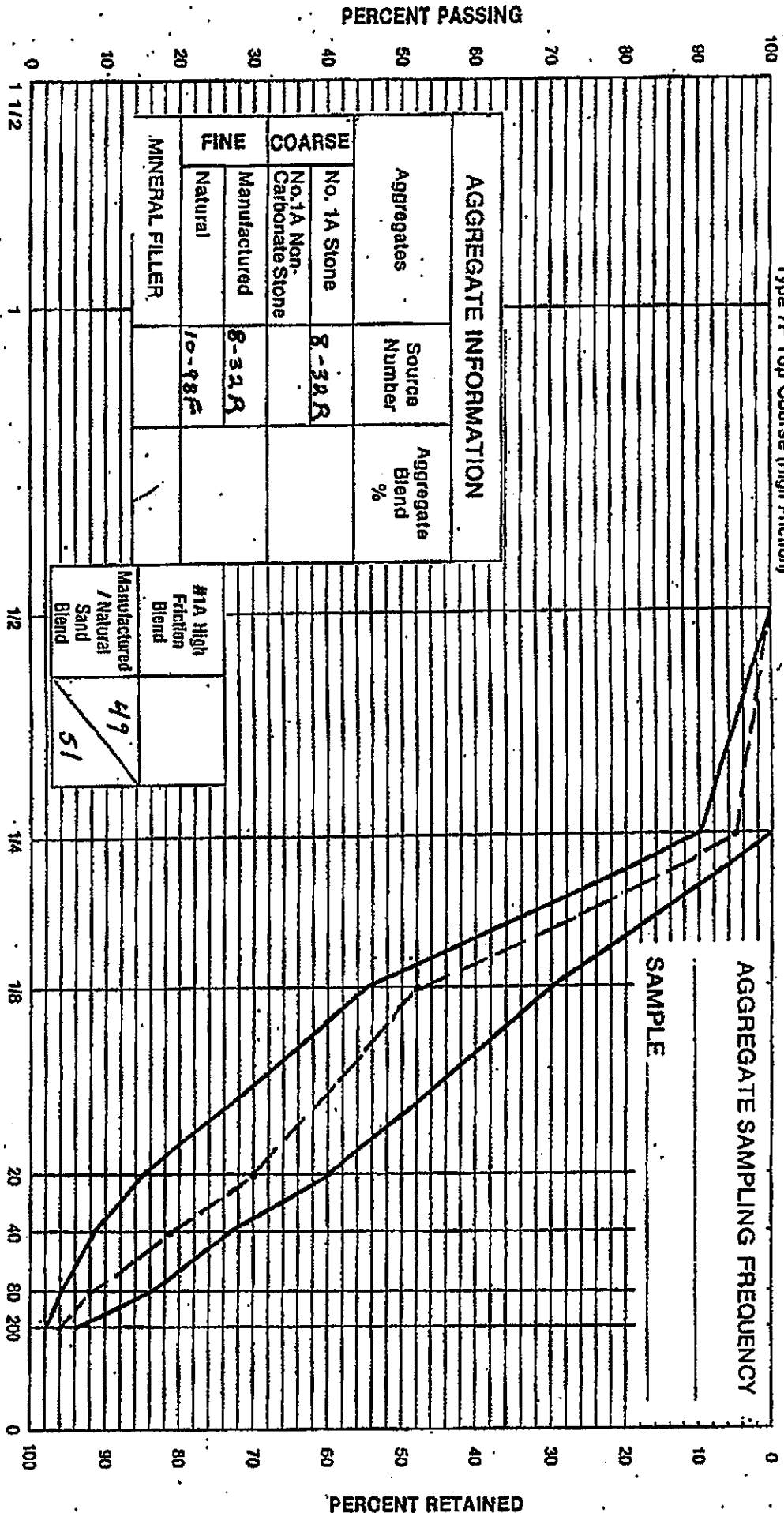




DEPARTMENT OF TRANSPORTATION  
 MATERIALS BUREAU  
**JOB MIX FORMULA**  
**MARSHALL MIX DESIGN**  
 Type 7F Top Course (High Friction)

Plant Flushing Region 11  
 Plant Location Flushing NY  
 Submitted By Ralph Hoefner Date 1-6-2016  
 (SUBMISSION INSTRUCTIONS ON BACK)



Sieve Size	2"	1 1/2"	1"	3/4"	1/2"	1/4"	No. 20	No. 40	No. 80	No. 200	Asphalt Content (Percent)			
1. General Limits							100	90-100	45-70	15-40	8-27	4-16	2-6	6.0-10
2. JMF Range							100	90-100	45-59	22-37	12-26	4-12	2-6	6.0
3. Target Value							100	95	52	30	19	8	4	6.0

U.S. STD. SIZES — RAISED TO 0.45 POWER

Asphalt Grade	AC
Asphalt Content	6.0

Recommended for Approval by Regional Director \_\_\_\_\_ Date \_\_\_\_\_  
 Approved by Director, Materials Bureau \_\_\_\_\_ Date \_\_\_\_\_  
 Remarks: \_\_\_\_\_

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BR 77a (2/90)

NEW YORK STATE  
DEPARTMENT OF TRANSPORTATION  
MATERIALS BUREAU

ITEM 403,1901 REGION 11

MIX TYPE 7F

WORKSHEET FOR ANALYSIS OF  
COMPACTED PAVING MIXTURE

PRODUCER FLUSHING ASPHALT

(Analysis by weight of total mixture)

LOCATION College PT

COMPOSITION OF PAVING MIXTURE

COMPACTION 7.5 BLOWS PER SIDE

CONSTITUENT MATERIAL	NYS DOT Source Number	Specific Gravity, G		Region Verification	Mix Composition, % by weight of Total Mix., P					
		Apparent	Bulk		Mix or Total Number					
					1	2	3	4	5	
Coarse Aggregates	No. 2 Stone			P <sub>1</sub>						
	No. 1 Stone			P <sub>2</sub>						
	No. 1 Non-Carbonate Stone			P <sub>3</sub>						
	No. 1A Stone	8-32R	2.801	2.768	P <sub>4</sub>	53.1	52.8	52.6	52.4	52.2
	1A Non-Carbonate Stone				P <sub>5</sub>					
Fine Aggregates	Manufactured	8-32R	2.900	2.810	P <sub>6</sub>	20.2	20.1	20.0	19.9	19.9
	Natural	10-98F	2.653	2.620	P <sub>7</sub>	21.1	21.1	21.0	20.9	20.7
MINERAL FILLER				P <sub>8</sub>						
TOTAL AGGREGATE				P <sub>8</sub>	94.4	94.0	93.6	93.2	92.8	
ASPHALT CEMENT @ 77 F (25C)		1.030		P <sub>8</sub>	5.6	6.0	6.4	6.8	7.2	

G <sub>mm</sub>	Max. Sp. Gr. of Paving Mix (ASTM D2041)	2.520	2.501	2.486	2.477	2.460
G <sub>mb</sub>	Bulk Sp. Gr. of compacted mix (ASTM D2726)	2.401	2.407	2.410	2.408	2.405
G <sub>sb</sub>	Bulk Sp. Gr. of total aggregate*	2.742	2.742	2.742	2.742	2.742
G <sub>se</sub>	Effective Sp. Gr. of total aggregate*	2.757	2.752	2.752	2.760	2.757
G <sub>sa</sub>	Apparent Sp. Gr. of total aggregate*	2.786	2.786	2.786	2.786	2.786
VMA	$100 - \left( \frac{G_{mb} \times P_s}{G_{sb}} \right)$	17.34	17.48	17.73	18.15	18.61
P <sub>a</sub>	Air Voids = $100 \left( \frac{G_{mm} - G_{mb}}{G_{mm}} \right)$	4.72	3.76	3.06	2.79	2.24
P <sub>vma</sub>	% VMA filled w/A.C. = $100 \left( \frac{VMA - P_s}{VMA} \right)$	72.78	78.49	82.74	84.63	87.96
P <sub>be</sub>	Effective Asphalt Content = $\left( \frac{G_b (VMA - P_s)}{G_{mb}} \right)$	5.41	5.87	6.27	6.57	7.01
	Stability (CORRECTED)	1621	1829	1988	1857	1673
	Flow	7.7	9.7	11.0	13.3	16.3
	Marshall Quotient = $\frac{\text{Stability (corrected)}}{\text{Flow}}$	210.5	188.6	180.7	139.6	102.6
	Unit Weight	149.82	150.20	150.38	150.26	150.07

\*EQUATIONS FROM CHAPTER V, SECTION E, NY MATERIALS METHOD 5.13

Prepared by RALPH HOEFFNER on 1-6-2016

DEPARTMENT OF TRANSPORTATION  
 MATERIALS BUREAU  
 MARSHALL GRADATION ANALYSIS WORKSHEET

NO. OF HOT BINS AVERAGED 10 X

AGGREGATE INFORMATION

Aggregate	Cold Feed Bins	(1)		(2)		Cold Feed Blend %
		Source Number	Test Number	Source Number	Test Number	
Coarse Aggregate	No. 1					
	No. 1 Non-Carbo- rate					
	No. 1A	8-3222				
Non-Carbo- 1A rate	Manufactured	8-3222				
	Natural	10-8888				
Fine Aggregate						

Method of Blending Coarse Aggregate at the Plant:

Separate Cold Feed Bins  
 Mineral Filler-Material Type:

COMBINED AVERAGE GRADATION

BIN	%		% Passing Sieve					200
	BATCH	1"	1/2"	1/4"	1/8"	20	40	
COMPENSATE	100.0	100	97.3	51.3	29.7	18.5	7.2	3.0
Spec. LIMITS		100	97.3	51.3	29.7	18.5	7.2	3.0

AVERAGE BIN BREAKDOWN

Sieve Sizes	BIN NO. 29		BIN NO. 31		BIN NO. 32		MINERAL FILLER	
	retained %	pass %	retained %	pass %	retained %	pass %	retained %	pass %
1"	0	100						
1/2"	0	100						
1/4"	2.7	97.3						
1/8"	46.0	51.3						
20	21.6	29.7						
40	11.2	18.5						
80	11.3	7.2						
200	4.2	3.0						
PAN	3.0							
TOTALS								

Remarks

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

LOCATION Flushing N.Y.

PRODUCER \_\_\_\_\_

MIX TYPE 7 FT 50

Flushing Asphalt

TESTED BY R. HoelFfner ON 1-6-2016

(over)

COMBINED MARSHALL GRADATION  
AT THE % ASPHALT CEMENT INDICATED

% A.C.	AGGREGATE COMPONENT (BIN)	% BATCH	GRAMS BATCH	WEIGHT RETAINED (GRAMS)											TOTAL Wgt. Ret.
				1"	3/4"	1/2"	1/4"	1/8"	20	40	80	200	PAN		
5.6	Composite	100.0	1132.8				30.6	521.0	244.7	126.9	121.0	47.6	34		
	Min. Filler														
	TOTAL														

1200.0 gr x 5.6 % A.C. = 67.2 gr. A.C.  
1200.0 gr - 67.2 gr. A.C. = 1132.8 gr. Aggregate

4

% A.C.	AGGREGATE COMPONENT (BIN)	% BATCH	GRAMS BATCH	WEIGHT RETAINED (GRAMS)											TOTAL Wgt. Ret.
				1"	3/4"	1/2"	1/4"	1/8"	20	40	80	200	PAN		
6.0	Composite	100.0	1128.0				30.5	518.9	243.6	126.3	127.5	47.3	33.9		
	Min. Filler														
	TOTAL														

1200.0 gr x 6.0 % A.C. = 72.0 gr. A.C.  
1200.0 gr - 72.0 gr. A.C. = 1128.0 gr. Aggregate

% A.C.	AGGREGATE COMPONENT (BIN)	% BATCH	GRAMS BATCH	WEIGHT RETAINED (GRAMS)											TOTAL Wgt. Ret.
				1"	3/4"	1/2"	1/4"	1/8"	20	40	80	200	PAN		
6.4	Composite	100.0	1123.2				30.3	516.7	242.6	125.8	126.9	47.2	33.7		
	Min. Filler														
	TOTAL														

1200.0 gr x 6.4 % A.C. = 76.8 gr. A.C.  
1200.0 gr - 76.8 gr. A.C. = 1123.2 gr. Aggregate

% A.C.	AGGREGATE COMPONENT (BIN)	% BATCH	GRAMS BATCH	WEIGHT RETAINED (GRAMS)											TOTAL Wgt. Ret.
				1"	3/4"	1/2"	1/4"	1/8"	20	40	80	200	PAN		
6.8	Composite	100.0	1118.4				30.2	514.5	241.6	125.3	126.3	46.9	33.6		
	Min. Filler														
	TOTAL														

1200.0 gr x 6.8 % A.C. = 81.6 gr. A.C.  
1200.0 gr - 81.6 gr. A.C. = 1118.4 gr. Aggregate

% A.C.	AGGREGATE COMPONENT (BIN)	% BATCH	GRAMS BATCH	WEIGHT RETAINED (GRAMS)											TOTAL Wgt. Ret.
				1"	3/4"	1/2"	1/4"	1/8"	20	40	80	200	PAN		
7.2	Composite	100.0	1113.6				30.0	512.2	240.5	124.7	125.8	46.7	33.7		
	Min. Filler														
	TOTAL														

1200.0 gr x 7.2 % A.C. = 86.4 gr. A.C.  
1200.0 gr - 86.4 gr. A.C. = 1113.6 gr. Aggregate

Result of 11.1

COMPUTATION OF MARSHALL MIX PROPERTIES

NEW YORK STATE DEPARTMENT OF TRANSPORTATION MATERIALS BUREAU

PRODUCER FLUSHING

ITEM Asphalt LOCATION FLUSHING N.Y.

MIX TYPE 7520

REGION 11

Specimen	Asphalt Content	Weight - Grams			S.S.D.	Volume CC	Specific Gravity		Voids Total Mix	Unit Wt. Lb/Cu Ft	Stability-Lb		Flow 0.01 In.
		In Air	In Water				Bulk Gmb	Theor. Gmm			Measured	Corrected	
A	5.6	1202.2	704.4	1204.0	499.6	2.466	2.530		1450	1716	16.5		
B	"	1214.7	708.9	1215.9	507.0	2.396	"		1500	1720	17.5		
C	"	1210.6	707.9	1212.2	504.3	2.400	"		1525	1586	9.0		
AVG.	5.6												
A	6.0	1208.7	707.8	1210.0	502.2	2.467	2.501		1498.2	1621	7.7		
B	"	1205.9	706.40	1206.7	500.3	2.410	"		1850	1924	10.2		
C	"	1198.7	701.5	1200.1	498.6	2.404	"		1700	1768	12.0		
AVG.	6.0								1725	1794	9.0		
A	6.4	1200.6	704.3	1201.4	497.1	2.415	2.486		3.76	150.20	1829		
B	"	1194.5	700.1	1195.4	495.3	2.442	"		1990	2129	11.0		
C	"	1196.0	695.1	1196.8	492.7	2.403	"		1750	1801	12.0		
AVG.	6.4								2.403	"			
A	6.5	1197.0	701.0	1197.9	496.9	2.410	2.486		3.06	150.38	1989		
B	"	1200.0	706.8	1207.0	500.2	2.411	"		1730	1886	10.0		
C	"	1201.5	702.2	1202.0	499.8	2.404	"		1700	1768	10.0		
AVG.	6.5								2.408	2.497	2.79		
A	7.2	1199.9	700.6	1200.6	500.0	2.408	2.460		150.26	1575	12.38		
B	"	1207.4	704.6	1205.1	503.5	2.398	"		1700	1768	13.5		
C	"	1211.6	710.5	1212.0	501.5	2.416	"		1575	1638	13.3		
AVG.	7.2								2.405	2.460	2.24		
									150.07	150.07	16.73		

PREPARED BY R. HoefFven DATE 1-6-2016

DEPARTMENT OF TRANSPORTATION  
MATERIALS BUREAU

PRODUCER FLUSHING ASPHALT

MAXIMUM SPECIFIC GRAVITY OF BITUMINOUS PAVING MIXTURES  
ASTM D-2041 (RICE METHOD)

LOCATION FLUSHING N.Y.

6

Maximum Specific Gravity of Bituminous Paving Mixture =  $G_{mm}$   
 $A =$  Weight of dry sample in air (grams)  
 $D =$  Weight of flask filled with airless water at 77°F (25°C) grams  
 $E =$  Weight of flask filled with water and sample at 77°F (25°C) grams  
 $G_{mm} = \frac{A}{A+D-E}$

ASPHALT CONTENT	5.0		6.0		7.4		8.5		9.2											
	TEST NO.	%	TEST NO.	%	TEST NO.	%	TEST NO.	%	TEST NO.	%										
A	1	1302.6	2	1393.6	1	1196.5	2	1255.7	1	1879.1	2	1841.1	1	1279.6	2	1347.2	1	1405.7	2	1312.7
D		7417.0		7417.0		7417.0		7417.0		7417.0		7417.0		7417.0		7417.0		7417.0		7417.0
E		8325.7		8327.4		8133.0		8172.9		8540.8		8516.7		8179.8		8320.3		8253.5		8185.2
A+D-E		518.9		553.2		480.5		499.8		755.3		741.4		516.8		543.9		771.9		534.5
$G_{mm}$		2.520		2.519		2.489		2.512		2.488		2.485		2.476		2.477		2.463		2.476
Average $G_{mm}$		2.520		2.501		2.486		2.477		2.460										

Test By R. Hoefler on 1-6-2016

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NEW YORK STATE  
DEPARTMENT OF TRANSPORTATION  
MATERIALS BUREAU

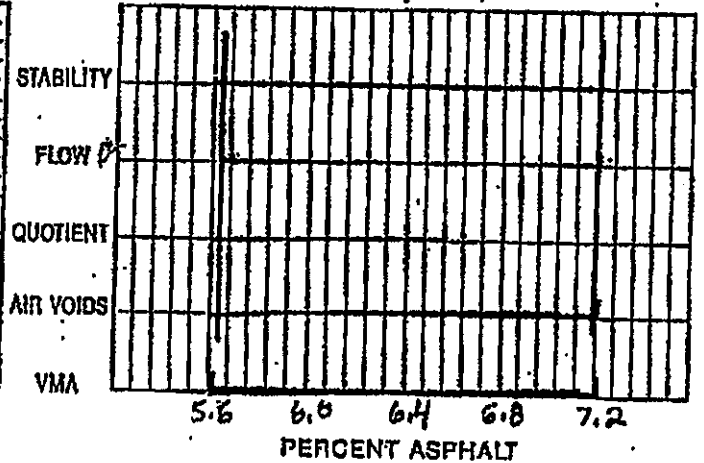
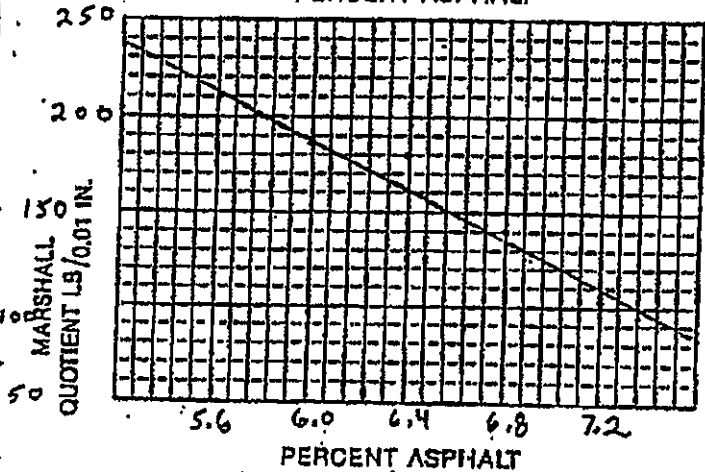
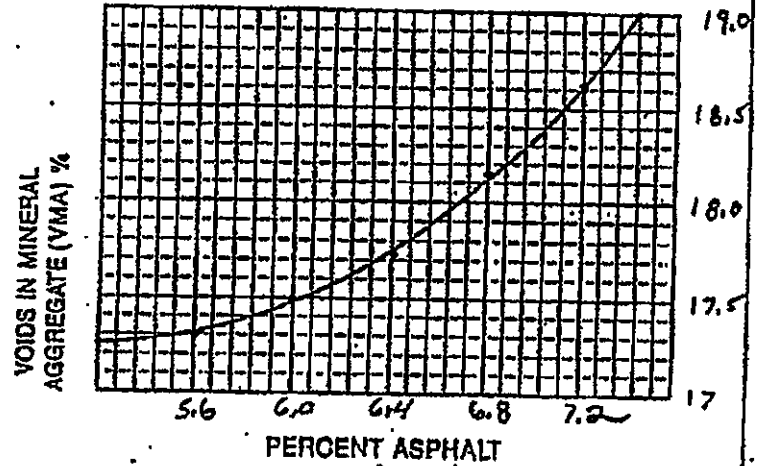
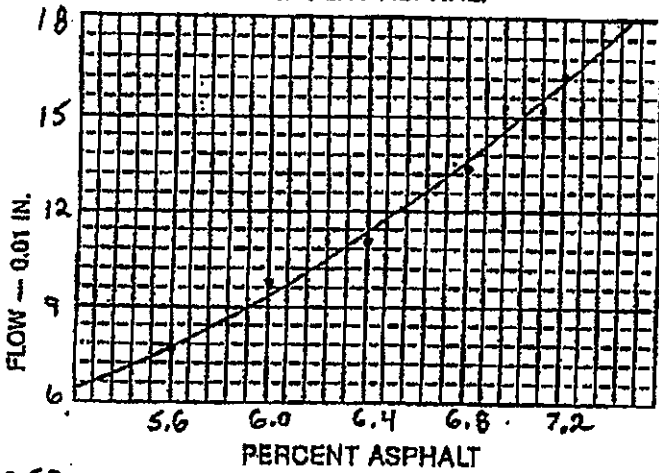
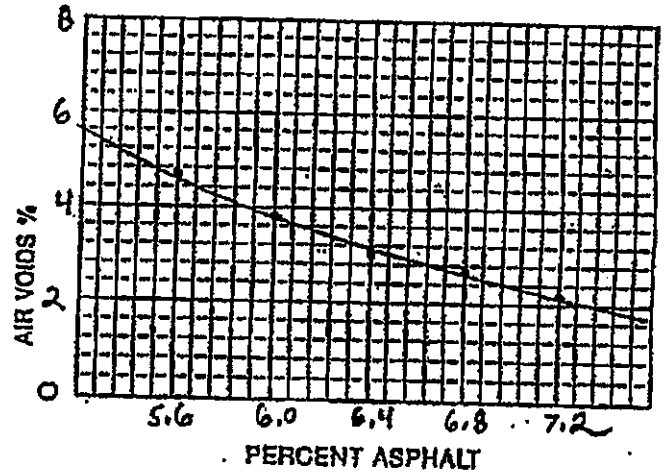
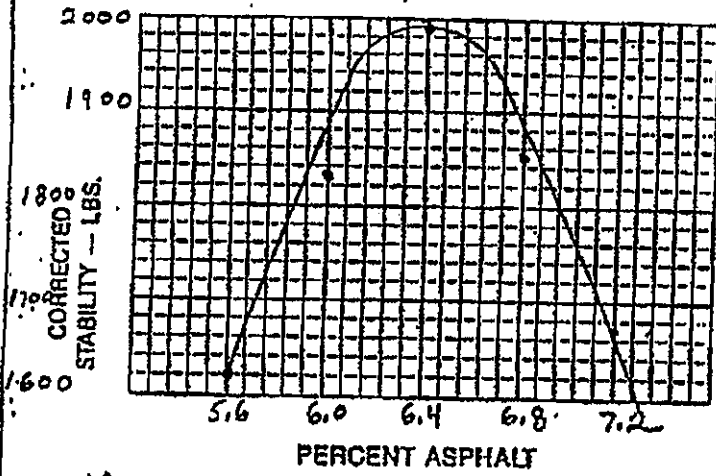
REGION 11

MIX TYPE 7F

Producer FLUSHING ASPHALT

Location FLUSHING NY

MARSHALL TEST PROPERTY CURVES AND RANGE DATA



COMMON OVERLAP RANGE 5.6 - 6.4  
MID POINT 6.0  
(OPTIMUM AC CONTENT)

SUBMITTED BY R. Hoeffner  
DATE 1-6-2016

VALUES AT OPTIMUM AC CONTENT

PROPERTY	STABILITY	FLOW	QUOTIENT	AIR VOIDS	VMA
SPEC.	1500 MIN	8 - 16	150 MIN	3 - 5	16.0
ACTUAL	1829	9.7	188.6	3.76	17.48