

Control Section: PW-7017 Puritan & Grand River Parklet						Job Number: PW-7017 Puritan & Grand River Parklet						
Contractor: Cadillac Asphalt, LLC						Route & Location: PW-7017 Puritan & Grand River Parklet						
Plant Number: 40-03						Plant Location: Dix						
Bituminous Mixture: 5E3 - 53637												
PIT NAME		Newport	Drake	Burmeister	Drake			Plt	Plt	CONTROL POINTS	COMBINED GRADATION	
PIT NUMBER		58-11	81-92	81-93	81-92			40-03	40-03			
AGGREGATE TYPE		L.sand	3/8 x 4	2NS	Man Sand			BHF	RAP			
BLEND % (10% Minimum)		17.0	15.0	21.0	25.6			1.4	20.0			
		17.0	15.0	21.0	27.0				20.0			
AVERAGE GRADATION	P 1 1/2 (37.5 mm)	100.0	100.0	100.0	100.0			100.0	100.0		100.0	
	P 1 in. (25.0 mm)	100.0	100.0	100.0	100.0			100.0	100.0		100.0	
	P 3/4 in. (19.0 mm)	100.0	100.0	100.0	100.0			100.0	100.0		100.0	
	P 1/2 in. (12.5 mm)	100.0	100.0	100.0	100.0			100.0	100.0	100.0	100.0	
	P 3/8 in. (9.5 mm)	94.1	88.3	100.0	100.0			100.0	99.3	90-100	97.1	
	P NO. 4 (4.75 mm)	59.7	12.0	96.0	91.3			100.0	85.3	90 Max	73.9	
	P NO. 8 (2.36 mm)	33.6	3.3	75.9	55.0			100.0	70.2	47-67	51.7	
	P NO. 16 (1.18 mm)	17.9	2.1	51.7	30.6			100.0	55.5		34.6	
	P NO. 30 (600 um)	8.9	1.6	30.2	17.2			100.0	42.8		22.5	
	P NO. 50 (300 um)	6.1	1.5	13.2	9.1			99.0	28.7		13.5	
	P NO. 100 (150 um)	5.7	1.3	5.3	4.5			95.0	16.6		8.1	
	TOTAL P NO. 200 (75 um)	5.0	1.1	2.6	3.1			91.0	10.8	2-10	5.8	
Crush Count 1 / 2 Face		100.0	98.1	24.0	94.9				91.6	75 Min	95.1	
L.A. Abrasion Year / Value		29 19	18 15	20 16	18 15			N A	N A	35 Max	< 35	
NAA ANGULARITY INDEX (METHOD A)		45.7		42.9	46.2				46.3	43 Min	44.0	
AWI Nomograph & Quarries		243.0	301.0	224.0	301.0				240.0	260 Min	272	
COARSE AGGREGATE BULK SPECIFIC GRAVITY #4 UP			2.660						2.737		2.644	
COARSE AGGREGATE BULK SPECIFIC GRAVITY #8					2.647					Combined GSB	2.662	
FINE AGGREGATE BULK SPECIFIC GRAVITY		2.577		2.650	2.647				2.737		2.643	
FLAT & ELONGATED %			0.5		0.2					10 Max	< 10	
SOFTSTONE %			0.2	0.3	0.2					5 Max	< 5	
ASPHALT CEMENT SUPPLIER			MPM Oil Monroe, MI ABS 6505					GRADE		64-28	SPECIFIC GRAVITY	1.029
SUBMITT ED BY:	NAME (Print or Type) Shelly Moultrup							DATE January 1, 2021		PHONE NUMBER 248-640-1960		
	SIGNATURE							LAB NO.		FAX NUMBER		
AC Content		Gmm						Gmb				
5.95		2.480						2.378				
VMA		Air Voids						VFA				
15.97		4.0						74.2				

SUBMITTED SUPERPAVE MIX DESIGN SUMMARY SHEET

Contractor:		Consultant:	
Cadillac Asphalt, LLC			
Control Section:	Job Number:	Mix Type:	
PW-7017 Puritan & Grand River Parklet	PW-7017 Puritan & Grand River Parklet	5E3 - 53637	
N_{INT}	N_{DES}	N_{MAX}	
7	86	134	
Mixing Temp (F)			Compaction Temp (F)
298 - 307			282 - 289

SUPERPAVE MIX PROPERTIES AT TESTED & OPTIMUM ASPHALT CONTENT

ITEM	TEST POINTS				RECOMMENDED OPTIMUM Regression Value at Optimum Asphalt Content	VERIFICATION TEST RESULTS @ N _{MAX}
	4 POINT DESIGN					
	FINAL		BLEND			
ASPHALT CONTENT (%)	5.0	5.5	6.0	6.5	5.95	5.95
BULK SPECIFIC GRAVITY @ N _{DES}	2.332	2.353	2.384	2.400	2.381	2.383
BULK SPECIFIC GRAVITY @ N _{MAX}						2.410
THEORETICAL MAXIMUM (S.G.)	2.515	2.500	2.477	2.457	2.480	2.480
AIR VOIDS (%) @ N _{DES}	7.30	5.89	3.75	2.31	4.00	3.90
VOIDS IN MINERAL AGGREGATE % (VMA) @ N _{DES}	16.82	16.33	15.93	15.63	15.87	15.79
VOIDS FILLED WITH ASPHALT % (VFA) @ N _{DES}	56.3	65.7	75.3	85.0	74.80	
% G _{mm} @ N _{INT}	85.2	86.0	88.3	89.2		88.0
% G _{mm} @ N _{DES}	92.7	94.1	96.3	97.7	96.0	96.1
% G _{mm} @ N _{MAX}						97.2
FINES/EFF ASPHALT RATIO	1.39	1.24	1.12	1.02	1.13	

The submitted superpave mix design final blend shall have a minimum of 4 test points at 0.5 percent asphalt content increments. At least one full asphalt content (0.5%) above and below optimum asphalt content is required.

ASPHALT CONTENT OF SUBMITTED SUPERPAVE MIX DESIGN

5.95

ASPHALT SPECIFIC GRAVITY

1.029

SPECIFIC GRAVITY OF COMBINED AGGREGATE G_{sb}

2.662

THEORETICAL MAXIMUM SPECIFIC GRAVITY OF BITUMINOUS PAVING MIXTURES ASTM D2041 (RICE METHOD)

PROJECT NUMBER PW-7017 PuritaL7 Puritan & Grand River Parklet	MIX DESIGN NUMBER
CONTRACTOR Cadillac Asphalt, LLC	5E3 - 53637

% ASPHALT BINDER		5.0	5.5
ASPHALT SPECIFIC GRAVITY		1.029	1.029
SAMPLE and BOWL WEIGHT in AIR, g	A	2100.0	2100.0
BOWL WEIGHT in AIR, g	B		
SAMPLE WEIGHT in AIR, g	C=A-B	2100.0	2100.0
SAMPLE and BOWL in WATER,g	D	2722.6	2646.0
BOWL in WATER,g	E	1457.5	1386.0
SAMPLE in WATER,g	F=D-E	1265.1	1260.0
VOLUME, cc	G=C-F	834.9	840.0
Gmm	C/G	2.515	2.500
Gse		2.722	2.727

% ASPHALT BINDER		6.0	6.5
ASPHALT SPECIFIC GRAVITY		1.029	1.029
SAMPLE and BOWL WEIGHT in AIR, g	A	2100.0	2100.0
BOWL WEIGHT in AIR, g	B		
SAMPLE WEIGHT in AIR, g	C=A-B	2100.0	2100.0
SAMPLE and BOWL in WATER,g	D	2709.2	2631.4
BOWL in WATER,g	E	1457.0	1386.0
SAMPLE in WATER,g	F=D-E	1252.2	1245.4
VOLUME, cc	G=C-F	847.8	854.6
Gmm	C/G	2.477	2.457
Gse		2.721	2.720
AVERAGE Gse		2.723	

Source Of Asphalt Cement: MPM Oil Monroe MI ABS 6505	Date Tested: January 1, 2021
Tester: Bahaa Jajou / Tammy Morgan	Checked By: Shelly Moultrup

GYRATORY COMPACTED BULK SPECIFIC GRAVITY WORKSHEET

Job Number:	Date:	Mix Design Number:
PW-7017 Puritan & Grand River Parklet	01/01/21	
Contractor:		Mix Type:
Cadillac Asphalt, LLC		5E3 - 53637

	SAMPLE	A	B	C	D	E
		WEIGHT IN AIR	SSD WEIGHT	WEIGHT IN WATER	VOLUME OF SAMPLE (B-C)	ACTUAL SPEC. GRAVITY (A/D)

ASPHALT
%

FOUR POINT DESIGN COMPACTED TO N_{DES}

5.0	A	4770.4	4781.5	2735.9	2045.6	2.332
	B	4745.3	4764.3	2729.0	2035.3	2.331
					AVERAGE	2.332

ASPHALT
%

5.5	A	4718.2	4725.3	2718.5	2006.8	2.351
	B	4718.4	4731.8	2727.8	2004.0	2.354
					AVERAGE	2.353

ASPHALT
%

6.0	A	4859.2	4861.6	2827.4	2034.2	2.389
	B	4806.1	4810.2	2790.4	2019.8	2.379
					AVERAGE	2.384

ASPHALT
%

6.5	A	4814.3	4816.6	2808.9	2007.7	2.398
	B	4812.0	4814.2	2811.7	2002.5	2.403
					AVERAGE	2.400

ASPHALT
%

VERIFICATION SPECIMEN COMPACTED AT OPTIMUM ASPHALT CONTENT TO N_{MAX}

6.0	1	4847.1	4848.6	2837.4	2011.2	2.410
					AVERAGE	2.410

Tester:	Checked By:
Bahaa Jajou / Tammy Morgan	Shelly Moultrup

COARSE AGGREGATE GRAVITY

Control Section:	Job Number:	Mix Design Number:
PW-7017 Puritan & Grand River Parklet	V-7017 Puritan & Grand River Park	40-03
Contractor:		Mix Type:
Cadillac Asphalt LLC		5E3 - 53637

TEST NUMBER	1				
BUCKET ID	1				
PAN ID	A				
A. SSD Agg. + Bucket	4394.9				
B. Weight of Bucket	2316.0				
C. = Weight of SSD Agregate (A - B)	2078.9				
D. Weight of SSD Agg. + Bucket in H ₂ O	2762.1				
E. Weight of Bucket in H ₂ O	1457.5				
F. = Weight of SSD Agg. In H ₂ O (D - E)	1304.6				
G. Weight of Pan + Oven Dry Aggregate	2914.0				
H. Weight of Pan	867.1				
J. = Weight of Oven Dry Aggregate (G-H)	2046.9				
C - F (SSD Volume)	774.3				
J - F (Dry Agg. - Dry Weight)	742.3				
C - J (SSD - Dry Weight)	32.0				AVERAGE
Bulk Dry S.G. = J/(C - F)	2.644				2.644
Bulk SSD S.G. = C/(C - F)	2.685				2.685
Apparent S.G. = J/(J - F)	2.758				2.758
Absorption, % = [(C - J) / J] x 100	1.56				1.56

REMARKS:

TEST PERFORMED BY: Bahaa Jajou / Tammy Morgan

FINE AGGREGATE GRAVITY

CONTROL SECTION I.D.		JOB NO.		MIX DESIGN #	
PW-7017 Puritan & Grand River Parklet		V-7017 Puritan & Grand River Park		40-03	
CONTRACTOR			MIXTURE TYPE		
Cadillac Asphalt LLC			5E3 - 53637		
TEST NUMBER	1				
FLASK NUMBER	A				
PAN NUMBER	1				
A. Weight of Flask + SSD Agg.	757.2	749.2			
B. Weight of Flask	254.7	248.6			
C. = Weight of SSD Aggregate (A - B)	502.5	500.6			
D. Weight of Flask + SSD Agg. + H ₂ O	1566.7	1558.4			
E. Weight of Flask + H ₂ O	1250.8	1244.6			
F. = Weight of SSD Agg. In H ₂ O (D - E)	315.9	313.8			
G. Weight of Pan + Oven Dry Aggregate	1155.3	1299.0			
H. Weight of Pan	661.0	806.4			
J. = Weight of Oven Dry Aggregate (G-H)	494.3	492.6			
C - F (SSD Volume)	186.6	186.8			
J - F (Dry Agg. - Dry Weight)	178.4	178.8			
C - J (SSD - Dry Weight)	8.2	8			AVERAGE
Bulk Dry S.G. = J/(C - F)	2.649	2.637			2.643
Bulk SSD S.G. = C/(C - F)	2.693	2.680			2.686
Apparent S.G. = J/(J - F)	2.771	2.755			2.763
Absorption, % = [(C - J) / J] x 100	1.7	1.6			1.64

REMARKS:

TEST PERFORMED BY: Bahaa Jajou / Tammy Morgan

Date 10.18.2020

28000

28000

Darryll Arnold
Shaun Moses

Cadillac Asphalt LLC

Contractor Furnished Mix Design

Asphalt Cement, %	Actual Bulk Pt.	Actual TMD	Bulk S.P. Gravity	Max. SP. Gravity	Air Voids , %	V.F.A.	Gsb V.M.A.	Effective A/C	F/eff A
4.7			2.314	2.527	8.44	50.79	17.16	3.9	1.50
4.8			2.319	2.523	8.08	52.59	17.04	4.0	1.46
4.9			2.325	2.519	7.72	54.42	16.93	4.1	1.42
5.0	2.332	2.515	2.331	2.516	7.36	56.26	16.82	4.2	1.39
5.1			2.336	2.512	7.00	58.11	16.71	4.3	1.35
5.2			2.341	2.508	6.65	59.98	16.61	4.4	1.32
5.3			2.346	2.504	6.30	61.87	16.51	4.5	1.29
5.4			2.352	2.500	5.95	63.76	16.42	4.6	1.27
5.5	2.353	2.500	2.357	2.497	5.61	65.66	16.33	4.7	1.24
5.6			2.362	2.493	5.27	67.58	16.24	4.8	1.21
5.7			2.366	2.489	4.93	69.50	16.16	4.9	1.19
5.8			2.371	2.485	4.60	71.43	16.08	5.0	1.16
5.9			2.376	2.482	4.26	73.36	16.01	5.1	1.14
6.0	2.384	2.477	2.380	2.478	3.94	75.29	15.93	5.2	1.12
6.1			2.385	2.474	3.61	77.23	15.87	5.3	1.10
6.2			2.389	2.470	3.29	79.17	15.80	5.4	1.08
6.3			2.393	2.467	2.97	81.11	15.74	5.5	1.06
6.4			2.398	2.463	2.66	83.05	15.68	5.6	1.04
6.5	2.400	2.457	2.402	2.459	2.35	84.98	15.63	5.7	1.02
6.6			2.406	2.456	2.04	86.91	15.58	5.8	1.00
6.7			2.410	2.452	1.73	88.83	15.53	5.9	0.98
Gb	1.029		FAC RATIO	0.97					
Gse	2.723		Pba	0.86556					
Gsb	2.662								