



**Department of
Design and
Construction**

Ana Barrio
Acting Commissioner

**Program Management Division
QA and Construction Safety Bureau**

John M. DeVito
Director
QA & Construction Safety

Concrete and Asphalt Generic Mix Design Approval # 2017 – 815

30-30 Thomson Avenue
Long Island City, NY 11101

Date: 11/2/2017

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To: **Larry Santana, QC Manager
Willets Point Asphalt**

From: **John M. DeVito, Director
QA & Construction Safety Bureau**

Date Submitted: 10/24/17

Plant: Willets Point Asphalt

NYSDOT Facility Numbers: H0354

Laboratory: N/A

Mix Design Type: 6FRA Top

Generic Mix Design Serial Number: WilletsPointAsphalt/6FRA/Top/NYCDDC/109/17

Generic Mix Design Date: 10/15/2017

Generic Mix Design Expiration Date: 11/30/2019

- 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: Carlos Ortiz, Engineer in Charge

QA & CONSTRUCTION SAFETY BUREAU

ASPHALT JOB MIX FORMULA SHEET - 6F RA TOP MIX

PLANT NAME: WILLETS POINT ASPHALT
 NYSDOT FACILITY #: H0354
 PLANT ADDRESS: FLUSHING
 New York, NY

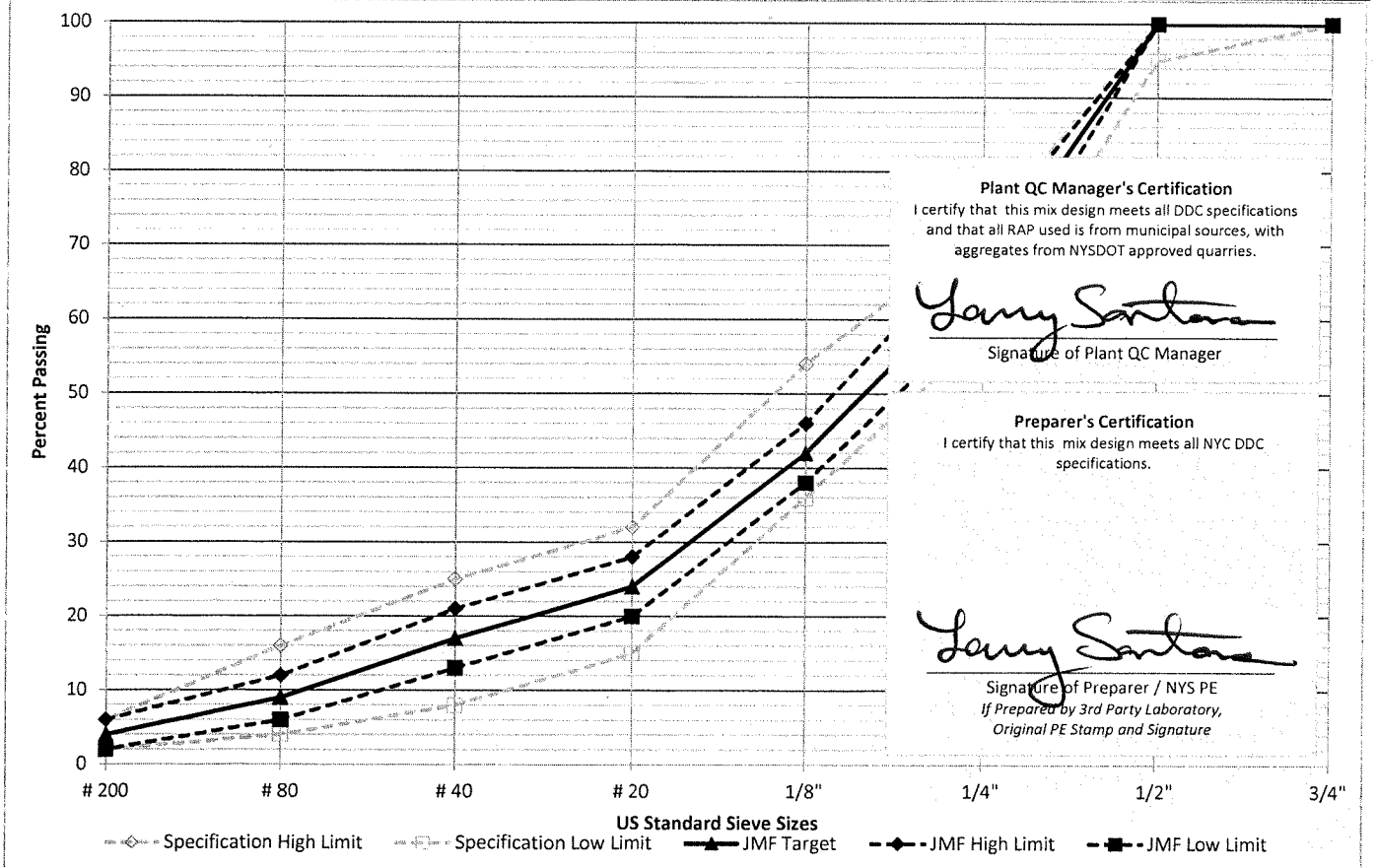
MIX DESIGN DATE: 10/15/2017
 PREPARED BY: LARRY SANTANA
 COMPANY: WILLETS POINT ASPHALT
 PLANT QC MGR: LARRY SANTANA

Item	Supplier / Quarry	NYSDOT Source	Friction Agg.	Agg. Blend %	Mix %	Lbs / Ton	
					0.0%	0	
#1 Stone	Tilcon, Mt Hope, NJ	8-32R	Yes	28.7%	27.7%	553	
#1A Stone	Tilcon, Mt Hope, NJ	8-32R	Yes	18.0%	17.4%	347	
					0.0%	0	
Manufactured Sand	Tilcon, Mt Hope, NJ	8-32R	N/A	23.3%	22.5%	449	
Screenings	Tilcon, Mt Hope, NJ	8-32R	N/A	0.0%	0.0%	0	
RAP	Flushing Asphalt Co.	N/A	Yes	30.0%	28.9%	578	
	RAP % Asphalt: 6.2%			RAP AC	1.8%	36	
All RAP to be from Municipal Sources - Aggregates from State Quarries					RAP Aggregate	27.1%	542
		N/A			0.0%	0	
	RAP % Asphalt:			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		3.6%	72	
Total Asphalt Content (P _b)					5.4%	108	
					100.0%	2,000	

Project No: Genenc
APPROVED
 NYC DDC (QA/QC BUREAU)
 Date: 11/2/17 Reviewed By: S.C.
 LOG NO: 2017-815
 QA/QC APPROVAL STAMP

WILLETSPOINT ASPHALT/6FRA/TOP/GENERIC/NYCDDC/109/17 EXP: 11/30/2019

Sieve Size	1-1/2"	1"	3/4"	1/2"	1/4"	1/8"	# 20	# 40	# 80	# 200	P _b
Specification Limits	100-100	100-100	100-100	95-100	58-72	36-54	15-32	8-25	4-16	2-6	5-6.2
JMF Target	100	100	100	100	66	42	24	17	9	4	5.4
JMF Range	100-100	100-100	100-100	100-100	61-71	38-46	20-28	13-21	6-12	2-6	5-6.1



QA & CONSTRUCTION SAFETY BUREAU

ASPHALT JOB MIX FORMULA SHEET - 6F RA TOP MIX

PLANT NAME: WILLETS POINT ASPHALT
 NYSDOT FACILITY #: H0354
 PLANT ADDRESS: FLUSHING
 New York, NY

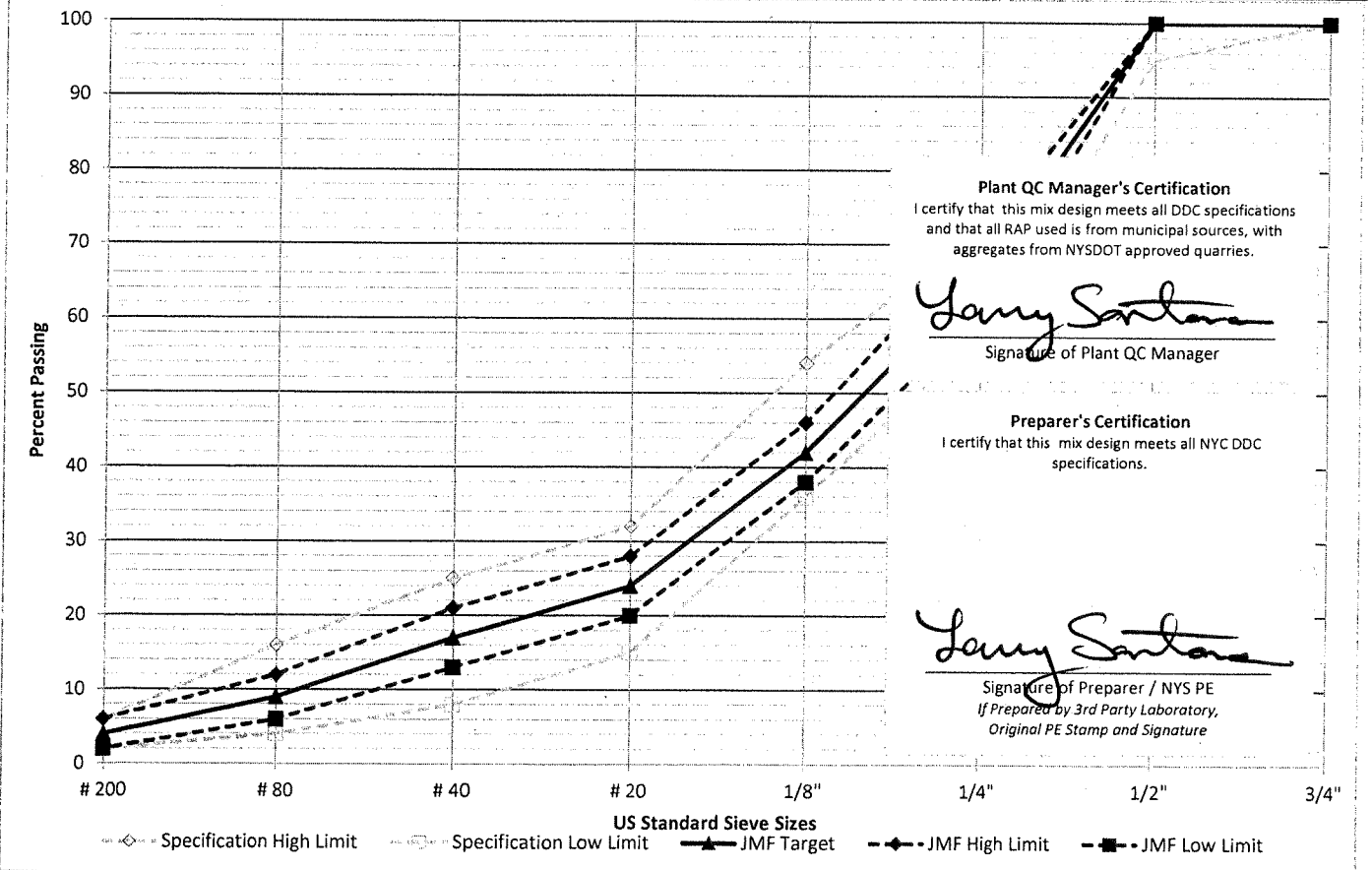
MIX DESIGN DATE: 10/15/2017
 PREPARED BY: LARRY SANTANA
 COMPANY: WILLETS POINT ASPHALT
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Item	Supplier / Quarry	NYSDOT Source	Friction Agg.	Agg. Blend %	Mix %	Lbs / Ton	
					0.0%	0	
#1 Stone	Tilcon, Mt Hope, NJ	8-32R	Yes	28.7%	27.7%	553	
#1A Stone	Tilcon, Mt Hope, NJ	8-32R	Yes	18.0%	17.4%	347	
					0.0%	0	
Manufactured Sand	Tilcon, Mt Hope, NJ	8-32R	N/A	23.3%	22.5%	449	
Screenings	Tilcon, Mt Hope, NJ	8-32R	N/A	0.0%	0.0%	0	
RAP	Flushing Asphalt Co.	N/A	Yes	30.0%	28.9%	578	
	RAP % Asphalt: 6.2%			RAP AC	1.8%	36	
All RAP to be from Municipal Sources - Aggregates from State Quarries					RAP Aggregate	27.1%	542
		N/A			0.0%	0	
	RAP % Asphalt:			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		3.6%	72	
Total Asphalt Content (P _b)					5.4%	108	
					100.0%	2,000	

QA&CS APPROVAL STAMP

WILLETSPOINTASPHALT/6FRA/TOP/GENERIC/NYCDDC/109/17 EXP: 11/30/2019

Sieve Size	1-1/2"	1"	3/4"	1/2"	1/4"	1/8"	# 20	# 40	# 80	# 200	P _b
Specification Limits	100-100	100-100	100-100	95-100	58-72	36-54	15-32	8-25	4-16	2-6	5-6.2
JMF Target	100	100	100	100	66	42	24	17	9	4	5.4
JMF Range	100-100	100-100	100-100	100-100	61-71	38-46	20-28	13-21	6-12	2-6	5-6.1



QA & CONSTRUCTION SAFETY BUREAU
ASPHALT COMBINED GRADATION WORKSHEET - 6F RA TOP MIX

PLANT NAME: WILLETS POINT ASPHALT

NYSDOT FACILITY #: H0354

MIX DESIGN DATE: 10/15/2017

Average Bin Gradations

Sieve	Not Used		#1 Stone		#1A Stone		Not Used		Manufactured Sand		Screenings		RAP		Not Used	
	% Ret.	% Pass	% Ret.	% Pass	% Ret.	% Pass	% Ret.	% Pass	% Ret.	% Pass	% Ret.	% Pass	% Ret.	% Pass	% Ret.	% Pass
1.5"		100.0		100.0		100.0		100.0		100.0		100.0		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	0.0	100.0	0.0	100.0		100.0	0.0	100.0	0.0	100.0	0.0	100.0		100.0
1/2"		100.0	0.7	99.3	0.0	100.0		100.0	0.0	100.0	0.0	100.0	0.0	100.0		100.0
1/4"		100.0	84.8	14.5	10.4	89.6		100.0	0.0	100.0	0.1	99.9	24.8	75.2		100.0
1/8"		100.0	13.5	1.0	72.3	17.3		100.0	4.8	95.2	12.4	87.5	22.3	52.9		100.0
#20		100.0	0.0	1.0	15.2	2.1		100.0	37.4	57.8	37.9	49.6	19.1	33.8		100.0
#40		100.0	0.0	1.0	0.0	2.1		100.0	19.2	38.6	13.3	36.3	8.9	24.9		100.0
#80		100.0	0.0	1.0	0.0	2.1		100.0	20.2	18.4	14.8	21.5	10.2	14.7		100.0
#200		100.0	0.0	1.0	0.0	2.1		100.0	14.2	4.2	8.8	12.7	5.4	9.3		100.0
Pan			1.0		2.1				4.2		12.7		9.3			
Totals	0.0		100.0		100.0		0.0		100.0		100.0		100.0		0.0	

Stockpiles Sampled By: DOUGLAS LOPEZ Date Sampled: 10/2/2017

Gradation Technician: DOUGLAS LOPEZ Date Tested: 10/2/2017

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	#1 Stone	#1A Stone	Not Used	Manufactured Sand	Screenings	RAP	Not Used
% Coarse Agg.	---	85.5%	10.4%	---	0.0%	0.1%	24.8%	---
Test Required?	NO	YES	YES	NO	NO	NO	YES	NO
A) Wt. in Air		1478.4	1480.3				1023.4	
B) Wt. SSD		1483.0	1485.3				1029.6	
C) Wt. in Water		935.0	935.1				643.2	
G _{sb} (A/(B-C))	---	2.698	2.690	---	---	---	2.649	---
G _{sa} (A/(A-C))	---	2.721	2.715	---	---	---	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	#1 Stone	#1A Stone	Not Used	Manufactured Sand	Screenings	RAP	Not Used
% Fine Agg.	---	14.5%	89.6%	---	100.0%	99.9%	75.2%	---
Test Required?	NO	YES	YES	NO	YES	YES	YES	NO
A) Wt. in Air		1478.4	1480.3		497.8	496.3	1023.4	
B) Wt. Flask + Water		0.0	0.0		600.0	685.0	0.0	
C) Wt. Flask + Water + Sample		935.0	935.1		992.8	997.0	643.2	
S) Wt. SSD		1483.0	1485.3		500.1	500.0	1029.6	
G _{sb} (A/(B+S-C))	---	2.698	2.690	---	2.658	2.640	2.649	---
G _{sa} (A/(B+A-C))	---	2.721	2.715	---	2.691	2.693	2.692	---

Combined Aggregate Specific Gravity

	Not Used	#1 Stone	#1A Stone	Not Used	Manufactured Sand	Screenings	RAP	Not Used
Combined G _{sb}	---	2.698	2.690	---	2.658	2.640	2.649	---
Combined G _{sa}	---	2.721	2.715	---	2.691	2.693	2.692	---

S. G. Technician: DOUGLAS LOPEZ Date Tested: 10/4/2017

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
#1 Stone	28.7%	28.7	28.7	28.7	28.5	4.2	0.3	0.3	0.3	0.3	0.3
#1A Stone	18.0%	18.0	18.0	18.0	18.0	16.1	3.1	0.4	0.4	0.4	0.4
Not Used	0.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Manufactured Sand	23.3%	23.3	23.3	23.3	23.3	22.2	13.5	9.0	4.3	1.0	
Screenings	0.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RAP	30.0%	30.0	30.0	30.0	30.0	22.6	15.9	10.1	7.5	4.4	2.8
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	100.0	99.8	66.1	41.5	24.3	17.1	9.4	4.4
Specification Limits		100-100	100-100	100-100	95-100	58-72	36-54	15-32	8-25	4-16	2-6

QA & CONSTRUCTION SAFETY BUREAU
 ASPHALT TRIAL GRADATION WORKSHEET - 6F RA TOP MIX

PLANT NAME: WILLETS POINT ASPHALT

NYS DOT FACILITY #: H0354

MIX DESIGN DATE: 10/15/2017

BATCH 1		Batch P _b :	4.5%													
		Batch Grams:	1225.0													
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	0.0
#1 Stone	28.7%	27.4%	335.8		0.0	0.0	0.0	2.4	284.7	45.3	0.0	0.0	0.0	0.0	3.4	335.8
#1A Stone	18.0%	17.2%	210.6		0.0	0.0	0.0	0.0	21.9	152.2	32.0	0.0	0.0	0.0	4.4	210.6
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
Manufactured Sand	23.3%	22.3%	272.6		0.0	0.0	0.0	0.0	0.0	13.1	101.9	52.3	55.1	38.7	11.4	272.6
Screenings	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
RAP	30.0%	30.5%	374.2	23.2	0.0	0.0	0.0	0.0	92.8	83.4	71.5	33.3	38.2	20.2	11.6	374.2
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	0.0
Virgin Asphalt		2.6%	31.9	31.9												31.9
Total Mix	100.0%	100.0%	1225.0	55.1	0.0	0.0	0.0	2.4	399.4	294.1	205.4	85.6	93.2	58.9	30.8	1225.0

4.50%

BATCH 2		Batch P _b :	5.0%													
		Batch Grams:	1225.0													
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	0.0
#1 Stone	28.7%	27.3%	334.0		0.0	0.0	0.0	2.3	283.2	45.1	0.0	0.0	0.0	0.0	3.3	334.0
#1A Stone	18.0%	17.1%	209.5		0.0	0.0	0.0	0.0	21.8	151.5	31.8	0.0	0.0	0.0	4.4	209.5
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
Manufactured Sand	23.3%	22.1%	271.2		0.0	0.0	0.0	0.0	0.0	13.0	101.4	52.1	54.8	38.5	11.4	271.2
Screenings	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
RAP	30.0%	30.4%	372.2	23.1	0.0	0.0	0.0	0.0	92.3	83.0	71.1	33.1	38.0	20.1	11.5	372.2
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	0.0
Virgin Asphalt		3.1%	38.2	38.2												38.2
Total Mix	100.0%	100.0%	1225.0	61.3	0.0	0.0	0.0	2.3	397.3	292.6	204.3	85.2	92.7	58.6	30.7	1225.0

5.00%

BATCH 3		Batch P _b :	5.5%													
		Batch Grams:	1225.0													
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	0.0
#1 Stone	28.7%	27.1%	332.2		0.0	0.0	0.0	2.3	281.7	44.9	0.0	0.0	0.0	0.0	3.3	332.2
#1A Stone	18.0%	17.0%	208.4		0.0	0.0	0.0	0.0	21.7	150.7	31.7	0.0	0.0	0.0	4.4	208.4
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
Manufactured Sand	23.3%	22.0%	269.7		0.0	0.0	0.0	0.0	0.0	12.9	100.9	51.8	54.5	38.3	11.3	269.7
Screenings	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
RAP	30.0%	30.2%	370.2	23.0	0.0	0.0	0.0	0.0	91.8	82.6	70.7	33.0	37.8	20.0	11.5	370.2
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	0.0
Virgin Asphalt		3.6%	44.4	44.4												44.4
Total Mix	100.0%	100.0%	1225.0	67.4	0.0	0.0	0.0	2.3	395.2	291.0	203.3	84.7	92.2	58.3	30.5	1225.0

5.50%

BATCH 4		Batch P _b :	6.0%													
		Batch Grams:	1225.0													
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	0.0
#1 Stone	28.7%	27.0%	330.5		0.0	0.0	0.0	2.3	280.2	44.6	0.0	0.0	0.0	0.0	3.3	330.5
#1A Stone	18.0%	16.9%	207.3		0.0	0.0	0.0	0.0	21.6	149.9	31.5	0.0	0.0	0.0	4.4	207.3
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
Manufactured Sand	23.3%	21.9%	268.3		0.0	0.0	0.0	0.0	0.0	12.9	100.3	51.5	54.2	38.1	11.3	268.3
Screenings	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
RAP	30.0%	30.1%	368.3	22.8	0.0	0.0	0.0	0.0	91.3	82.1	70.3	32.8	37.6	19.9	11.4	368.3
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	0.0
Virgin Asphalt		4.1%	50.7	50.7												50.7
Total Mix	100.0%	100.0%	1225.0	73.5	0.0	0.0	0.0	2.3	393.1	289.5	202.2	84.3	91.8	58.0	30.3	1225.0

6.00%

BATCH 5		Batch P _b :	6.5%													
		Batch Grams:	1225.0													
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	0.0
#1 Stone	28.7%	26.8%	328.7		0.0	0.0	0.0	2.3	278.8	44.4	0.0	0.0	0.0	0.0	3.3	328.7
#1A Stone	18.0%	16.8%	206.2		0.0	0.0	0.0	0.0	21.4	149.1	31.3	0.0	0.0	0.0	4.3	206.2
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
Manufactured Sand	23.3%	21.8%	266.9		0.0	0.0	0.0	0.0	0.0	12.8	99.8	51.2	53.9	37.9	11.2	266.9
Screenings	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
RAP	30.0%	29.9%	366.3	22.7	0.0	0.0	0.0	0.0	90.8	81.7	70.0	32.6	37.4	19.8	11.4	366.3
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	0.0
Virgin Asphalt		4.6%	56.9	56.9												56.9
Total Mix	100.0%	100.0%	1225.0	79.6	0.0	0.0	0.0	2.3	391.0	287.9	201.1	83.8	91.3	57.7	30.2	1225.0

6.50%

QA & CONSTRUCTION SAFETY BUREAU

ASPHALT MAXIMUM DENSITY & MARSHALL PROPERTIES WORKSHEET - 6F RA TOP MIX

PLANT NAME: WILLETS POINT ASPHALT

NYSDOT FACILITY #: H0354

MIX DESIGN DATE: 10/15/2017

Theoretical Maximum Specific Gravity G_{mm} per ASTM D2041

Trial Batch	1		2		3		4		5	
P_b	4.5%		5.0%		5.5%		6.0%		6.5%	
A) Sample in Air (grams)	2012.3	2011.7	2007.2	2015.8	1690.6	1760.1	2021.8	2010.4	2051.3	2032.4
B) Pycnometer in Water (Grams)	1288.8	1296.0	1288.8	1296.0	1288.8	1296.0	1288.8	1296.0	1288.8	1296.0
C) Sample & Pycnometer in Water (Grams)	2500.2	2508.3	2491.5	2502.5	2297.3	2346.8	2488.1	2489.2	2499.5	2493.8
$G_{mm} (A/(A+B-C))$	2.513	2.517	2.495	2.491	2.479	2.481	2.458	2.460	2.440	2.435
Average G_{mm}	2.515		2.493		2.480		2.459		2.438	

Density Technician: DOUGLAS LOPEZ

Date Tested: 10/4/2017

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

$P_b = 4.5\%$

Specimen A	1220.4	1222.2	700.1	522.1	2.337	2.515	7.06%		2500	1	2500	8.5	294
Specimen B	1218.0	1220.1	700.2	519.9	2.343	2.515	6.85%		2700	1	2700	9.0	300
Specimen C	1218.1	1220.3	700.1	520.2	2.342	2.515	6.89%		2575	1	2580	8.5	304
Average					2.341	2.515	6.92%	146.1			2590	8.7	299

TRIAL BATCH 2

$P_b = 5.0\%$

Specimen A	1223.1	1224.5	705.8	518.7	2.358	2.493	5.41%		2800	1	2800	9.0	311
Specimen B	1222.8	1224.6	705.2	519.4	2.354	2.493	5.57%		2850	1	2850	9.5	300
Specimen C	1224.0	1225.3	705.4	519.9	2.354	2.493	5.56%		2975	1	2980	9.5	314
Average					2.356	2.493	5.50%	147.0			2880	9.3	308

TRIAL BATCH 3

$P_b = 5.5\%$

Specimen A	1221.9	1222.8	708.9	513.9	2.378	2.480	4.13%		3375	1	3380	10.0	338
Specimen B	1226.3	1227.2	709.5	517.7	2.369	2.480	4.49%		3150	1	3150	10.5	300
Specimen C	1219.3	1220.4	708.2	512.2	2.381	2.480	4.01%		3075	1	3080	11.0	280
Average					2.376	2.480	4.19%	148.3			3200	10.5	306

TRIAL BATCH 4

$P_b = 6.0\%$

Specimen A	1238.7	1239.6	720.0	519.6	2.384	2.459	3.05%		2975	1	2980	11.0	271
Specimen B	1239.5	1240.4	719.8	520.6	2.381	2.459	3.18%		3000	1	3000	11.0	273
Specimen C	1239.8	1240.7	720.4	520.3	2.383	2.459	3.10%		2850	1	2850	11.5	248
Average					2.383	2.459	3.09%	148.7			2940	11.2	264

TRIAL BATCH 5

$P_b = 6.5\%$

Specimen A	1242.5	1242.9	723.2	519.7	2.391	2.438	1.94%		2675	1	2680	11.5	233
Specimen B	1242.8	1243.3	724.1	519.2	2.394	2.438	1.82%		2500	1	2500	12.0	208
Specimen C	1242.9	1243.5	723.9	519.6	2.392	2.438	1.89%		2475	1	2480	12.0	207
Average					2.392	2.438	1.89%	149.3			2550	11.8	216

Marshall Technician: DOUGLAS LOPEZ

Date Tested: 10/4/2017