

PAVEMENT MANAGEMENT SERVICES, INC.



435 South Washington Square
Lansing, Michigan 48933

June 3, 2009

(517) 485-5291 off
(517) 485-5665 fax

Mr. Robert Brown
Assistant Director of Facilities Planning
Grand Valley State University
1008 Service Building
1 Campus Drive
Allendale, Michigan 49401-9403

Dear Mr. Brown:

Pavement Management Services, Inc. (PMSI) was retained to evaluate the porous asphalt pavement and aggregate base removed from Lot Q on campus. We removed 15 six-inch cores from the existing porous pavement. PMSI retained cores 1, 5, 7, 8 and 14, as marked on the enclosed site plan. Two cores were retained by Grand Valley State University personnel; the remaining cores were taken by Fishbeck, Thompson, Carr and Huber.

The surface of the asphalt showed moderate loss of the asphalt cement; however, only a slight amount of raveling existed. There were two small areas that exhibited cracking at paving joints. These joints were not raveling and were not causing any structural problems. At all of the core locations, the ability to drain water from the core equipment was excellent to very good.

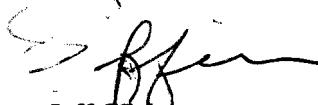
The enclosed test data indicate that all mixture parameters still meet original mixture specification, with the exception of percent of asphalt cement in the mixture. I believe the main reason for the loss of asphalt cement on the surface aggregate was snow plowing.

The aggregate base showed no signs of deterioration and will still meet Michigan Department of Transportation gradation specifications for a 2G and 3G.

I believe the pavement has been through five winters and, in my judgment, is still performing at nearly 100 percent of capacity, with many more years of service life remaining. This project would indicate that this water handling system and pavement structure is a very viable process.

If you have any further questions, please contact me.

Sincerely yours,


Jeff Click
President

JCC:dnc
encl.

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FACILITIES PLANNING

811 W. STATE ST.
SI. JOHNS, MI 48879
OFFICE: 989-224-2642
FAX: 989-224-3455



ROBERT L. ANDREWS, JR.
PRESIDENT

MIM 108 & MIM 109

SIEVE ANALYSIS REPORT

AMIS JOB # 2658 PROJECT: Grand Valley State University
DATE: 5-7-09 CLIENT/CONTRACTOR: PMSI
SAMPLE IDENTIFICATION: 21AA modified

SIEVE SIZE	WEIGHT RETAINED (grams)	% RETAINED	CUMULATIVE % PASSING	SPECIFICATIONS/TARGET
1 1/2"				
1"	0	0	100	
3/4"	290.6	11.3	88.7	
1/2"	952.3	37.2	51.5	
3/8"	530.9	20.7	30.8	
No. 4	578.9	22.6	8.2	
No. 8	86.6	3.4	4.8	
No. 16	23.6	0.9	3.9	
No. 30	10.6	0.4	3.5	
No. 50	9.3	0.4	3.1	
No. 100	8.9	0.3	2.8	
No. 200	8.8	0.3	2.5	
Pan/LBW	2.2/62.4	2.5		CRUSH SPEC.: _____ %
Total Wt	2565.1			CRUSH CONTENT 100 %

WEIGHT OF OVEN DRY SAMPLE BEFORE WASHING: 2565.1 gr.

WEIGHT OF OVEN DRY SAMPLE AFTER WASHING: 2502.7 gr.

WEIGHT LOSS BY WASH (LBW): 62.4 gr. 2.4%

CLAY IRON STONE: _____ %

TOTAL SOFT PARTICLE: _____ %

CHERT: _____ %

TOTAL: _____ %

1 FACE CRUSH: _____ %

2 FACE CRUSH: _____ %

FLAT & ELONG: _____ %

REMARKS: The sample tested meets MDOI 2G & 3G gradation specifications.

TEST PERFORMED BY: Robert L. Andrews Jr.

AA/ma


EXTRACTION/GRADATION REPORT

MIM 325 & MIM 311

 AMTS JOB # 2658 DATE: 5-6-09

 PROJECT: Grand Valley State University

 CLIENT: PMSI

CONTRACTOR: _____

SAMPLED BY: _____ DATE SAMPLED: _____

PLANT LOCATION: _____

 TYPE OF MIXTURE: Open graded

WEIGHT OF SAMPLE	2414.6	SIEVE SIZE	WEIGHT RETAINED (grams)	% RETAINED	CUMULATIVE % PASSING	SPECIFICATIONS
WEIGHT OF DRY EXTRACTED SAMPLE	2342.9	1 1/2"	0	0	100	
LOSS IN WEIGHT	71.7	1"	33.2	1.4	98.6	
DUST CORRECTION	7.2	3/4"	113.5	4.8	93.8	
WEIGHT OF EXTRACTED BIT.	64.5	1/2"	647.5	27.6	66.2	
PERCENT BITUMEN	2.7	3/8"	634.8	27.0	39.2	
WEIGHT OF DRY EXTRACTED AGG.	2350.1	No. 4	549.4	23.4	15.8	
WEIGHT OF DRY AGG. AFTER WASH	2245.7	No. 8	87.0	3.7	12.1	
WEIGHT LOSS BY WASHING	104.4	No. 16	39.3	1.7	10.4	
WEIGHT PASSING #200 BY SHAKING	9.7	No. 30	24.4	1.0	9.4	
TOTAL WEIGHT PASSING #200	114.1	No. 50	32.2	1.4	8.0	
PERCENT P.#200	4.9	No. 100	40.9	1.7	6.3	
		No. 200	33.8	1.4	4.9	
		P. #200	114.1	4.9		
		TOTAL WEIGHT	2350.1			

 MIM - 117
 CRUSH CONTENT: 93.8 %

REMARKS: _____

RECOVERED PENEIRATION =

BY:

AA/ma



ASIM 3203

REPORT OF RESULTS OF MARSHALL TEST

PROJECT: Grand Valley State University JOB #: 2658
ARCHITECT/ENGINEER: PMSI DATE: 5-4-09
CONTRACTOR: _____ GRADATION SPECIFICATION: OG
LOCATION/STATION: _____ SAMPLE CONDITION: freshly mixed/
reheated
COMPACTION EFFORT: Cores PERCENT ASPHALT CEMENT: _____

Specimen Number	1	5	7
A. Weight in Air (grams)	2169.0	2100.6	2636.8
B. Weight in Water (grams)			
C. S.S.D. Weight (grams)			
D. Specimen Volume (cc) C-B	1066.8	1018.3	1277.8
E. Bulk Specific Gravity of Specimen A/(C-B)	2.033	2.063	2.064
F. Specimen Density Ex62.4 (pcf)	126.9	128.7	128.8
Gmm	2.616	2.616	2.616
% Air	22.3	21.1	21.1
Back washed fines	1.0 gr.	12.1 gr.	

TESTED BY:

R.L. Andrews, Jr.



ASIM 3203

REPORT OF RESULTS OF MARSHALL TEST

PROJECT: Grand Valley State University JOB #: 2658
ARCHITECT/ENGINEER: PMSI DATE: 5-4-09
CONTRACTOR: _____ GRADATION SPECIFICATION: OG
LOCATION/STATION: _____ SAMPLE CONDITION: freshly mixed,
reheated
COMPACTION EFFORT: Cores PERCENT ASPHALT CEMENT: _____

Specimen Number	8	14	
A. Weight in Air (grams)	2655.4	2686.7	
B. Weight in Water (grams)			
C. S.S.D. Weight (grams)			
D. Specimen Volume (cc) C-B	1287.4	1320.8	
E. Bulk Specific Gravity of Specimen A/(C-B)	2.063	2.034	
F. Specimen Density Ex62.4 (pcf)	128.7	126.9	
Gram	2.616	2.616	
% Air	21.1	22.2	

TESTED BY:

R. J. Andrews, Jr.

St. Johns, MI 48879 • (517) 224-2642



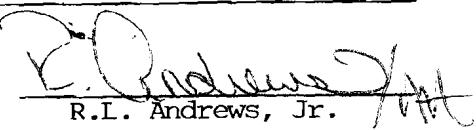
ASIM 3203

REPORT OF RESULTS OF MARSHALL TEST

PROJECT: Grand Valley State University JOB # 2658
ARCHITECT/ENGINEER: PMSI DATE: 5-7-09
CONTRACTOR: _____ GRADATION SPECIFICATION: _____
LOCATION/STATION: _____ SAMPLE CONDITION: freshly mixed/
reheated
COMPACTION EFFORT: 50/50 PERCENT ASPHALT CEMENT: _____

Specimen Number	1	2	3	4
A. Weight in Air (grams)	1037.2	1037.8	1032.4	1035.3
B. Weight in Water (grams)				
C. S.S.D. Weight (grams)				
D. Specimen Volume (cc) C-B	511.7	512.3	508.9	511.8
E. Bulk Specific Gravity of Specimen A/(C-B)	2.027	2.026	2.029	2.023
F. Specimen Density Ex62.4 (pcf)	126.5	126.4	126.6	126.2
Gmm	2.616	2.616	2.616	2.616
% Air	22.5	22.6	22.4	22.7

TESTED BY:


R.I. Andrews, Jr.

**THEORETICAL MAXIMUM SPECIFIC GRAVITY
OF BITUMINOUS PAVING MIXTURES
MODIFIED ASTM D 2041 (RICE METHOD)**

PROJECT NUMBER	MIX DESIGN NUMBER
Grand Valley State University CONTRACTOR	MIM - 314

Pavement Management Services, Inc.

% ASPHALT BINDER

2.7

ASPHALT SPECIFIC GRAVITY

SAMPLE and BOWL WEIGHT in AIR, g

A

4382.5

BOWL WEIGHT in AIR, g

B

2066.1

SAMPLE WEIGHT in AIR, g

C=A-B

2316.4

SAMPLE and BOWL in WATER, g

D

2753.4

BOWL in WATER, g

E

1322.6

SAMPLE in WATER, g

F=D-E

1430.8

VOLUME, cc

G=C-F

885.6

G_{mm}

C/G

2.616

G_{se}

% ASPHALT BINDER

ASPHALT SPECIFIC GRAVITY

SAMPLE and BOWL WEIGHT in AIR, g

A

BOWL WEIGHT in AIR, g

B

SAMPLE WEIGHT in AIR, g

C=A-B

SAMPLE and BOWL in WATER, g

D

BOWL in WATER, g

E

SAMPLE in WATER, g

F=D-E

VOLUME, cc

G=C-F

G_{mm}

C/G

G_{se}

AVERAGE G_{se}

SOURCE AND GRADE OF ASPHALT CEMENT USED

DATE TESTED

5-5-09

TESTER

CHECKED BY

R.L. Andrews, Jr.