



**Department of
Design and
Construction**

Lorraine Grillo
Commissioner

**Safety & Site Support Division
Office of Quality Assurance**

John M. DeVito, SCTPP
Director
Quality Assurance Unit

Concrete and Asphalt Generic Mix Design Approval # 2020 – 091

30-30 Thomson Avenue
Long Island City, NY 11101

Tel. 718 / 391-1395
Fax 718 / 391-2885
www.nyc.gov/buildnyc

Date: 2/27/2020

To: Larry Santana,
Flushing Asphalt

From: John M. DeVito, Director
Quality Assurance

Date Submitted: 2/27/2020

Plant: Flushing Asphalt

NYSDOT Facility Numbers: H0239

Laboratory: N/A

Mix Design Type: 3RA Binder

Generic Mix Design Serial Number: FlushingAsphalt/3RA/Binder/Generic/NYCDDC/008/20

Generic Mix Design – Mix Design Date: 2/18/2020

Generic Mix Design – Expiration Date: 2/28/2022 (See Comment 1 Below)

Comments: 1) This mix design is approved only for the NYSDOT Facility Numbers listed above.
2) Approval is limited to the material sources and aggregate sizes shown on the mix design.
3) Dosage of admixtures may be adjusted by the plant within manufacturer's written guidelines, but admixtures not listed may not be added.

Reviewed & Prepared by:

Scott Cruz, QA Inspector

Recommended for Acceptance by:

Juan Martinez, PE, Deputy Director

QA & CONSTRUCTION SAFETY BUREAU

ASPHALT JOB MIX FORMULA SHEET - 3 RA BINDER MIX

PLANT NAME: **FLUSHING ASPHALT**
 NYSDOT FACILITY #: **H0239**
 PLANT ADDRESS: **FLUSHING**
New York, NY

MIX DESIGN DATE: **2/18/2020**

PREPARED BY: **Florin Niculescu**

COMPANY: **FLUSHING ASPHALT**

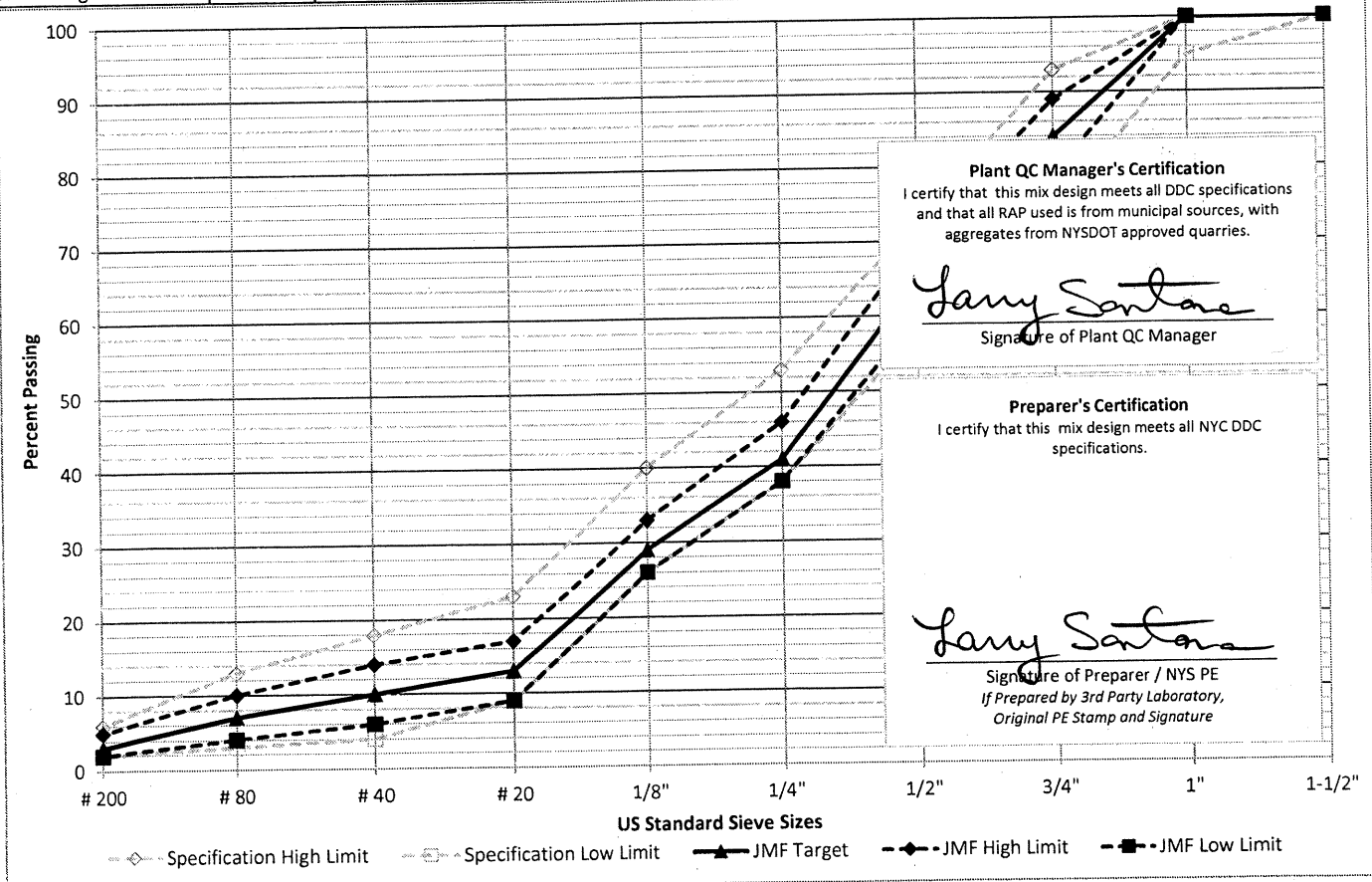
PLANT QC MGR: **LARRY SANTANA**

Item	Supplier / Quarry	NYSDOT Source	High Friction	Agg. Blend %	Mix %	Lbs / Ton
					0.0%	0
#57 Stone	Tilcon, Mt Hope, NJ	8-32R	Yes	46.0%	44.8%	895
#8 Stone	Tilcon, Mt Hope, NJ	8-32R	Yes	10.0%	9.7%	195
					0.0%	0
Natural Sand	Tilcon, Mt Hope, NJ	8-32R	N/A	0.0%	0.0%	0
Manuf. Sand	Tilcon, Mt Hope, NJ	8-32RFM	N/A	14.0%	13.6%	272
RAP 1	Flushing Asphalt Co.	N/A	Yes	30.0%	29.2%	584
	RAP % Asphalt: 6.2%			RAP AC	1.8%	36
All RAP to be from Municipal Sources - Aggregates from State Quarries				RAP Aggregate	27.4%	548
		N/A			0.0%	0
	RAP % Asphalt: 0.0%			RAP AC	0.0%	0
All RAP to be from Municipal Sources - Aggregates from State Quarries				RAP Aggregate	0.0%	0
Virgin Asphalt	Grade: PG64-22	SG (G _b):	1.034		2.7%	54
Total Asphalt Content (P _b):					4.5%	90
				100.0%	100.0%	2,000

Project No: **Generic**
APPROVED
 NYC DDC (QA/QC SAFETY BUREAU)
 Date: **2/27/20** Reviewed By: **S.C.**
 LOG NO: **2020-091**
 QA/QC APPROVAL STAMP

FLUSHING ASPHALT/3RA/BINDER/Generic/NYCDDC/008/20 EXPIRES: 2/28/2022

Sieve Size	1-1/2"	1"	3/4"	1/2"	1/4"	1/8"	# 20	# 40	# 80	# 200	P _b
Specification Limits	100-100	95-100	74-93	58-73	38-53	26-40	9-23	4-18	3-13	2-6	4-6
JMF Target	100	100	84	65	41	29	13	10	7	3	4.5
JMF Range	100-100	100-100	79-89	60-70	38-46	26-33	9-17	6-14	4-10	2-5	4-5.2



QA & CONSTRUCTION SAFETY BUREAU

ASPHALT JOB MIX FORMULA SHEET - 3 RA BINDER MIX

PLANT NAME: **FLUSHING ASPHALT**
 NYSDOT FACILITY #: **H0239**
 PLANT ADDRESS: **FLUSHING**
New York, NY

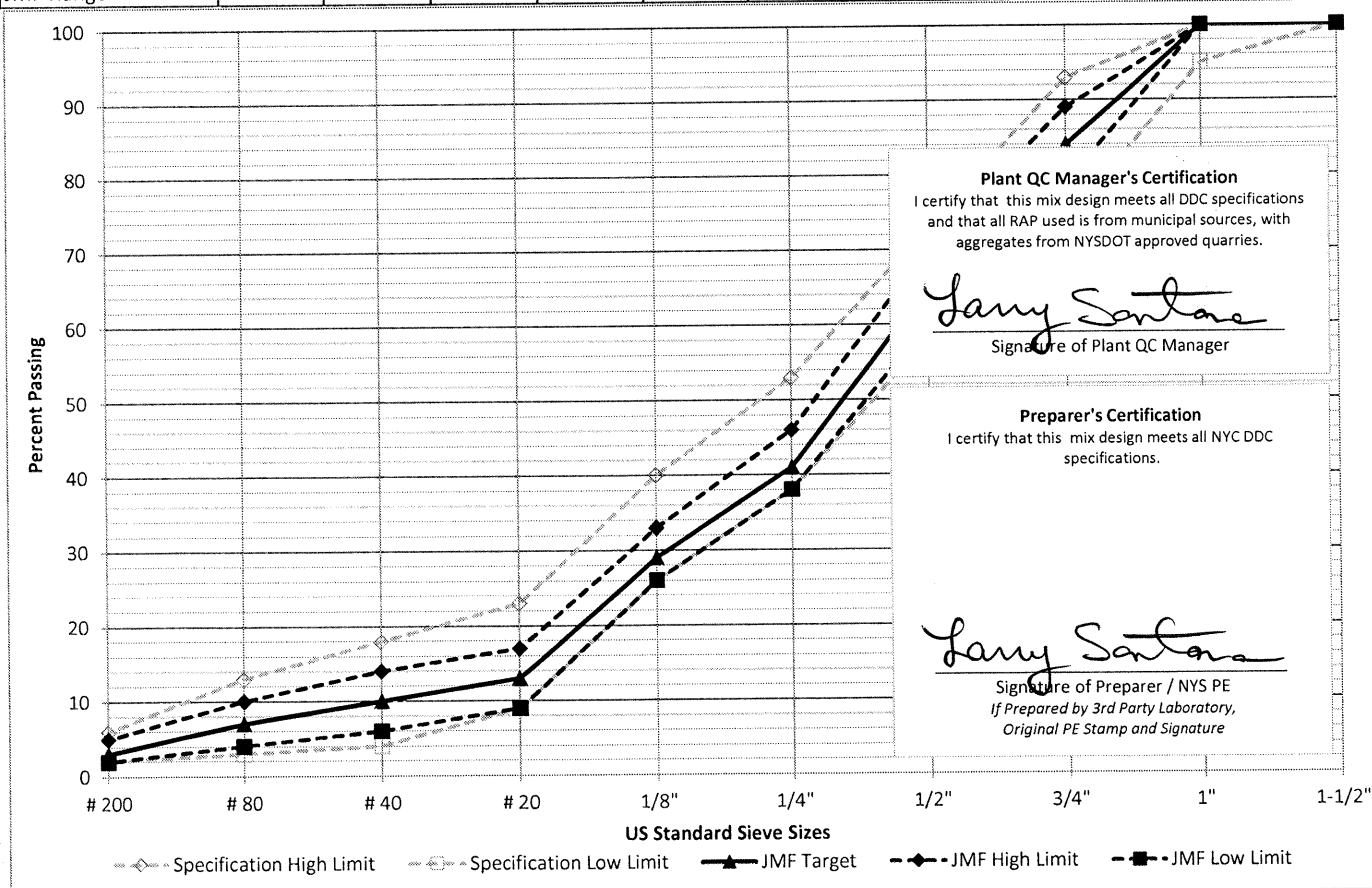
MIX DESIGN DATE: **2/18/2020**
 PREPARED BY: **Florin Niculescu**
 COMPANY: **FLUSHING ASPHALT**
 PLANT QC MGR: **LARRY SANTANA**

Item	Supplier / Quarry	NYSDOT Source	High Friction	Agg. Blend %	Mix %	Lbs / Ton
					0.0%	0
#57 Stone	Tilcon, Mt Hope, NJ	8-32R	Yes	46.0%	44.8%	895
#8 Stone	Tilcon, Mt Hope, NJ	8-32R	Yes	10.0%	9.7%	195
					0.0%	0
Natural Sand	Tilcon, Mt Hope, NJ	8-32R	N/A	0.0%	0.0%	0
Manuf. Sand	Tilcon, Mt Hope, NJ	8-32RFM	N/A	14.0%	13.6%	272
RAP 1	Flushing Asphalt Co.	N/A	Yes	30.0%	29.2%	584
RAP % Asphalt: 6.2%				RAP AC	1.8%	36
All RAP to be from Municipal Sources - Aggregates from State Quarries				RAP Aggregate	27.4%	548
		N/A			0.0%	0
RAP % Asphalt: 0.0%				RAP AC	0.0%	0
All RAP to be from Municipal Sources - Aggregates from State Quarries				RAP Aggregate	0.0%	0
Virgin Asphalt	Grade: PG64-22	SG (G _b):	1.034		2.7%	54
Total Asphalt Content (P _b):					4.5%	90
					100.0%	2,000

QA&CS APPROVAL STAMP

FLUSHING ASPHALT/3RA/BINDER/Generic/NYCDDC/008/20 EXPIRES: 2/28/2022

Sieve Size	1-1/2"	1"	3/4"	1/2"	1/4"	1/8"	# 20	# 40	# 80	# 200	P _b
Specification Limits	100-100	95-100	74-93	58-73	38-53	26-40	9-23	4-18	3-13	2-6	4-6
JMF Target	100	100	84	65	41	29	13	10	7	3	4.5
JMF Range	100-100	100-100	79-89	60-70	38-46	26-33	9-17	6-14	4-10	2-5	4-5.2



QA & CONSTRUCTION SAFETY BUREAU

AGGREGATE SPECIFIC GRAVITY & COMBINED GRADATION WORKSHEET - 3 RA BINDER MIX

PLANT NAME: FLUSHING ASPHALT

NYSDOT FACILITY #: H0239

MIX DESIGN DATE: 2/18/2020

Average Bin Gradations

	Not Used		#57 Stone		#8 Stone		Not Used		Natural Sand		Manuf. Sand		RAP 1		Not Used	
Sieve	% Ret.	% Pass	% Ret.	% Pass	% Ret.	% Pass	% Ret.	% Pass	% Ret.	% Pass	% Ret.	% Pass	% Ret.	% Pass	% Ret.	% Pass
1.5"		100.0	0.0	100.0	0.0	100.0		100.0	0.0	100.0	0.0	100.0	0.0	100.0		100.0
1"		100.0	0.0	100.0	0.0	100.0		100.0	0.0	100.0	0.0	100.0	0.0	100.0		100.0
3/4"		100.0	35.0	65.0	0.0	100.0		100.0	0.0	100.0	0.0	100.0	0.0	100.0		100.0
1/2"		100.0	40.2	24.8	1.6	98.4		100.0	0.0	100.0	0.0	100.0	0.0	100.0		100.0
1/4"		100.0	18.8	6.0	64.6	33.8		100.0	0.0	100.0	0.0	100.0	29.8	70.2		100.0
1/8"		100.0	3.2	2.8	28.6	5.2		100.0	0.0	100.0	9.9	90.1	21.6	48.6		100.0
#20		100.0	2.8	0.0	5.2	0.0		100.0	0.0	100.0	44.9	45.2	26.3	22.3		100.0
#40		100.0	0.0	0.0	0.0	0.0		100.0	0.0	100.0	14.7	30.5	4.2	18.1		100.0
#80		100.0	0.0	0.0	0.0	0.0		100.0	0.0	100.0	14.9	15.6	3.4	14.7		100.0
#200		100.0	0.0	0.0	0.0	0.0		100.0	0.0	100.0	12.4	3.2	5.6	9.1		100.0
Pan			0.0		0.0				0.0		3.2		9.1			
Totals	0.0		100.0		100.0		0.0		0.0		100.0		100.0		0.0	

Stockpiles Sampled By: F.Niculescu Date Sampled: 2/14/2020

Gradation Technician: F.Niculescu Date Tested: 2/14/2020

Coarse Aggregate Specific Gravity per ASTM C127

Discard portion of sample that passes the 1/4 sieve.

Only Perform this test if aggregate is 10% or more coarse (less than 90% passing the 1/4" sieve)

	Not Used	#57 Stone	#8 Stone	Not Used	Natural Sand	Manuf. Sand	RAP 1	Not Used
% Coarse Agg.	---	94.0%	66.2%	---	0.0%	0.0%	29.8%	---
Test Required?	NO	YES	YES	NO	NO	NO	YES	NO
A) Wt. in Air		2655.3	2650.1				1023.4	
B) Wt. SSD		2670.5	2670.0				1029.6	
C) Wt. in Water		1688.2	1682.0				643.2	
G _{sb} (A)/(B-C)	---	2.703	2.682	---	---	---	2.649	---
G _{sa} (A)/(A-C)	---	2.746	2.737	---	---	---	2.692	---

Fine Aggregate Specific Gravity per ASTM C128

Discard portion of sample that does not pass the #4 sieve.

Only Perform this test if 10% or more passes the 1/4" Sieve.

	Not Used	#57 Stone	#8 Stone	Not Used	Natural Sand	Manuf. Sand	RAP 1	Not Used
% Fine Agg.	---	6.0%	33.8%	---	100.0%	100.0%	70.2%	---
Test Required?	NO	NO	YES	NO	YES	YES	YES	NO
A) Wt. in Air		0.0	2650.1		497.8	497.8	1023.4	
B) Wt. Flask + Water		0.0	0.0		680.0	680.0	0.0	
C) Wt. Flask + Water + Sample		0.0	1682.0		992.8	992.8	643.2	
S) Wt. SSD		0.0	2670.0		500.1	500.1	1029.6	
G _{sb} (A)/(B+S-C)	---	---	2.682	---	2.658	2.658	2.649	---
G _{sa} (A)/(B+A-C)	---	---	2.737	---	2.691	2.691	2.692	---

Combined Aggregate Specific Gravity

	Not Used	#57 Stone	#8 Stone	Not Used	Natural Sand	Manuf. Sand	RAP 1	Not Used
Combined G _{sb}	---	2.703	2.682	---	2.658	2.658	2.649	---
Combined G _{sa}	---	2.746	2.737	---	2.691	2.691	2.692	---

S. G. Technician: F.Niculescu Date Tested: 2/14/2020

Combined Average Gradations, % Passing

Bin	Agg Blend	1.5"	1"	3/4"	1/2"	1/4"	1/8"	#20	#40	#80	#200
Not Used	0.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
#57 Stone	46.0%	46.0	46.0	29.9	11.4	2.8	1.3	0.0	0.0	0.0	0.0
#8 Stone	10.0%	10.0	10.0	10.0	9.8	3.4	0.5	0.0	0.0	0.0	0.0
Not Used	0.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Natural Sand	0.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Manuf. Sand	14.0%	14.0	14.0	14.0	14.0	14.0	12.6	6.3	4.3	2.2	0.4
RAP 1	30.0%	30.0	30.0	30.0	30.0	21.1	14.6	6.7	5.4	4.4	2.7
Not Used	0.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	100.0%	100.0	100.0	83.9	65.2	41.2	29.0	13.0	9.7	6.6	3.2
Specification Limits		100-100	95-100	74-93	58-73	38-53	26-40	9-23	4-18	3-13	2-6

QA & CONSTRUCTION SAFETY BUREAU
ASPHALT TRIAL GRADATION WORKSHEET - 3 RA BINDER MIX

PLANT NAME: FLUSHING ASPHALT

NYSDOT FACILITY #: H0239

MIX DESIGN DATE: 2/18/2020

BATCH 1 Batch P_b: 3.5%
Batch Grams: 1280.0

Batch Weights, Retained on Sieve - Grams															
Bin	Agg. Blend	Mix Blend	Batch Grams	Asph. Grams	1.5"	1"	3/4"	1/2"	1/4"	1/8"	#20	#40	#80	#200	Pan
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
#57 Stone	46.0%	44.4%	568.2		0.0	0.0	198.9	228.4	106.8	18.2	15.9	0.0	0.0	0.0	0.0
#8 Stone	10.0%	9.7%	123.5		0.0	0.0	0.0	2.0	79.8	35.3	6.4	0.0	0.0	0.0	0.0
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Natural Sand	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Manuf. Sand	14.0%	13.5%	172.9		0.0	0.0	0.0	0.0	0.0	17.1	77.6	25.4	25.8	21.4	5.5
RAP 1	30.0%	30.9%	395.1	24.5	0.0	0.0	0.0	0.0	117.7	85.3	103.9	16.6	13.4	22.1	11.5
Not Used	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Virgin Asphalt		1.6%	20.3	20.3											
Total Mix	100.0%	100.0%	1280.0	44.8	0.0	0.0	198.9	230.4	304.3	156.0	203.9	42.0	39.2	43.6	17.0

3.50%

BATCH 2 Batch P_b: 4.0%
Batch Grams: 1280.0

Batch Weights, Retained on Sieve - Grams															
Bin	Agg. Blend	Mix Blend	Batch Grams	Asph. Grams	1.5"	1"	3/4"	1/2"	1/4"	1/8"	#20	#40	#80	#200	Pan
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
#57 Stone	46.0%	44.2%	565.2		0.0	0.0	197.8	227.2	106.3	18.1	15.8	0.0	0.0	0.0	0.0
#8 Stone	10.0%	9.6%	122.9		0.0	0.0	0.0	2.0	79.4	35.1	6.4	0.0	0.0	0.0	0.0
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Natural Sand	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Manuf. Sand	14.0%	13.4%	172.0		0.0	0.0	0.0	0.0	0.0	17.0	77.2	25.3	25.6	21.3	5.5
RAP 1	30.0%	30.7%	393.0	24.4	0.0	0.0	0.0	0.0	117.1	84.9	103.4	16.5	13.4	22.0	11.4
Not Used	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Virgin Asphalt		2.1%	26.8	26.8											
Total Mix	100.0%	100.0%	1280.0	51.2	0.0	0.0	197.8	229.2	302.8	155.2	202.8	41.8	39.0	43.3	16.9

4.00%

BATCH 3 Batch P_b: 4.5%
Batch Grams: 1280.0

Batch Weights, Retained on Sieve - Grams															
Bin	Agg. Blend	Mix Blend	Batch Grams	Asph. Grams	1.5"	1"	3/4"	1/2"	1/4"	1/8"	#20	#40	#80	#200	Pan
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
#57 Stone	46.0%	43.9%	562.3		0.0	0.0	196.8	226.0	105.7	18.0	15.7	0.0	0.0	0.0	0.0
#8 Stone	10.0%	9.6%	122.2		0.0	0.0	0.0	2.0	79.0	35.0	6.4	0.0	0.0	0.0	0.0
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Natural Sand	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Manuf. Sand	14.0%	13.4%	171.1		0.0	0.0	0.0	0.0	0.0	16.9	76.8	25.2	25.5	21.2	5.5
RAP 1	30.0%	30.5%	391.0	24.2	0.0	0.0	0.0	0.0	116.5	84.4	102.8	16.4	13.3	21.9	11.3
Not Used	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Virgin Asphalt		2.6%	33.4	33.4											
Total Mix	100.0%	100.0%	1280.0	57.6	0.0	0.0	196.8	228.0	301.2	154.3	201.8	41.6	38.8	43.1	16.8

4.50%

BATCH 4 Batch P_b: 5.0%
Batch Grams: 1280.0

Batch Weights, Retained on Sieve - Grams															
Bin	Agg. Blend	Mix Blend	Batch Grams	Asph. Grams	1.5"	1"	3/4"	1/2"	1/4"	1/8"	#20	#40	#80	#200	Pan
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
#57 Stone	46.0%	43.7%	559.4		0.0	0.0	195.8	224.9	105.2	17.9	15.7	0.0	0.0	0.0	0.0
#8 Stone	10.0%	9.5%	121.6		0.0	0.0	0.0	1.9	78.6	34.8	6.3	0.0	0.0	0.0	0.0
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Natural Sand	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Manuf. Sand	14.0%	13.3%	170.2		0.0	0.0	0.0	0.0	0.0	16.9	76.4	25.0	25.4	21.1	5.4
RAP 1	30.0%	30.4%	388.9	24.1	0.0	0.0	0.0	0.0	115.9	84.0	102.3	16.3	13.2	21.8	11.3
Not Used	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Virgin Asphalt		3.1%	39.9	39.9											
Total Mix	100.0%	100.0%	1280.0	64.0	0.0	0.0	195.8	226.8	299.6	153.5	200.7	41.4	38.6	42.9	16.7

5.00%

BATCH 5 Batch P_b: 5.5%
Batch Grams: 1280.0

Batch Weights, Retained on Sieve - Grams															
Bin	Agg. Blend	Mix Blend	Batch Grams	Asph. Grams	1.5"	1"	3/4"	1/2"	1/4"	1/8"	#20	#40	#80	#200	Pan
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
#57 Stone	46.0%	43.5%	556.4		0.0	0.0	194.7	223.7	104.6	17.8	15.6	0.0	0.0	0.0	0.0
#8 Stone	10.0%	9.5%	121.0		0.0	0.0	0.0	1.9	78.1	34.6	6.3	0.0	0.0	0.0	0.0
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Natural Sand	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Manuf. Sand	14.0%	13.2%	169.3		0.0	0.0	0.0	0.0	0.0	16.8	76.0	24.9	25.2	21.0	5.4
RAP 1	30.0%	30.2%	386.9	24.0	0.0	0.0	0.0	0.0	115.3	83.6	101.7	16.2	13.2	21.7	11.2
Not Used	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Virgin Asphalt		3.6%	46.4	46.4											
Total Mix	100.0%	100.0%	1280.0	70.4	0.0	0.0	194.7	225.6	298.0	152.7	199.7	41.1	38.4	42.7	16.6

5.50%

QA & CONSTRUCTION SAFETY BUREAU

ASPHALT MAXIMUM DENSITY & MARSHALL PROPERTIES WORKSHEET - 3 RA BINDER MIX

PLANT NAME: FLUSHING ASPHALT

NYSDOT FACILITY #: H0239

MIX DESIGN DATE: 2/18/2020

Theoretical Maximum Specific Gravity G_{mm} per ASTM D2041

Trial Batch	1		2		3		4		5	
P_b	3.5%		4.0%		4.5%		5.0%		5.5%	
A) Sample in Air (grams)	2068.3	2135.6	2145.3	2188.4	2112.3	2055.1	2133.2	2030.4	2100.2	2158.9
B) Pycnometer in Water (Grams)	7408.2	7300.9	7408.2	7300.9	7408.2	7300.9	7408.2	7300.9	7408.2	7300.9
C) Sample & Pycnometer in Water (Grams)	8668.8	8604.1	8711.2	8630.1	8683.1	8540.6	8689.2	8520.4	8662.5	8592.3
$G_{mm} (A/(A+B-C))$	2.561	2.566	2.547	2.547	2.522	2.520	2.503	2.504	2.483	2.489
Average G_{mm}	2.563		2.547		2.521		2.504		2.486	

Density Technician:

F.Niculescu

Date Tested:

2/14/2020

Computation of Marshall Mix Properties (75 Blows per Side)

Weight In Air	SSD Weight	Weight In Water	Sample Volume	Bulk SG G_{mb}	Max SG G_{mm}	% Air P_a	Unit Weight	Meas. Stability	Corr. Factor	Corr. Stability	Marshall Flow	Marshall Quotient
Grams	Grams	Grams	CC	---	---	%	PCF	lbs	lbs	lbs	0.01"	lb/0.01"
A	B	C	D	E	F	G	H	J	K	L	M	N
---	---	---	B-C	A/D	---	(F-E)/F	$E*62.4$	---	---	J*K	---	L/M

TRIAL BATCH 1

$P_b = 3.5\%$

Specimen A	1240.8	1242.2	723.9	518.3	2.394	2.563	6.6%		2400	1	2400	8.5	282
Specimen B	1240.5	1242.5	724.1	518.4	2.393	2.563	6.6%		2500	1	2500	9.0	278
Specimen C	1241.1	1243.6	724.3	519.3	2.390	2.563	6.8%		2350	1	2350	8.5	276
Average					2.392	2.563	6.7%	149.3			2420	8.7	279

TRIAL BATCH 2

$P_b = 4.0\%$

Specimen A	1239.9	1241.9	724.1	517.8	2.395	2.547	6.0%		2700	1	2700	10.5	257
Specimen B	1238.7	1240.5	724.4	516.1	2.400	2.547	5.8%		2650	1	2650	9.5	279
Specimen C	1238.2	1240.7	725.1	515.6	2.401	2.547	5.7%		2750	1	2750	9.5	289
Average					2.399	2.547	5.8%	149.7			2700	9.8	275

TRIAL BATCH 3

$P_b = 4.5\%$

Specimen A	1242.8	1244.5	731.3	513.2	2.422	2.521	3.9%		2850	1	2850	10.5	271
Specimen B	1241.1	1243.1	730.2	512.9	2.420	2.521	4.0%		2900	1	2900	11.0	264
Specimen C	1240.6	1243.0	730.1	512.9	2.419	2.521	4.1%		2900	1	2900	10.5	276
Average					2.420	2.521	4.0%	151.0			2880	10.7	270

TRIAL BATCH 4

$P_b = 5.0\%$

Specimen A	1244.3	1245.6	732.1	513.5	2.423	2.504	3.2%		2650	1	2650	11.0	241
Specimen B	1245.1	1246.7	733.1	513.6	2.424	2.504	3.2%		2700	1	2700	11.5	235
Specimen C	1243.7	1245.1	733.9	511.2	2.433	2.504	2.8%		2600	1	2600	11.5	226
Average					2.427	2.504	3.1%	151.4			2650	11.3	234

TRIAL BATCH 5

$P_b = 5.5\%$

Specimen A	1242.8	1243.9	735.8	508.1	2.446	2.486	1.6%		2300	1.04	2390	11.5	208
Specimen B	1245.1	1245.3	734.5	510.8	2.438	2.486	1.9%		2250	1	2250	12.5	180
Specimen C	1245.2	1246.4	734.1	512.3	2.431	2.486	2.2%		2250	1	2250	12.0	188
Average					2.438	2.486	1.9%	152.1			2300	12.0	192

Marshall Technician:

F.Niculescu

Date Tested:

2/14/2020

QA & CONSTRUCTION SAFETY BUREAU

MIX VOLUMETRIC PROPERTIES WORKSHEET - 3 RA BINDER MIX

PLANT:	FLUSHING ASPHALT	NYSDOT FACILITY #:	H0239	MIX DESIGN DATE:	2/18/2020
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Agg. Blend %	Constituent Material	NYSDOT Source	G _{sa}	G _{sb}	Total Mix Composition by Weight				
					Trial Batch				
					1	2	3	4	5
0.0%	Not Used	---	---	---	0.0%	0.0%	0.0%	0.0%	0.0%
46.0%	#57 Stone	8-32R	2.746	2.703	44.4%	44.2%	43.9%	43.7%	43.5%
10.0%	#8 Stone	8-32R	2.737	2.682	9.7%	9.6%	9.6%	9.5%	9.5%
0.0%	Not Used	---	---	---	0.0%	0.0%	0.0%	0.0%	0.0%
0.0%	Natural Sand	8-32R	2.691	2.658	0.0%	0.0%	0.0%	0.0%	0.0%
14.0%	Manuf. Sand	8-32RFM	2.691	2.658	13.5%	13.4%	13.4%	13.3%	13.2%
30.0%	RAP 1		2.692	2.649	30.9%	30.7%	30.5%	30.4%	30.2%
0.0%	Not Used		---	---	0.0%	0.0%	0.0%	0.0%	0.0%
	Virgin Asphalt				1.6%	2.1%	2.6%	3.1%	3.6%
100.0%					100.0%	100.0%	100.0%	100.0%	100.0%

Mix General Properties				Trial Batch				
				1	2	3	4	5
P _b	Percent Total Asphalt Binder, %			3.5%	4.0%	4.5%	5.0%	5.5%
P _{ba}	Percent Absorbed Asphalt Binder, %			0.43%	0.48%	0.37%	0.41%	0.41%
P _{be}	Percent Effective Asphalt Binder, %			3.09%	3.54%	4.15%	4.61%	5.11%
DP	Dust Proportion			1.0	1.1	1.3	1.4	1.6
G _{mm}	Mix Maximum Specific Gravity			2.563	2.547	2.521	2.504	2.486
G _{mb}	Mix Bulk Specific Gravity			2.392	2.399	2.420	2.427	2.438
G _{sb}	Aggregate Bulk Gravity			2.678	2.678	2.678	2.678	2.678
G _{se}	Aggregate Effective Gravity			2.708	2.712	2.704	2.707	2.707
G _{sa}	Aggregate Apparent Specific Gravity			2.721	2.721	2.721	2.721	2.721

Mix Acceptance Properties		Low Limit	High Limit	Trial Batch				
				1	2	3	4	5
VMA	Voids in Mineral Aggregate, %	13.5%		✓ 13.8%	✓ 14.0%	✓ 13.7%	✓ 13.9%	✓ 14.0%
	Note: All five trial batches must meet the minimum VMA requirement.							
VFA	Voids Filled with Asphalt, %	65%	75%	✗ 51.7%	✗ 58.5%	✓ 70.7%	✗ 77.8%	✗ 86.2%
P _a	Percent Air Voids, %	3.0%	5.0%	✗ 6.7%	✗ 5.8%	✓ 4.0%	✓ 3.1%	✗ 1.9%
----	Marshall Stability (Corrected), lb	1500		✓ 2420	✓ 2700	✓ 2880	✓ 2650	✓ 2300
----	Marshall Flow, 0.01"	8	12	✓ 8.7	✓ 9.8	✓ 10.7	✓ 11.3	✓ 12.0
----	Marshall Quotient, lb/0.01"	150		✓ 279	✓ 275	✓ 270	✓ 234	✓ 192

QA & CONSTRUCTION SAFETY BUREAU

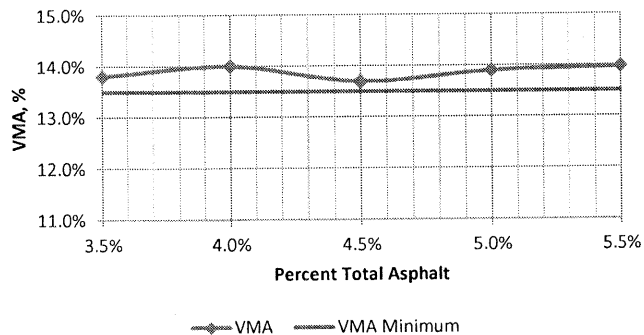
PROPERTY CURVES & DESIRED ASPHALT CONTENT WORKSHEET - 3 RA BINDER MIX

PLANT NAME: FLUSHING ASPHALT

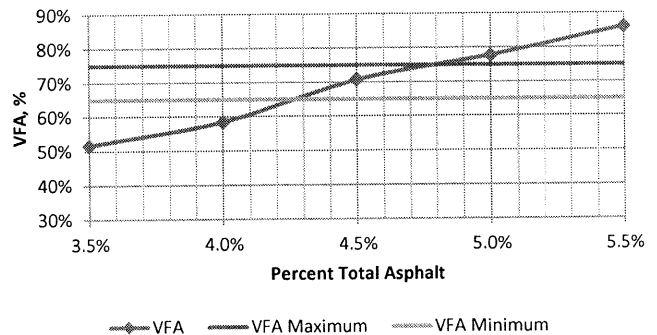
NYSDOT FACILITY #: H0239

MIX DESIGN DATE: 2/18/2020

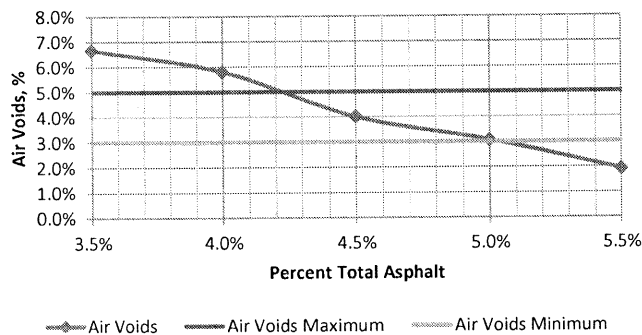
Voids in Mineral Aggregate



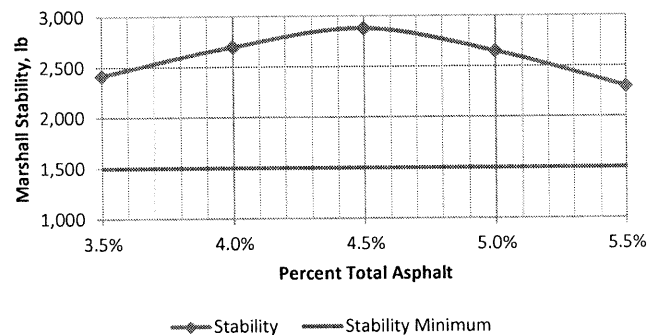
Voids Filled with Asphalt



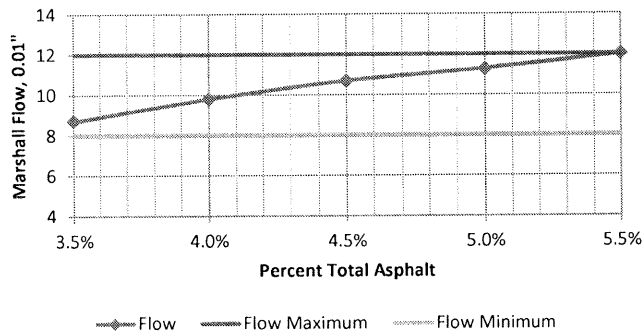
Air Voids



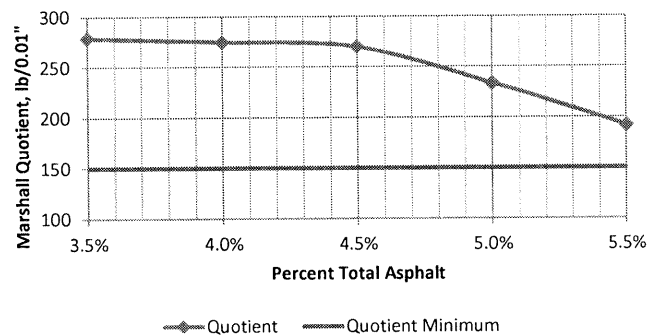
Marshall Stability



Marshall Flow



Marshall Quotient



Property	High	Low
Voids in Mineral Aggregate (VMA), %	4.0%	4.5%
Voids Filled with Asphalt (VFA), %	4.8%	4.3%
Percent Air Voids, %	4.3%	5.0%
Marshall Stability (Corrected), lb	4.5%	5.5%
Marshall Flow, 0.01"	5.5%	3.5%
Marshall Quotient, lb/0.01"	4.1%	5.5%
Overlap	5.5%	3.5%

Properties at Desired AC%
13.7%
70.7%
4.0%
2880
10.7
250

Midpoint	4.5%
Desired Total Asphalt Content P _b	4.5%

Desired Asphalt Content is the midpoint, unless the midpoint is on the VMA curve's positive slope.
If this is the case, the Desired Asphalt Content is as close as possible to the bottom of the VMA curve, within the Overlap Range.