

EVALUATION

USING MARSHALL METHOD OF DESIGN
FOR BITUMINOUS CONCRETE MIX

FINAL REPORT 83-1

JANUARY 1983

STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH DIVISION

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ABSTRACT

This evaluation was conducted to determine the advantages, disadvantages and the best utilization of the Marshall Method of Design for bituminous concrete mixes.

This evaluation includes results, pro and con, compiled from four projects completed in 1982 utilizing the Marshall Method.

The results indicate that the Marshall Method is a valuable tool when developing a bituminous concrete mix.

The recommendation is not to use the Marshall Method of Design on all projects but to require that all projects meet certain design criteria based on test values using Marshall.

INTRODUCTION

For the past several years, the Marshall Method of Design for developing bituminous concrete mixes has been used in Vermont in varying degrees. Only in the past few years has the actual technology of the Method been thoroughly investigated. As this technology has been better understood, the use of the Marshall Method has been better utilized by this Agency.

The first big step in utilizing parts of the Marshall Method by the Agency was incorporating into the specifications the use of Maximum Specific Gravity of Bituminous Paving Mixtures AASHTO Designation: T-209-78. This test provides an accurate method to determine the percent Air Voids in the mix. This has reduced the problem of flushing pavements. With the success of T-209, further investigation and use of the Marshall Method has continued.

In 1982, four projects were completed which required design by the Marshall Method. Three of the projects required the mix to meet certain Marshall test values. One other project was designed by the Marshall Method, but was not required by contract to meet Marshall Criteria.

This evaluation will discuss results and experiences pertaining to the Marshall Method encountered on the following four projects. The three projects required by contract to meet certain Marshall test values were Georgia-Fairfax-Fairfield-St. Albans-Swanton IR 89-3(4), Newbury-Ryegate-Barnet-Waterford I91-2(65) Stage III, and Sunderland-Manchester FLH F 019-1(21) Stage II. The remaining project, Waterford-St. Johnsbury I93-1(4) Stage II was required to meet the Agency's Standard Specification.

How Marshall Method Was Used

1. Before paving could begin on any of the projects, the contractor was required to submit a complete Marshall Design with support data to the State of Vermont Materials & Research Division for evaluation.
2. Upon receipt of the design, the Materials & Research Division reproduced the contractor's design before acceptance or recommending changes.
3. After acceptance of the design, trial mixes were produced from the plant and tested.
4. Paving began after the trial mixes were accepted. The mix was monitored throughout the project.

Problems

One problem with the use of the Marshall Method was trying to reproduce the contractors design. Several designs, when reproduced, did not agree with the contractor's. This meant that a second attempt would have to be made to verify the first results. Even when the reproduction did verify the contractor's design, troubles were encountered when the trial mixes were tested at the plant. It is very difficult to exactly design a mix under laboratory conditions and have the plant produce the same mix without some changes being required.

Problems would be reduced with improvement in gradation control of necessary aggregate in both crushing and stockpiling.

Advantages

The Marshall Method of design does produce a design that is normally quite close to what is desired. It certainly is a good starting point. It is only reasonable to expect some changes will have to be made prior to and during production.

Test Results During Production

The appendix contains the average test results of each mix used on the four projects.

Evaluation of Criteria

In evaluating the Marshall test values used on these projects and by further study of the Marshall, one factor that appears to be of great importance is the VMA or voids in the mineral aggregate. VMA is defined as the intergranular void space between the aggregate particles in a compacted paving mixture that includes the air voids and the effective asphalt content expressed as a percent of the total volume. The importance of VMA is that there must be sufficient voids in the aggregate to allow the proper amount of asphalt cement to provide an adequate film thickness on the aggregate. If the film thickness is not sufficient on the aggregate, durability will be reduced.

On all four projects, VMA was monitored but was not a specification requirement. On three of the projects, Waterford - St. Johnsbury, Sunderland-Manchester, and Newbury - Waterford, VMA results were above the minimum criteria set forth by Asphalt Institute Manual Series 2 (MS-2) March, 1979.

On the Georgia - Swanton project, VMA values were lower than the minimum considered acceptable as set forth in the above stated manual. This project was paved with a 3/8" nominal maximum size aggregate. The average VMA was 15; the minimum criteria as set forth in the above stated manual is a VMA of 16.

The Percent of Voids Filled with Asphalt was one criteria required on three projects. This value did not provide the control that was expected. This criteria forced the contractor to hold the voids of the mix to $3 \pm 0.5\%$ which restricted the VMA. The Percent of Voids Filled with Asphalt is an indicator of mix qualities but should not be a specification criteria.

All of the mixes on the four projects has flow properties between 8 and 20 and stability properties in excess of 1000 pounds.

The Percent Air Voids requirement on all bituminous concrete mixes for the projects was 2.0 to 5.0. No problems were encountered maintaining this requirement on any of the projects. It is believed by most in the industry that 2 percent air voids is too low a value for a quality mix, in that it introduces a danger of flushing.

Conclusions

1. All Marshall Design Criteria are important properties that a quality bituminous concrete mix must have.
2. It is now believed Percent Voids Filled With Asphalt should not be used as a specification criteria.
3. VMA, % Voids in Mix, Stability and Flow should be used as specification criteria on all projects.
4. If the specification requires all mixes to meet a design criteria, the routine testing at the plant in the form of trial drops and job samples would be a realistic check of a design.

Recommendations

1. It is recommended that the submittal of a complete Marshall Design to the Agency by the contractor not be required on all projects but rather be required for each plant at the beginning of the season for all types of mixes.
2. It is recommended that the following Design Criteria should be adopted in the Specification and required on all projects:

DESIGN CRITERIA

Marshall Test Property, 50 Blows/Side	Criteria
Air Voids, Types II, III & IV	3.0 - 5.0%
VMA Type II	14% Minimum
III	15% Minimum
IV	16% Minimum
Stability Type II, III & IV	1000 Pounds Minimum
Flow Type II, III & IV	8 - 20 0.01 inches

Vermont Agency of Transportation
 Materials & Research Division
 Bituminous Concrete Sub-division

Sheet 1 of 2

Project No. GEORGIA-SWANTON IR 89-3(4)
 Source Pike-Swanton 801
 Proj. Code No. B201B
 Mix Design No. 19.75

Report on Bituminous Concrete Pavement

Item 406 Type IV Year (s) 1982

Job Aim

Lab No.	Date	I.D. No.	Qty. Rep.	Job Aim												% Slip AC	% Eff. AC	% VMA	% Air Voids	% Voids Filled	Unit Wt.	Flow	Stab.	Bulk Sp. Gr.	Max. Sp. Gr.	Rej. or Appr'd
				1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#200	Ext. AC	%											
D82 0269	9/10/82	GS-1D	-		100	99.8	67.8	49.6	36.0	24.0	12.3	3.0	6.83	6.36	5.18	14.1	2.0	85.9	149.6	16	1824	2.397	2.447	R		
D82 0270	9/11/82	GS-1T	400T			100	68.2	48.5	35.7	24.1	13.0	4.1	7.12	6.21	5.11	15.0	3.1	79.3	148.3	12	1730	2.377	2.453	A		
D82 0271	9/12/82	GS-2T	482T		100	98.7	68.3	47.1	34.2	23.5	12.5	3.2	6.93	6.29	5.05	15.2	3.5	77.0	148.1	12	1545	2.373	2.458	A		
D82 0263	9/14/82	GS-3T	500T			100	69.0	50.6	38.1	25.8	13.0	3.2	6.86	6.27	5.14	14.4	2.4	83.4	149.4	11	1493	2.394	2.453	A		
D82 0264	9/14/82	GS-4T	500T			100	67.8	46.6	33.7	23.2	13.2	3.6	6.98	6.23	5.03	14.3	2.5	82.5	149.6	11	1545	2.397	2.458	A		
D82 0265	9/14/82	GS-5T	616T			100	69.7	50.5	39.4	27.4	15.0	3.6	7.06	6.26	5.06	14.9	3.1	79.1	148.6	10	1441	2.381	2.457	A		
D82 0266	9/15/82	GS-6T	500T			100	67.9	50.2	39.3	27.6	14.3	3.7	7.00	6.22	5.20	14.6	2.5	82.9	148.9	10	1069	2.386	2.448	A		
D82 0267	9/15/82	GS-7T	500T			100	68.9	49.8	38.0	26.3	13.7	3.3	7.03	6.29	5.31	15.1	2.7	82.1	148.3	12	1203	2.377	2.443	A		
D82 0336	9/15/82	GS-8T	400T		100	99.2	62.5	40.8	32.7	21.4	11.6	3.3	7.26	6.29	5.21	13.0	0.6	95.3	151.8	12	1493	2.432	2.447	R		
D82 0339	9/15/82	GS-9T	824T			100	67.1	48.9	37.8	26.6	13.9	3.2	7.64	6.30	5.20	14.1	1.9	86.5	149.6	11	1338	2.398	2.445	R		
D82 0340	9/16/82	GS-2D	-			100	65.8	48.1	38.4	27.8	15.2	3.7	6.75	6.27	5.17	14.1	1.7	87.7	150.0	9	1079	2.404	2.446	R		
D82 0341	9/16/82	GS-3D	-			100	65.0	48.0	38.3	27.3	14.2	2.8	6.73	6.24	5.19	15.3	3.3	78.4	147.6	10	1183	2.366	2.446	A		
D82 0342	9/17/82	GS-10T	430T			100	66.0	47.7	37.9	26.6	13.2	2.5	7.05	6.26	5.05	15.1	3.1	79.5	148.3	11	1390	2.376	2.452	A		
D82 0334	9/19/82	GS-11T	500T			100	99.3	68.0	50.6	40.3	28.8	15.2	3.2	6.95	6.27	5.00	14.7	3.0	79.5	148.7	11	1690	2.383	2.456	A	
D82 0335	9/18/82	GS-12T	500T			100	99.0	68.6	50.6	39.8	28.1	15.2	3.6	6.82	6.27	5.16	14.5	2.5	82.8	148.6	11	1493	2.385	2.447	A	
D82 0336	9/18/82	GS-13T	492T			100	98.2	67.5	47.3	37.1	26.3	13.6	3.1	6.50	6.27	5.01	14.5	2.8	83.9	148.9	12	1545	2.387	2.456	A	
D82 0495	9/22/82	GS-1L	500T			100	99.0	64.6	46.2	34.8	23.0	11.2	2.7	6.84	6.28	5.03	15.2	3.6	76.4	147.6	8	1079	2.365	2.454	A	
D82 0496	9/22/82	GS-2L	650T			100	98.5	66.8	48.7	38.1	26.0	13.1	3.2	6.80	6.28	5.19	15.1	3.1	79.5	147.8	10	1286	2.369	2.445	A	
D82 0499	9/24/82	GS-14T	500T			100	98.9	65.5	48.2	38.3	26.9	14.0	3.1	7.00	6.27	5.04	15.1	3.4	77.5	147.3	11	1338	2.361	2.444	A	
D82 0496	9/24/82	GS-15T	500T			100	99.2	64.7	49.1	39.3	27.7	14.3	3.0	6.98	6.24	5.25	15.4	3.3	78.6	147.5	8	1255	2.364	2.444	A	
D82 0531	9/24/82	GS-16T	925T			100	99.1	66.1	48.3	37.5	26.9	14.5	3.2	6.87	6.29	5.05	14.8	3.1	79.1	148.4	9	1255	2.379	2.454	A	
D82 0532	9/28/82	GS-3L	500T			100	98.8	64.8	48.3	38.0	26.0	13.5	2.8	6.72	6.28	5.11	15.1	3.2	78.8	148.0	9	1125	2.372	2.450	A	
D82 0533	9/28/82	GS-4L	500T			100	99.2	67.2	49.3	38.4	26.4	13.5	2.7	6.76	6.38	5.06	15.0	3.3	78.1	148.1	10	1493	2.374	2.455	A	

Project No. CROSS-SWINTON IR 89-3(4)
Source Pike - SWINTON EOI
Proj. Code No. 82018
Mix Design No. 1975

Vermont Agency of Transportation
Materials & Research Division
Bituminous Concrete Sub-division

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Report on Bituminous Concrete Pavement

Item 406 Type IV Year (s) 1982

Job Aim

Lab No.	Date	I.D. No.	Qty. Rep.			100	95/100	60/74	44/52	32/40	21/39	10/18	2/5	60/68	%	Slip AC	% Eff. AC	VMA	% Air Voids	% Voids Filled	Unit Wt.	Flow	Stab.	Bulk Sp. Gr.	Max. Sp. Gr.	Rej. or Appr'vd		
				1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#200	Ext. AC														
DBZ 0534	9/29/82	GS-5L	500T			100	98.5	66.7	48.8	37.6	26.0	13.6	3.5	6.98	6.23	50.6	14.7	2.9	80.2	148.4	10	1390	2.379	2.451	A			
DBZ 0535	9/29/82	GS-GL	147T			100	98.8	67.4	49.5	38.9	27.3	14.0	2.5	7.14	6.28	51.7	14.8	2.8	81.1	148.3	11	1441	2.377	2.446	A			
AVG.						100	99.4	66.8	48.5	37.4	26.0	13.6	3.2	6.96	6.27	51.2	14.7	2.8	81.4	148.6	10.7	1389	2.382	2.450				
PROGRESS SAMPLES																												
DBZ 0294	9/19/82					100	98.7	67.9	48.3	36.3	25.4	14.6	3.7	6.76														A
DBZ 0442	9/24/82					100	98.3	67.1	49.7	38.3	26.1	13.0	2.1	6.53														
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Form TA179C 12/82

Vermont Agency of Transportation
Materials & Research Division
Bituminous Concrete Sub-division

Sheet 1 of 2

Project No. GEORGIA-SWANTON IR99-3(4)
Source PINE-SWANTON BC1
Proj.Code No. B201B
Mix Design No. 1763

Report on Bituminous Concrete Pavement

Item 406 Type IV Year (s) 1982

Job Aim

Lab No.	Date	I.D. No.	Qty. Rep.			100	95/100	63/44	44/52	32/40	21/29	10/16	15/45	60/65	% Ext. AC	% Slip AC	% Eff. AC	VMA	% Air Voids	% Voids Filled	Unit Wt.	Flow	Stab.	Bulk Sp. Gr	Max. Sp.Gr.	Rej. or Appr'vd
				1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#200	Ext. AC	Slip AC	Eff. AC	VMA	Air Voids	Voids Filled	Unit Wt.	Flow	Stab.	Bulk Sp. Gr	Max. Sp.Gr.	Rej. or Appr'vd	
D82 0536	7/30/82	GS-7L	500T			100	99.1	67.8	48.5	37.8	29.0	14.5	3.2	6.85	6.39	5.06	14.5	2.7	84.7	149.1	11	1400	2.390	2.457	A	
D82 0537	7/30/82	GS-8L	300T			100	98.8	65.8	47.5	36.8	26.4	14.8	3.6	6.93	6.40	5.03	14.0	2.9	80.2	148.9	13	1400	2.386	2.457	A	
D82 0538	7/1/82	GS-17T	500T			100	98.7	67.0	46.6	35.6	24.9	13.7	3.5	6.88	6.36	5.05	14.7	2.9	80.2	148.7	11	1400	2.383	2.455	A	
D82 0539	7/1/82	GS-18T	492T			100	65.2	47.6	36.7	25.9	13.8	3.4	6.97	6.36	5.01	14.4	2.7	81.3	149.1	12	1545	2.390	2.457	A		
D82 0595	7/6/82	GS-19T	500T			100	98.4	65.7	49.0	38.9	27.3	13.7	2.6	7.05	6.39	5.09	15.5	3.7	76.1	147.8	8	1255	2.308	2.458	A	
D82 0596	7/6/82	GS-20T	500T			100	99.3	65.6	48.8	38.3	26.6	13.7	3.2	6.99	6.39	5.12	14.4	2.4	83.6	149.6	10	1545	2.398	2.460	A	
D82 0597	7/6/82	GS-21T	500T			100	99.4	67.8	49.2	37.9	26.7	14.9	3.6	7.07	6.40	5.15	14.1	2.0	85.8	150.1	10	1390	2.406	2.455	R	
D82 0598	7/7/82	GS-22T	500T			100	98.3	67.0	49.6	39.4	27.7	14.3	2.5	6.99	6.37	4.98	15.2	3.6	76.2	148.3	12	1648	2.376	2.464	A	
D82 0599	7/7/82	GS-23T	300T			100	98.6	64.7	45.8	35.9	25.5	13.9	3.7	6.88	6.38	5.04	13.9	2.0	85.6	150.4	15	1725	2.411	2.461	R	
D82 0678	7/7/82	GS-24T	646T			100	98.0	63.9	48.6	40.2	38.7	14.0	2.5	7.11	6.29	5.10	15.5	3.7	76.1	147.5	10	1286	2.363	2.455	A	
D82 0679	7/8/82	GS-25T	600T			100	98.2	63.9	46.3	37.1	26.3	13.7	2.9	7.05	6.31	4.91	14.5	3.0	79.3	149.2	12	1400	2.391	2.464	A	
D82 0680	7/8/82	GS-26T	700T			100	97.6	63.4	46.4	36.5	25.4	13.5	3.1	6.84	6.25	4.87	14.1	2.7	80.9	148.8	13	1563	2.401	2.468	A	
D82 0681	7/9/82	GS-27T	675T			100	98.5	64.7	47.3	37.6	26.4	13.6	2.9	6.91	6.28	4.89	14.8	3.4	77.0	148.7	10	1542	2.383	2.468	A	
D82 0700	7/13/82	GS-28T	500T			100	98.4	62.3	44.2	33.9	23.8	12.5	3.1	7.11	6.30	4.96	14.4	2.8	80.6	149.5	12	1493	2.396	2.464	A	
D82 0701	7/13/82	GS-29T	500T			100	98.8	63.3	46.0	35.4	25.1	13.6	3.2	7.12	6.29	4.86	14.4	3.0	79.1	149.4	11	1338	2.395	2.470	A	
D82 0702	7/13/82	GS-30T	498T			100	99.2	65.4	48.6	36.6	25.0	13.3	2.9	6.92	6.32	4.96	15.0	3.5	76.7	148.4	9	1286	2.379	2.464	A	
D82 0703	7/14/82	GS-31T	500T			100	98.8	62.9	45.2	34.4	23.7	13.4	3.7	6.70	6.27	5.04	14.6	2.8	80.8	149.1	10	1400	2.390	2.458	A	
D82 0772	7/14/82	GS-32T	500T			100	99.0	66.8	49.1	36.9	24.5	12.8	3.1	6.88	6.30	5.08	15.4	3.6	76.5	147.6	9	1286	2.365	2.454	A	
D82 0773	7/14/82	GS-33T	923T			100	99.5	66.4	47.3	35.5	23.7	12.9	3.6	6.81	6.27	5.07	14.8	2.9	80.4	149.4	11	1493	2.395	2.466	A	
D82 0774	7/15/82	GS-34T	500T			100	99.1	67.4	47.7	36.2	23.6	12.0	2.6	6.85	6.28	4.92	14.9	3.5	76.6	148.3	8	1183	2.377	2.463	A	
D82 0775	7/15/82	GS-35T	500T			100	98.7	64.0	46.1	34.5	23.6	12.7	3.4	6.90	6.27	4.98	14.4	3.0	79.2	149.3	12	1400	2.393	2.468	A	
D82 0776	7/15/82	GS-36T	464T			100	99.2	67.4	48.9	37.0	24.6	12.6	3.3	6.85	6.27	5.08	15.1	3.3	78.1	148.1	10	1306	2.373	2.454	A	
D82 0848	7/19/82	GS-37T	500T			100	98.6	64.4	47.5	36.5	23.4	11.8	2.8	6.69	6.29	4.97	15.1	3.5	76.7	148.3	10	1286	2.376	2.463	A	

Project No. GEORGIA-SWANTON IR 89-344
Source PIKE-SWANTON 801
Proj. Code No. 92018
Mix Design No. 1763

Vermont Agency of Transportation
Materials & Research Division
Bituminous Concrete Sub-division

Report on Bituminous Concrete Pavement

Item 4026 Type II' Year (s) 1982

Job Afm

PROGRESS SAMPLES

D82 0527	7/18/82			100	97.6	66.9	47.2	35.8	25.1	13.5	3.0	0.76
D82 0576	7/6/82			100	98.7	67.2	46.8	34.8	24.1	13.6	3.6	0.62
D82 0585	7/9/82			100	98.5	68.0	47.6	36.8	25.7	14.0	2.9	0.92

Vermont Agency of Transportation
Materials & Research Division
Bituminous Concrete Sub-division

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Project No. CHICHA-SIMONIN ER59-3C4

Source PFL-SIMONIN 506

Proj.Code No. GRCONB

Mix Design No. 1954 8 1991

Report on Bituminous Concrete Pavement

Item 406 Type IV Year (s) 1982

Lab No.	Date	I.D. No.	Qty. Rep.	Job Aim #1954												% Slip AC	% Ext. AC	VMA	% Air Voids	% Voids Filled	Unit Wt.	Flow	Stab.	Bulk Sp. Gr	Max. Sp.Gr.	Rej. or Appd.
				1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#200	Ext. AC	% Slip AC	% Eff. AC	% Voids Filled									
D62-0103	7/24/82	GS-1D	-		100	98.6	65.7	47.7	37.2	25.4	12.6	2.4	6.36	6.35			4.1	74.0	147.1	10	1090	2.357	2.459	R		
D62-0104	7/25/82	GS-2D	-		100	98.3	67.3	46.9	32.5	24.7	12.4	2.1	6.94	6.59			2.7	82.0	148.5	10	1150	2.300	2.446	A		
D62-0105	7/27/82	GS-3D	-		100	98.7	67.1	48.1	37.0	24.3	11.2	1.6	6.91	6.50			4.7	74.0	146.0	5	750	2.340	2.455	R		
D62-0106	7/26/82	GS-4D	-		100	99.3	68.3	45.7	36.7	23.9	10.2	1.4	6.75	6.50			5.4		144.0	4	740	2.308	2.452	R		
D62-0107	7/24/82	GS-5D	-		100	99.0	67.0	48.7	36.7	24.0	11.3	1.9	6.93	6.60			3.7	77.0	146.6	8	1070	2.350	2.441	A		
D62-0108	7/27/82	GS-6D	-		100	98.6	67.7	48.0	35.0	23.1	11.3	2.0	6.95	6.59			3.5	79.4	147.2	10	1110	2.357	2.445	R		
D62-0109	7/28/82	GS-7D	-		100	99.1	66.1	48.0	37.5	26.0	12.4	2.8	6.90	6.44			3.5	79.0	147.8	10	1070	2.368	2.455	A		
D62-0099	7/11/82	GS-1L	150T		100	98.9	65.5	48.5	35.9	23.6	11.8	2.4	6.97	6.51	5.23	14.9	2.7	81.9	149.1	13	1120	2.359	2.450	A		
D62-0100	7/11/82	GS-2L	161T		100	99.2	70.2	51.0	38.3	25.2	12.5	2.5	6.86	6.39	5.19	15.7	3.7	76.4	147.3	9	1130	2.361	2.452	A		
Ave.					100	98.9	67.5	48.5	36.6	24.5	11.8	2.1	6.82	6.50			15.3	3.8			147.1	8.8	1018	2.357	2.450	

Project No. GEOGRAPHIC SWATHES IRE59-3(4)
Source PIKE-SWATHES EOG
Proj. Code No. E201A
Mix Design No. 1947

Vermont Agency of Transportation
Materials & Research Division
Bituminous Concrete Sub-division

Sheet 1 of 1

Report on Bituminous Concrete Pavement

Item 406 Type IV Year (s) 1982

Job Aim

Project No. Georgia-Savannah I-857-X4
Source Pike-Savannah - SUG
Proj. Code No. FEB01B
Mix Design No. 17-55

Vermont Agency of Transportation
Materials & Research Division
Bituminous Concrete Sub-division

Report on Bituminous Concrete Pavement

Item 406 Type III Year (s) 1982

Sheet 1 of 1

Job Aim

Newbury - Waterford

Project No. I 91-2 (65) St. III

Source P.K. - Waterford (706)

Proj. Code No. 82020

Mix Design No. 1769

Vermont Agency of Transportation
Materials & Research Division
Bituminous Concrete Sub-division

Report on Bituminous Concrete Pavement

Sheet 1 of 3

Item 406 Type III Year (s) 82

Job Aim

Lab No.	Date	I.D. No.	Qty. Rep.		100 100	95 100	78 90	54 66	44 52	32 41	19 27	7 15	2.3 5.0	6.0 6.7	% Ext. AC	% Stip AC	% Eff. AC	% VMA	% Air Voids	% Voids Filled	Unit Wt.	Flow	Stab.	Bulk Sp. Gr.	Max. Sp. Gr.	Rej. or Appr'd
				1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#200													
D82 0115	5-27	NW-1L	—		100.0	98.6	81.2	54.7	42.7	33.9	21.6	11.5	2.7	6.44	6.31	5.43	16.77	3.6	78.5	154.8	9	2141	2.481	2.574	R	
D82 0101	5-27	NW-2L			100.0	96.9	80.5	61.0	48.3	37.5	24.5	14.3	3.7	6.33	6.29	5.20	16.54	3.6	77.0	156.4	9	2590	2.506	2.606	A	
D82 0102	5-28	NW-3L	—		100.0	99.1	85.4	61.1	50.2	37.0	24.4	12.9	2.8	6.73	6.30	5.48	17.97	4.8	73.3	153.4	8	1706	2.458	2.573	A	
D82 0170	6-3	NW-1L	100TON		100.0	99.0	83.6	53.6	42.0	33.7	29.8	10.5	2.4	6.89	6.49	5.48	15.07	1.4	90.7	158.6	7	1929	2.542	2.577	R	
D82 0171	6-3	NW-2L	250TON		100.0	98.3	84.1	67.0	57.0	45.4	28.3	14.7	3.9	6.83	6.38	5.86	18.44	4.5	75.8	151.9	12	1596	2.435	2.549	R	
D82 0172	6-3	NW-3L	400TON		100.0	98.5	81.5	56.2	47.2	38.4	23.7	11.5	2.3	7.73	6.50	5.85	18.28	4.3	76.5	152.5	8	1653	2.444	2.553	A	
D82 0173	6-3	NW-4L	400TON		100.0	99.5	82.7	62.8	50.7	40.3	25.6	13.4	4.1	6.83	6.51	5.91	16.77	2.0	85.1	155.9	9	2092	2.499	2.550	A	
D82 0174	6-4	NW-5L	400TON		100.0	97.1	83.3	61.6	50.3	40.4	24.8	12.2	3.0	6.83	6.50	5.68	18.18	4.6	75.0	152.6	8	1600	2.445	2.564	A	
D82 0175	6-4	NW-6L	500TON		100.0	97.9	83.7	60.1	48.1	37.5	22.4	11.3	3.0	7.10	6.50	5.60	16.91	3.3	80.4	155.1	9	1960	2.485	2.570	A	
D82 0176	6-4	NW-7L	500TON		100.0	97.4	82.7	59.0	47.4	36.8	22.0	11.1	3.0	6.52	6.50	5.75	17.29	3.4	80.3	154.3	11	1934	2.472	2.560	A	
D82 0177	6-5	NW-8L	500TON		100.0	97.5	83.3	64.9	49.3	38.0	22.8	11.5	3.1	6.84	6.50	5.47	16.64	3.3	80.2	155.6	8	1776	2.494	2.578	A	
D82 0178	6-5	NW-9L	500TON		100.0	97.6	83.8	59.9	47.2	37.4	22.8	11.3	3.4	6.79	6.50	5.69	17.23	3.5	79.9	154.4	9	1960	2.474	2.563	A	
D82 0194	6-7	NW-10L	500TON		100.0	97.9	83.2	59.8	48.9	38.2	25.1	14.1	3.2	6.75	6.46	5.22	16.44	3.7	77.5	155.8	8	1985	2.497	2.593	A	
D82 0195	6-7	NW-11L	500TON		100.0	98.3	83.8	59.1	42.6	38.4	23.3	12.8	2.9	6.73	6.50	5.31	16.54	3.6	78.3	155.7	11	2024	2.495	2.588	A	
D82 0353	6-15	NW-12L	500TON		100.0	98.3	80.0	57.6	47.4	37.9	24.1	12.9	3.1	6.73	6.41	5.71	17.20	3.4	80.2	154.3	22	1368	2.473	2.560	A	
D82 0354	6-15	NW-13L	500TON		100.0	96.6	79.6	57.3	47.1	37.6	24.0	12.6	2.8	6.60	6.40	5.52	16.54	3.1	81.3	155.4	9	1083	2.491	2.572	A	
D82 0357	6-15	NW-14L	370TON		100.0	97.7	79.4	59.1	47.3	37.4	24.2	12.9	3.2	6.66	6.38	5.62	16.31	2.6	84.1	155.8	8	1994	2.496	2.563	A	
D82 0346	6-16	NW-15L	200TON		100.0	98.5	83.8	55.9	47.0	37.7	24.1	11.9	2.5	6.54	6.40	5.50	18.14	5.0	72.4	152.5	8	1376	2.444	2.573	R	
D82 0347	6-18	NW-16L	400TON		100.0	100.0	82.0	58.2	47.1	35.1	22.4	12.5	3.2	6.59	6.39	5.78	16.74	2.7	83.9	155.1	11	1835	2.485	2.555	A	
D82 0348	6-18	NW-17L	113TON		100.0	99.6	81.3	60.8	48.3	36.0	22.6	12.1	3.3	6.64	6.40	5.84	17.30	3.2	81.5	154.1	13	1319	2.470	2.552	A	
D82 0349	6-19	NW-18L	762TON		100.0	98.4	78.7	58.7	46.3	33.8	21.4	12.1	3.2	6.64	6.40	5.62	17.01	3.4	80.0	154.6	13	1824	2.477	2.565	A	
D82 0414	6-21	NW-19L	108TON		100.0	95.0	79.2	57.6	47.0	36.9	23.3	11.9	2.7	6.64	6.40	5.81	17.48	3.5	80.0	153.6	11	1384	2.461	2.550	A	
D82 0415	6-22	NW-20L	108TON		100.0	96.2	81.0	57.6	46.8	36.8	23.7	12.3	2.8	6.64	6.40	5.55	17.99	4.7	73.9	152.8	8	1380	2.449	2.570	R	

Newbury - Waterford
Project No. I 91-2(65) 5/3
Source Pike - Waterford (706)
Proj. Code No. 82020
Mix Design No. 1793

Vermont Agency of Transportation
Materials & Research Division
Bituminous Concrete Sub-division

Report on Bituminous Concrete Pavement

Item 406 Type III Year (s) 82

Job Aim

Lab No.	Date	I.D. No.	Qty. Rep.		100 100	95 100	78 90	54 66	44 52	32 41	19 27	7 15	2.0 5.0	6.0 6.8	%	% Slip AC	% Eff. AC	VMA	% Air Voids	% Voids Filled	Unit Wt.	Flow	Stab.	Bulk Sp. Gr.	Max. Sp.Gr.	Ref. or Appr'd
				1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#200	Ext. AC												
D82 0436	6-24	NW-21L	400TON	100.0	97.1	80.5	58.1	47.0	37.1	25.9	14.5	2.9	6.70	6.40	5.66	17.78	4.2	76.4	153.1	13	1828	2.454	2.562	A		
D82 0437	6-25	NW-22L	402TON	100.0	96.9	80.3	59.4	48.1	37.0	25.3	14.2	3.2	6.74	6.40	5.74	16.49	2.5	84.8	155.6	11	2600	2.493	2.558	A		
D82 0668	7-8	NW-23L	500TON	100.0	98.8	80.3	58.6	45.8	34.4	22.3	12.4	3.0	6.79	6.40	6.06	17.22	2.5	85.5	155.6	9	1999	2.485	2.537	A		
D82 0669	7-8	NW-24L	500TON	100.0	98.4	82.0	59.2	46.6	34.9	22.9	13.1	3.3	6.79	6.41	5.63	16.78	3.1	81.5	155.1	14	1464	2.485	2.565	A		
D82 0670	7-9	NW-25L	500TON	100.0	98.6	82.7	59.6	45.9	34.1	22.3	12.6	3.2	6.79	6.40	5.70	16.67	2.8	83.2	155.4	12	2048	2.490	2.561	A		
D82 0671	7-9	NW-26L	500TON	100.0	98.6	81.1	59.0	45.6	33.8	22.1	12.7	3.2	6.83	6.40	5.71	17.82	4.1	76.9	153.4	11	1862	2.458	2.560	A		
D82 0672	7-10	NW-27L	500TON	100.0	97.7	81.0	56.9	44.9	33.5	21.9	12.6	3.0	6.57	6.40	5.58	16.55	3.6	84.3	156.0	13	2040	2.500	2.568	A		
D82 0673	7-10	NW-28L	256TON	100.0	98.0	81.4	57.1	45.6	33.7	21.7	12.2	3.2	6.74	6.41	6.05	17.39	2.8	83.9	153.9	12	1823	2.467	2.538	A		
D82 0712	7-13	NW-29L	300TON	100.0	98.8	82.4	59.7	46.9	34.5	22.2	12.5	2.9	6.89	6.38	5.88	16.02	1.6	90.0	156.5	10	2217	2.508	2.540	R		
D82 0713	7-14	NW-30L	642TON	100.0	98.3	82.2	58.4	46.3	34.3	21.9	12.0	2.7	7.06	6.41	5.70	16.57	2.7	83.7	155.4	12	2065	2.490	2.560	A		
D82 0714	7-15	NW-31L	204TON	100.0	99.3	79.7	56.0	45.2	34.0	21.5	11.5	2.6	6.32	6.40	5.79	16.60	2.5	84.9	155.5	11	2055	2.492	2.555	A		
D82 0800	7-16	NW-32L	500TON	100.0	99.0	80.5	58.5	46.2	34.3	22.0	12.0	2.9	6.78	6.40	5.52	16.55	3.1	81.26	155.6	10	1718	2.493	2.572	A		
D82 0801	7-16	NW-33L	166TON	100.0	97.2	78.7	54.6	43.5	33.2	22.0	12.6	3.2	6.80	6.40	5.66	16.17	2.0	87.62	156.7	10	1976	2.512	2.563	R		
D82 0827	7-19	NW-34L	500TON	100.0	99.0	80.4	56.1	44.6	33.4	21.9	12.2	2.9	6.78	6.41	5.54	15.83	2.2	86.0	156.9	9	2558	2.514	2.571	R		
D82 0828	7-19	NW-35L	500TON	100.0	98.6	83.7	57.2	45.4	33.9	21.3	11.3	2.6	6.85	6.40	5.57	16.64	3.2	81.1	155.2	12	1882	2.487	2.568	A		
D82 0829	7-19	NW-36L	500TON	100.0	99.5	82.5	57.0	44.3	33.5	21.4	11.8	3.0	6.42	6.40	5.26	16.25	3.4	79.1	156.0	13	2262	2.500	2.588	A		
D82 0830	7-20	NW-37L	500TON	100.0	98.6	81.5	58.2	45.9	34.9	22.7	12.8	3.4	7.03	6.40	5.40	16.16	2.9	81.7	156.2	10	2509	2.503	2.579	A		
D82 0831	7-20	NW-38L	500TON	100.0	99.7	82.6	57.7	46.1	35.4	22.1	11.9	3.0	6.59	6.40	5.24	16.75	4.0	76.0	155.1	11	2248	2.486	2.590	A		
D82 0805	7-21	NW-39L	500TON	100.0	99.7	81.3	55.5	43.8	33.7	22.6	13.0	2.7	6.66	6.41	5.36	15.91	2.7	82.7	156.7	10	2506	2.511	2.582	A		
D82 0806	7-21	NW-40L	500TON	100.0	99.1	82.2	55.6	43.6	33.4	22.3	12.6	2.8	6.83	6.40	5.33	15.70	2.6	83.5	157.1	9	2420	2.517	2.584	A		
D82 0807	7-21	NW-41L	500TON	100.0	98.9	83.7	58.5	46.0	36.0	23.8	13.8	4.7	7.04	6.40	5.61	15.82	2.1	87.0	156.7	15	2535	2.511	2.564	R		

Project No. I 91 - 2 (65) 5/3
 Source P.K. - Waterford (706)
 Proj. Code No. B2020
 Mix Design No. 1793

Vermont Agency of Transportation
 Materials & Research Division
 Bituminous Concrete Sub-division

Report on Bituminous Concrete Pavement

Sheet 3 of 3
 Item 406 Type JIP Year (s) 82

Lab No.	Date	I.D. No.	Qty. Rep.	Job Aim																% Slip AC	% Eff. AC	VMA	% Air Voids Filled	Unit Wt.	Flow	Stab.	Bulk Sp. Gr.	Max. Sp. Gr.	Rej. or Appr'vd
				1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#200	Ext. AC	AC	AC	AC	AC	AC										
D82 0808	7-22	NW 42L	500TON	100.0	100.0	87.2	59.6	47.3	36.5	24.2	13.6	3.2	6.57	6.41	5.39	16.64	3.5	78.8	155.3	12	1960	2.489	2.580	A					
D82 0809	7-22	NW 43L	500TON	100.0	99.4	86.5	59.4	46.9	36.1	23.8	13.3	3.0	6.67	6.40	5.45	16.54	3.3	80.3	155.5	11	2091	2.492	2.576	A					
D82 0852	7-23	NW 4T	500TON	100.0	98.8	82.3	57.7	46.5	37.1	25.1	13.5	3.6	6.65	6.39	5.95	15.96	1.4	91.4	156.5	9	2600	2.508	2.543	R					
D82 0853	7-23	NW 5T	500TON	100.0	98.5	84.7	61.2	48.6	36.9	25.4	14.7	3.4	6.82	6.36	5.42	16.53	3.3	79.8	155.3	11	2111	2.489	2.575	A					
D82 0888	7-26	NW 6T	500TON	100.0	98.9	84.2	60.1	48.4	37.7	24.3	13.7	3.3	6.87	6.40	5.54	16.80	3.3	80.1	155.0	11	2039	2.484	2.570	A					
- AVG. OF DESIGN #1793 -				100.0	98.7	82.1	58.1	46.0	34.9	22.9	12.8	3.1	6.75	6.40	5.61	16.55	2.9	82.8	155.6	11	2131	2.493	2.566	-					
<hr/>																													
B:3																													
DESIGN #	1769			100/100	95/100	78/90	54/66	44/52	33/41	19/27	7/15	20/50	60/67																
D82 0350	6-10	NW 1T	118TON	100.0	96.3	78.5	56.9	46.7	37.1	23.3	11.8	2.8	6.69	6.50	5.71	17.04	3.2	81.2	154.7	14	2200	2.479	2.562	A					
D82 0351	6-10	NW 2T	400TON	100.0	96.9	81.8	59.1	48.5	37.8	23.8	12.5	3.2	6.75	6.41	5.99	18.37	3.9	72.8	154.2	8	1703	2.471	2.571	A					
D82 0352	6-11	NW 3T	172TON	100.0	98.0	80.8	59.6	48.6	37.2	22.3	11.3	2.7	6.82	6.40	5.63	16.17	2.4	85.2	156.1	13	1960	2.502	2.564	A					
- AVG. OF DESIGN #1769 -	-			100.0	98.1	82.4	59.1	47.8	37.4	23.7	12.3	3.0	6.74	6.43	5.62	17.13	3.5	79.7	154.6	10	1784	2.478	2.568	-					
<hr/>																													
D82 0209	6-9	PR	-	100.0	84.3	64.2	50.8	59.5	27.4	17.3	4.8	6.32	-														R		
D82 0284	6-15	PR	-	100.0	82.3	58.7	47.5	37.7	23.7	12.2	2.8	6.55	-														A		
D82 0407	6-22	PR	-	100.0	88.0	65.9	52.7	40.5	26.6	15.2	3.8	6.32	-														R		
D82 0575	7-6	PR	-	100.0	99.0	85.3	63.6	47.8	36.8	24.2	13.3	2.9	6.31	-													A		
D82 0872	7-19	PR	-	100.0	98.7	82.0	55.9	42.7	32.2	21.0	18.8	3.2	6.43	-													R		
D82 0803	7-21	PR	-	100.0	99.0	82.9	57.3	43.9	33.3	21.5	12.2	3.1	6.57	-													A		
D82 0832	7-23	PR	-	100.0	99.5	86.2	61.4	47.4	37.2	25.6	15.0	4.0	6.57	-													A		

Vermont Agency of Transportation
Materials & Research Division
Bituminous Concrete Sub-division

Sheet 1 of 4

Newbury-Waterford
Project No. I 91 - 2 (65) S/3
Source P.KC - Waterford 803
Proj. Code No. 82020
Mix Design No. 1949

Report on Bituminous Concrete Pavement

Item 406 Type III Year (s) 82

Lab No.	Date	I.D. No.	Qty. Rep.	Job Aim															% Slip AC	% Eff. AC	VMA	% Air Voids	% Voids Filled	Unit Wt.	Flow	Stab.	Bulk Sp. Gr	Max. Sp. Gr.	Rej. or Appd.
				1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#200	Ext. AC	%	100	95	78	54	44	33	19	7	20	15	10	6		
D82 0095	5-28	NW-1D	-	100.0	99.5	86.8	61.3	44.0	31.8	19.1	9.6	2.5		6.42	5.09	14.58	4.4	70.3	155.2	10	1710	2.487	2.600	R					
D82 0096	5-28	NW-2D	-	100.0	100.0	84.2	61.8	46.3	34.4	22.0	11.2	2.7		6.42	5.11	16.9	4.5	73.4	154.9	8	1450	2.482	2.599	R					
D82 0125	6-1	NW-3D	-	100.0	98.8	87.3	60.6	47.6	36.5	22.2	10.5	3.0	6.64	6.61	5.54	17.13	3.7	78.4	154.7	10	1739	2.480	2.575	A					
D82 0765	7-15	NW-1L	1000TON	100.0	99.0	85.2	54.8	43.7	33.7	21.7	10.6	3.0	6.35	6.37	5.44	16.55	3.3	80.1	155.4	11	1213	2.491	2.576	A					
D82 0766	7-15	NW-2L	1068TON	100.0	98.3	82.7	59.4	45.2	34.3	22.1	11.1	3.3	6.34	6.37	5.35	16.10	3.0	81.4	156.3	13	1440	2.505	2.582	A					
D82 0767	7-15	NW-3L	800TON	100.0	99.4	80.6	58.3	46.2	35.4	22.5	10.6	3.2	6.52	6.37	5.39	16.10	2.9	81.9	156.2	14	1410	2.504	2.579	A					
D82 0224	6-8	NW-1T	500TON	100.0	99.6	85.9	62.5	46.0	35.1	23.4	12.3	3.5	6.34	6.51	5.34	16.35	3.3	79.8	156.0	9	1317	2.500	2.586	A					
D82 0225	6-8	NW-2T	700TON	100.0	100.0	89.5	63.7	49.8	38.5	25.8	14.7	4.2	6.59	6.50	5.55	16.19	2.6	83.9	156.3	11	1622	2.505	2.573	A					
D82 0226	6-8	NW-3T	500TON	100.0	99.3	85.8	60.3	46.6	35.8	24.1	13.3	3.6	6.32	6.50	5.28	15.86	2.9	81.7	156.7	9	1440	2.511	2.587	A					
D82 0272	6-9	NW-4T	500TON	100.0	99.0	78.8	61.4	47.9	36.4	24.5	13.7	3.5	6.30	6.46	5.22	16.35	3.6	77.9	155.4	12	1544	2.499	2.592	A					
D82 0273	6-9	NW-5T	500TON	100.0	99.2	81.3	61.6	48.9	38.0	25.9	14.5	2.5	6.54	6.51	5.50	15.96	2.6	84.6	156.8	15	1725	2.513	2.576	A					
D82 0274	6-9	NW-6T	500TON	100.0	99.0	79.5	59.2	45.8	35.4	24.0	13.2	3.4	6.53	6.47	5.27	15.86	2.9	81.7	157.0	16	1872	2.516	2.591	A					
D82 0275	6-9	NW-7T	496TON	100.0	99.2	80.5	60.1	46.5	35.7	23.7	12.8	3.1	6.54	6.53	5.19	15.78	3.0	81.0	157.2	14	1712	2.519	2.597	A					
D82 0276	6-10	NW-8T	500TON	100.0	99.1	80.0	57.4	44.7	34.0	22.9	13.0	3.6	6.44	6.50	5.30	15.48	2.4	84.5	157.6	11	2128	2.525	2.588	A					
D82 0277	6-10	NW-9T	500TON	100.0	98.6	81.6	59.7	45.6	35.4	23.7	13.7	3.6	6.51	6.50	5.56	15.73	2.0	87.3	157.6	15	2042	2.526	2.578	R					
D82 0278	6-10	NW-10T	700TON	100.0	98.9	81.7	61.9	47.4	36.9	24.7	13.1	3.5	6.27	6.38	5.47	15.83	2.4	84.8	156.7	11	1867	2.512	2.574	A					
D82 0279	6-10	NW-11T	1000TON	100.0	99.3	84.0	63.2	48.0	36.8	24.1	12.6	3.4	6.52	6.39	5.29	16.22	3.3	79.7	155.4	9	1799	2.499	2.585	A					
D82 0280	6-11	NW-12T	500TON	100.0	98.3	82.5	60.0	45.8	34.8	23.3	12.8	3.3	6.43	6.40	5.16	16.23	3.6	77.8	156.2	13	1473	2.503	2.595	A					
D82 0281	6-11	NW-13T	1000TON	100.0	98.9	82.7	59.4	45.8	34.9	23.3	13.0	3.6	6.36	6.37	5.10	15.91	3.4	78.6	156.6	15	1783	2.510	2.598	A					
D82 0365	6-18	NW-14T	500TON	100.0	99.0	83.4	61.0	49.1	37.4	25.4	14.9	4.8	6.55	6.45	5.60	15.95	2.2	86.2	156.7	14	1670	2.512	2.568	R					
D82 0366	6-18	NW-15T	1000TON	100.0	98.7	83.4	63.1	49.6	37.1	24.8	14.4	4.6	6.37	6.38	5.23	15.62	2.7	82.5	157.2	12	1632	2.519	2.590	A					
D82 0367	6-18	NW-16T	760TON	100.0	98.1	76.8	56.8	45.0	34.0	23.2	13.9	4.9	6.23	6.40	5.15	14.52	1.7	88.3	158.9	18	1867	2.547	2.590	R					
D82 0368	6-19	NW-17T	500TON	100.0	98.8	78.8	57.3	44.8	34.3	22.3	11.7	3.1	6.21	6.38	5.42	16.86	3.7	78.1	154.9	11	1199	2.483	2.578	A					

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Vermont Agency of Transportation
 Materials & Research Division
 Bituminous Concrete Sub-division

Report on Bituminous Concrete Pavement

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Lab No.	Date	I.D. No.	Qty. Rep.	Job Aim												% Stip AC	% Eff. AC	VMA	% Air Voids Filled	Unit Wt.	Flow	Stab.	Bulk Sp. Gr.	Max. Sp. Gr.	Rej. or Appd.
				1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#200	Ext. AC											
D82 0369	6-19	NW-18T	500TON	100.0	99.7	84.9	63.3	49.3	37.5	24.7	13.5	3.9	6.09	6.36	5.52	16.89	3.5	79.3	154.8	9	1289	2.481	2.571	A	
D82 0370	6-19	NW-19T	1000TON	100.0	98.9	85.1	64.2	50.4	38.5	25.3	13.9	4.1	6.59	6.38	5.39	16.25	3.1	80.9	156.0	11	1643	2.500	2.580	A	
D82 0371	6-19	NW-20T	1000TON	100.0	99.1	83.8	62.6	48.8	37.4	24.4	13.5	3.8	6.45	6.39	5.36	16.56	3.5	78.9	155.5	11	1650	2.492	2.582	A	
D82 0410	6-22	NW-21T	500TON	100.0	99.4	82.9	62.6	50.5	39.6	26.5	14.2	3.8	6.44	6.40	5.48	17.58	4.4	75.0	153.5	B	1116	2.460	2.574	A	
D82 0411	6-22	NW-22T	500TON	100.0	99.1	85.8	64.4	52.1	40.7	27.0	14.5	3.8	6.38	6.32	5.38	17.58	4.7	73.5	153.4	11	1263	2.459	2.579	R	
D82 0412	6-22	NW-23T	1100TON	100.0	99.1	79.6	59.3	46.1	35.7	22.8	11.4	2.8	6.36	6.39	5.78	17.18	3.2	81.3	154.3	11	1300	2.473	2.555	A	
D82 0413	6-22	NW-24T	1000TON	100.0	99.1	85.7	58.2	45.0	35.3	22.6	11.0	2.8	6.25	6.41	5.54	17.39	4.0	76.7	153.8	10	1092	2.464	2.563	A	
D82 0604	7-6	NW-25T	500TON	100.0	99.6	82.8	60.6	46.8	36.6	23.6	11.3	2.2	6.36	6.39	5.32	17.63	4.8	72.5	153.4	15	1181	2.459	2.584	R	
D82 0605	7-6	NW-26T	500TON	100.0	99.3	83.5	59.5	46.7	36.3	23.9	12.2	3.3	6.35	6.38	5.47	16.54	3.2	80.5	155.4	12	1454	2.491	2.574	A	
D82 0606	7-6	NW-27T	750TON	100.0	99.7	84.3	61.2	45.8	35.0	23.0	11.3	2.7	6.35	6.38	5.78	17.48	3.6	79.6	153.7	14	1150	2.463	2.554	A	
D82 0607	7-6	NW-28T	754TON	100.0	99.6	83.6	59.6	46.6	36.1	23.6	12.0	3.2	6.39	6.38	5.55	16.82	3.4	80.0	154.9	14	1313	2.483	2.569	A	
D82 0608	7-7	NW-29T	500TON	100.0	98.7	83.5	59.0	45.6	35.4	23.2	11.6	3.2	6.31	6.38	5.53	17.00	3.6	78.8	154.6	13	1376	2.478	2.570	A	
D82 0609	7-7	NW-30T	500TON	100.0	99.0	82.0	58.5	46.9	36.5	23.9	12.0	3.2	6.32	6.39	5.33	17.08	4.2	75.5	154.4	12	1424	2.475	2.583	A	
D82 0610	7-7	NW-31T	800TON	100.0	99.2	81.3	60.3	46.4	36.2	23.8	12.1	3.3	6.51	6.43	5.77	16.69	3.4	79.7	155.3	12	1326	2.487	2.576	A	
D82 0611	7-7	NW32T	800TON	100.0	99.6	87.0	60.9	48.4	37.8	24.6	12.6	3.6	6.50	6.40	5.66	17.00	2.5	85.0	155.9	15	1558	2.498	2.563	A	
D82 0612	7-7	NW33T	912TON	100.0	99.0	81.2	57.2	45.7	35.9	23.6	11.8	2.9	6.29	6.38	5.57	17.17	3.7	78.5	154.4	12	1311	2.474	2.568	A	
D82 0613	7-8	NW34T	500TON	100.0	99.2	82.0	57.9	46.4	36.7	23.9	12.8	3.8	6.32	6.39	5.49	16.22	2.8	82.7	156.1	17	1535	2.501	2.573	A	
D82 0614	7-8	NW35T	500TON	100.0	98.4	81.5	59.3	47.9	37.8	24.6	12.3	2.8	6.30	6.36	5.44	17.24	4.0	76.7	154.0	12	1163	2.468	2.572	A	
D82 0615	7-8	NW36T	1200TON	100.0	98.7	83.4	61.3	47.1	36.4	24.5	12.9	3.2	6.42	6.36	5.50	16.65	3.3	80.4	155.3	14	1397	2.488	2.573	A	
D82 0616	7-8	NW37T	1300TON	100.0	98.2	82.8	59.7	44.9	35.6	23.4	11.9	3.3	6.35	6.36	5.37	16.40	3.3	79.9	155.8	11	1439	2.496	2.580	A	
D82 0636	7-9	NW38T	500TON	100.0	99.6	83.0	61.2	48.5	37.7	24.4	12.5	3.2	6.51	6.36	5.42	17.45	4.4	74.8	153.7	10	1287	2.463	2.577	R	
D82 0637	7-9	NW39T	800TON	100.0	97.3	63.8	63.1	48.5	37.5	24.6	12.9	3.5	6.37	6.37	5.59	16.63	3.0	81.8	155.3	14	1577	2.488	2.566	A	
D82 0638	7-9	NW40T	1000TON	100.0	99.5	83.6	64.9	50.1	37.9	24.3	12.9	3.6	6.42	6.36	5.65	16.93	3.2	80.9	154.7	11	1350	2.479	2.562	A	

Newbury - Waterford

Project No. I 91-2(65) 5/3
 Source Pike-Waterford 803
 Proj. Code No. 82020
 Mix Design No. 1949

Vermont Agency of Transportation
 Materials & Research Division
 Bituminous Concrete Sub-division

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Report on Bituminous Concrete Pavement

Item 406 Type III Year (s) 82

Job Aim

Lab No.	Date	I.D. No.	Qty. Rep.	Job Aim												% Stab.	Bulk Sp. Gr.	Max. Sp.Gr.	Rej. or Appd.				
				1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#200	Ext. AC	% S11p AC	% Eff. AC	VMA	% Air Voids Filled	Unit Wt.	Flow			
D82 0639	7-9	NW-41T	1118 TON	100.0	98.8	82.1	60.0	49.8	37.8	25.0	12.9	3.5	6.43	6.37	5.58	17.01	3.5	79.4	154.5	12	1456	2.476	2.567 A
D82 0640	7-10	NW-42T	500 TON	100.0	98.4	80.2	57.7	46.8	36.6	24.4	12.9	3.4	6.23	6.41	5.65	16.87	3.2	81.3	154.9	12	1352	2.482	2.563 A
D82 0641	7-10	NW-43T	1000 TON	100.0	98.9	79.9	59.9	49.2	38.4	25.2	13.0	3.2	6.20	6.36	5.44	17.28	4.2	76.0	154.1	14	1330	2.469	2.576 A
D82 0642	7-10	NW-44T	1345 TON	100.0	98.6	82.8	60.1	48.6	37.5	24.6	12.1	3.1	6.35	6.37	5.50	17.09	3.8	77.9	154.4	15	1287	2.475	2.572 A
D82 0820	7-19	NW-45T	500 TON	100.0	99.7	84.6	58.2	45.7	36.0	23.2	11.1	2.9	6.52	6.42	5.42	16.39	3.2	80.5	155.3	10	1550	2.489	2.571 A
D82 0821	7-19	NW-46T	500 TON	100.0	99.7	87.0	59.5	46.5	36.5	23.5	11.6	3.2	6.35	6.41	5.57	16.60	3.0	81.7	155.4	14	1696	2.490	2.568 A
D82 0822	7-19	NW-47T	1000 TON	100.0	98.9	82.9	63.7	51.6	40.9	25.7	12.1	3.1	6.33	6.40	5.45	17.74	4.7	73.7	153.2	10	1287	2.450	2.576 R
D82 0823	7-19	NW-48T	900 TON	100.0	99.2	83.3	57.8	44.3	33.5	21.0	10.1	2.8	6.34	6.41	5.51	16.13	2.6	83.6	156.2	14	1621	2.504	2.572 A
D82 0824	7-20	NW-49T	500 TON	100.0	99.0	85.3	58.5	45.2	35.2	23.3	12.3	3.4	6.64	6.44	5.49	15.97	2.5	84.3	156.6	18	1729	2.510	2.574 A
D82 0825	7-20	NW-50T	500 TON	100.0	98.8	83.7	59.9	47.0	36.6	23.9	11.6	2.3	6.29	6.42	5.38	17.59	4.7	73.6	153.6	8	1227	2.461	2.581 R
D82 0826	7-20	NW-51T	140 TON	100.0	97.1	82.3	58.5	45.2	35.4	23.2	11.6	2.7	6.53	6.40	5.50	16.76	3.4	79.7	155.1	13	1421	2.485	2.572 A
D82 0815	7-21	NW-52T	500 TON	100.0	98.4	79.6	55.8	44.1	34.4	22.8	11.9	3.3	6.34	6.41	5.50	16.25	2.8	82.8	156.1	15	1755	2.502	2.573 A
D82 0816	7-21	NW-53T	700 TON	100.0	99.2	83.9	59.8	46.3	35.5	23.0	12.0	3.1	6.48	6.43	5.37	16.23	3.1	80.9	156.1	10	1600	2.502	2.582 A
D82 0817	7-21	NW-54T	1000 TON	100.0	98.3	80.9	58.4	46.0	35.5	23.1	11.7	2.8	6.36	6.41	5.46	17.19	4.0	76.7	154.3	10	1421	2.472	2.576 A
D82 0818	7-21	NW-55T	1000 TON	100.0	99.0	83.4	60.2	47.0	36.2	23.2	11.7	3.3	6.33	6.42	5.49	16.66	3.3	80.2	155.4	10	1577	2.490	2.574 A
D82 0819	7-22	NW-56T	500 TON	100.0	99.0	78.9	54.5	43.1	33.6	22.3	11.6	2.7	6.28	6.40	5.38	16.11	2.9	81.8	156.3	14	1563	2.505	2.581 R
D82 0854	7-22	NW-57T	500 TON	100.0	99.2	83.0	59.7	46.4	35.4	24.4	13.5	3.9	6.38	6.39	5.39	15.77	2.5	84.0	156.9	11	1486	2.514	2.579 A
D82 0855	7-22	NW-58T	615 TON	100.0	98.7	80.6	60.0	45.8	35.1	24.4	13.9	4.4	6.48	6.42	5.39	15.11	1.7	88.5	158.3	11	1925	2.537	2.581 R
D82 0856	7-22	NW-59T	100 TON	100.0	99.5	83.0	62.2	47.7	36.7	24.1	12.3	2.9	6.41	6.43	5.52	17.24	3.9	77.4	154.3	14	1726	2.472	2.572 A
D82 0857	7-22	NW-60T	1000 TON	100.0	98.4	82.5	61.1	47.0	35.8	23.8	12.5	3.2	6.40	6.40	5.50	16.77	3.4	79.7	155.1	13	1600	2.486	2.573 A
D82 0858	7-23	NW-61T	1000 TON	100.0	99.5	80.8	60.2	46.0	35.4	23.3	12.3	3.8	6.46	6.42	5.43	16.94	2.9	82.1	156.2	12	1577	2.503	2.578 A

Newbury - Waterford
Project No. I 91-2(65) 5/3
Source P.K.C. - Waterford 803
Proj. Code No. 82020
Mix Design No. 1949

Vermont Agency of Transportation
Materials & Research Division
Bituminous Concrete Sub-division

Report on Bituminous Concrete Pavement

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Job Aim

Project No. Sunderland-Manchester FH-F-019-1(c1) S/H
Source Pike-Shutsbury (910)
Proj. Code No. SP2033
Mix Design No. Z402 #24

Vermont Agency of Transportation
Materials & Research Division
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Report on Bituminous Concrete Pavement

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Project No. Sunderland-Manchester F24-F07-1C1 5/2
Source Pike-90-Shaffsbury
Proj. Code No. ED82033
Mix Design No. 1766

Report on Bituminous Concrete Pavement

Item 406 Type II Year (s) 1982

Lab No.	Date	I.D. No.	Qty. Rep.	100	95/100	70/80	65/80	49/61	34/42	22/30	14/22	8/16	2/5	49/57	% Ext. AC	% Slip AC	% Eff. AC	% VMA	% Air Voids	% Voids Filled	Unit Wt.	Flow	Stab.	Bulk Sp. Gr.	Max. Sp. Gr.	Rej. or Appr'd
				1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#200	Ext. AC	Slip AC	Eff. AC	VMA	Air Voids	Voids Filled	Unit Wt.	Flow	Stab.	Bulk Sp. Gr.	Max. Sp. Gr.	Rej. or Appr'd	
DB2 1581	9/8/82	SM-16B	500T		100	77.4	70.2	50.5	36.2	26.0	17.5	10.0	2.3	5.35	5.29	5.25	15.3	3.0	80.9	149.8	11	1630	2.401	2.475	R	
DB2 1582	9/8/82	SM-17B	360T		100	77.5	70.3	51.7	37.9	27.4	18.8	11.0	3.0	5.32	5.30	5.09	15.1	3.1	79.4	150.2	11	1863	2.407	2.485	A	
DB2 1624	9/24/82	SM-18B	500T		100	80.0	69.6	50.1	37.0	26.4	17.9	10.6	2.1	5.31	5.30	4.98	15.2	3.5	77.0	150.1	11	1549	2.405	2.491	A	
DB2 1625	9/24/82	SM-19B	381T		100	86.2	78.7	57.0	40.9	29.4	20.4	12.6	3.2	5.60	5.31	5.08	15.6	3.7	76.2	149.4	10	1499	2.394	2.485	A	
DB2 1626	9/24/82	SM-20B	500T		100	85.7	74.4	53.8	35.6	25.7	18.5	12.0	3.3	5.69	5.29	5.06	15.0	3.1	79.4	150.4	12	1600	2.410	2.487	A	
DB2 1627	9/24/82	SM-21B	500T		100	80.2	73.4	53.9	37.1	36.5	18.9	12.2	3.2	5.40	5.30	5.01	14.9	3.1	79.2	150.5	11	1640	2.412	2.490	A	
DB2 1628	9/24/82	SM-22B	1000T		100	82.2	74.6	59.5	42.2	30.4	21.4	13.4	3.6	5.56	5.29	5.08	15.6	3.7	76.3	149.4	11	1549	2.395	2.486	A	
DB2 1629	9/24/82	SM-23B	640T		100	77.3	70.3	52.5	35.8	25.5	17.9	11.2	3.0	5.15	5.31	5.00	15.5	3.8	75.5	149.4	11	1549	2.395	2.490	A	
DB2 1630	9/25/82	SM-24B	500T		100	78.4	76.1	53.1	36.8	26.4	18.7	11.6	2.9	5.35	5.30	4.98	15.2	3.5	78.1	150.0	11	1671	2.404	2.491	A	
DB2 1631	9/29/82	SM-25B	500T		100	77.2	69.5	52.0	37.6	37.2	18.7	10.9	3.0	5.52	5.29	5.08	15.4	3.5	77.3	149.7	10	1610	2.399	2.486	A	
DB2 1633	9/25/82	SM-26B	660T		100	77.3	69.1	52.4	37.4	27.4	19.1	11.3	3.1	5.37	5.29	5.08	15.2	3.2	78.9	150.2	11	1570	2.407	2.486	A	
DB2 1805	9/30/82	SM-27B	500T		100	83.3	76.3	52.5	37.1	27.8	20.5	13.4	4.7	5.84	5.31	5.16	15.7	3.6	77.0	149.2	12	1661	2.391	2.481	A	
DB2 1806	9/30/82	SM-28B	660T		100	85.6	74.1	53.5	35.4	25.7	18.4	11.7	3.0	5.52	5.29	5.08	15.6	3.7	76.3	149.3	11	1600	2.393	2.486	A	
DB2 1807	10/1/82	SM-29B	500T		100	85.1	76.2	56.8	38.4	26.9	18.4	11.2	2.9	5.59	5.29	5.00	15.9	4.2	78.5	149.9	11	1468	2.386	2.490	A	
DB2 1808	10/1/82	SM-30B	500T		100	84.5	76.2	56.7	38.6	27.4	18.8	11.5	3.1	5.59	5.29	5.08	15.6	3.7	76.3	149.4	12	1519	2.394	2.485	A	
DB2 1809	10/1/82	SM-31B	1000T		100	85.5	76.7	57.1	38.6	27.0	18.2	11.2	2.8	5.62	5.31	5.08	15.7	3.8	75.7	149.2	11	1438	2.391	2.486	A	
DB2 1810	10/1/82	SM-32B	761T		100	82.3	74.6	59.6	42.2	30.5	21.3	13.0	3.4	5.39	5.29	5.12	15.3	3.3	78.5	149.9	10	1458	2.402	2.483	A	
DB2 1811	10/1/82	SM-33B	500T		100	85.3	76.2	57.0	38.7	27.1	18.4	11.1	2.9	5.66	5.31	4.99	15.8	4.1	740	149.1	10	1479	2.389	2.491	A	
DB2 1812	10/1/82	SM-34B	500T		100	85.6	77.4	57.5	42.1	30.8	21.2	13.8	2.8	5.58	5.29	5.08	15.9	4.0	74.8	148.9	11	1529	2.386	2.486	A	
DB2 1813	10/1/82	SM-35B	1161T		100	83.5	75.6	51.9	36.6	27.2	19.6	13.4	3.4	5.61	5.30	5.09	15.7	3.8	75.8	149.1	11	1580	2.390	2.485	A	
DB2 2000	10/1/82	SM-36B	170T	100	98.4	79.2	74.3	53.9	37.0	27.0	18.9	11.7	3.4	6.08	5.35	5.07	15.6	3.7	76.2	149.4	12	1701	2.395	2.487	A	
Avg.		1 test per	585T	100	99.2	81.9	74.0	54.4	38.1	27.4	19.1	11.8	3.1	5.53	5.30	5.07	15.5	3.58	76.9	149.6	11	1579	2.397	2.486		

Project No. Sunderland-Manchester FLH-F019-1(2) 5%
Source Pika (90) Sloughbury
Proj. Code No. SE033
Mix Design No. 2402 & 1766

Vermont Agency of Transportation
Materials & Research Division
Bituminous Concrete Sub-division

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Report on Bituminous Concrete Pavement

Item 406 Type II Year (s) 1982

Job Aim PROGRESS SAMPLES

Vermont Agency of Transportation
Materials & Research Division
Bituminous Concrete Sub-division

Sheet 1 of 2

Project No. Sunderland-Manchester FLH-FO19-1(21) 5%
Source Pike-(90) Shaftsbury
Proj. Code No. B2033
Mix Design No. 2406

Report on Bituminous Concrete Pavement

Item 406 Type III Year (s) 1982

Job Aim

Lab No.	Date	I.D. No.	Qty. Rep.	/	100	95/100	78/90	40/72	43/51	30/50	19/27	10/18	2/5	5.5/6.3	%	% Slip AC	% Eff. AC	VMA	% Air Voids	% Voids Filled	Unit Wt.	Flow	Stab.	Bulk Sp. Gr.	Max. Sp.Gr.	Rej. or Appr'vd
				1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#200	Ext. AC												
D82 1870	10/4/82	SM-1D	—		100	84.8	61.4	47.1	34.0	23.7	14.8	3.7	6.19	5.96	5.56	15.5	2.4	84.5	150.4	15	1874	2.411	2.470	A		
D82 1871	10/5/82	SM-1T	500T		100	89.1	63.9	47.0	34.3	24.4	14.8	3.3	5.99	5.90	5.48	15.8	3.0	81.1	149.6	13	2217	2.398	2.473	A		
D82 1872	10/5/82	SM-2T	200T		100	99.5	85.6	64.9	48.8	35.4	24.5	14.2	2.8	6.14	5.90	5.44	16.6	3.9	76.4	148.4	13	1833	2.379	2.475	A	
D82 1873	10/6/82	SM-3T	500T		100	87.2	63.3	43.9	30.8	21.5	13.2	3.6	5.87	5.90	5.14	15.1	3.0	80.5	150.8	12	2127	2.417	2.493	A		
D82 1874	10/6/82	SM-4T	500T		100	99.7	84.5	63.2	46.8	34.0	23.6	13.9	3.2	6.02	5.90	5.58	16.4	3.4	79.3	148.7	12	1823	2.383	2.466	A	
D82 1909	10/6/82	SM-5T	100T		100	99.4	85.4	66.5	48.3	36.8	26.5	16.4	4.3	6.16	5.91	5.28	15.7	3.3	79.0	149.9	11	1661	2.403	2.485	A	
D82 1910	10/7/82	SM-6T	500T		100	87.8	64.0	48.7	34.5	23.7	14.4	3.5	6.21	5.91	5.36	16.3	3.8	76.7	148.9	10	1468	2.387	2.480	A		
D82 1911	10/7/82	SM-7T	500T		100	87.1	68.9	50.9	34.5	24.2	14.7	3.5	6.24	5.91	5.49	16.0	3.1	80.6	149.4	9	1397	2.395	2.472	A		
D82 1912	10/7/82	SM-8T	1000T		100	99.2	85.6	66.6	49.1	36.8	26.4	16.0	3.1	6.33	5.90	5.40	15.8	3.1	80.3	149.8	11	1580	2.401	2.478	A	
D82 1913	10/7/82	SM-9T	630T		100	85.6	66.4	48.7	36.1	25.5	15.6	3.4	6.31	5.91	5.43	16.4	3.8	76.9	148.7	9	1337	2.383	2.476	A		
D82 1950	10/11/82	SM-10T	500T		100	99.1	86.1	61.7	47.2	36.2	26.0	16.0	3.8	6.01	5.90	5.53	16.5	3.6	78.1	149.5	12	1509	2.390	2.470	A	
D82 1951	10/11/82	SM-11T	500T		100	99.6	88.3	60.9	48.1	36.2	25.9	16.6	3.5	6.01	5.89	5.45	16.0	3.2	78.4	149.4	11	1407	2.394	2.474	A	
D82 1952	10/11/82	SM-12T	1360T		100	99.3	85.9	66.4	48.8	36.6	26.1	15.9	3.5	6.10	5.89	5.32	15.7	3.2	79.6	149.9	11	1468	2.402	2.482	A	
D82 1953	10/14/82	SM-13T	500T		100	99.3	84.0	62.6	49.2	38.8	28.6	18.0	3.4	6.05	5.90	5.27	16.2	3.9	75.9	148.9	10	1423	2.387	2.485	R	
D82 1954	10/14/82	SM-14T	500T		100	87.1	60.1	47.1	35.3	25.0	15.6	3.1	6.17	5.90	5.45	16.2	3.5	78.4	148.9	9	1306	2.387	2.474	A		
D82 1955	10/14/82	SM-15T	940T		100	86.4	60.3	48.1	34.3	24.2	15.0	2.9	6.15	5.90	5.35	15.9	3.4	78.7	149.5	9	1346	2.396	2.480	A		
D82 1956	10/14/82	SM-16T	500T		100	98.7	85.4	59.6	47.4	32.6	25.1	13.1	2.6	6.07	5.91	5.54	16.9	4.1	75.8	147.8	8	1276	2.369	2.469	A	
D82 1957	10/14/82	SM-17T	500T		100	98.2	86.3	60.0	48.6	36.7	24.5	12.6	2.6	5.98	5.88	5.71	17.3	4.1	76.2	147.1	8	1306	2.358	2.458	A	
D82 1958	10/14/82	SM-18T	580T		100	98.6	84.4	61.7	49.4	38.1	26.6	14.9	4.0	5.99	5.90	5.61	17.0	4.0	76.4	147.7	9	1377	2.367	2.465	A	
D82 1959	10/14/82	SM-19T	500T		100	98.3	61.4	46.8	35.0	24.0	13.7	3.2	5.97	5.89	5.45	16.5	3.8	76.9	148.5	10	1468	2.380	2.474	A		
D82 1960	10/14/82	SM-20T	500T		100	98.6	87.5	61.2	44.4	33.8	23.0	13.6	3.3	6.10	5.90	5.26	15.1	2.7	82.2	150.9	11	1610	2.418	2.486	A	
D82 1961	10/14/82	SM-21T	1000T		100	99.4	84.7	62.7	49.8	37.6	26.5	15.6	3.5	6.05	5.91	5.57	16.9	4.0	76.4	147.7	10	1580	2.367	2.466	A	
D82 1962	10/14/82	SM-22T	500T		100	85.4	62.8	50.0	38.0	27.3	16.6	3.8	6.16	5.90	5.58	16.9	4.0	70.4	147.8	10	1529	2.368	2.467	A		

Vermont Agency of Transportation
Materials & Research Division
Bituminous Concrete Sub-division

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Project No. Sunderland-Manchester FLH-F019-101
Source Pike (910)-Shaftsbury
Proj. Code No. 02033
Mix Design No. 2406

Report on Bituminous Concrete Pavement

Item 406 Type III Year (s) 1982

Job Aim

Lab No.	Date	I.D. No.	Qty. Rep.	1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#200	Ext. AC	% Slip AC	% Eff. AC	VMA	% Air Voids	% Voids Filled	Unit Wt.	Flow	Stab.	Bulk Sp. Gr.	Max. Sp. Gr.	Rej. or Appr'd	
				100	95/100	75/70	60/52	43/51	30/35	14/27	10/18	2/5	55/63	%	Ext. AC	% Slip AC	% Eff. AC	VMA	% Air Voids	% Voids Filled	Unit Wt.	Flow	Stab.	Bulk Sp. Gr.	Max. Sp. Gr.	Rej. or Appr'd
D82 1963	1/1/82	SM-23T	500T		100	99.1	86.3	63.6	48.0	35.2	23.9	13.5	3.4	6.00	5.91	5.40	16.2	3.6	77.8	149.0	11	1620	2.388	2.478	A	
D82 1964	1/1/82	SM-24T	1000T		100	99.3	86.0	63.9	48.6	36.1	24.7	14.6	3.7	6.24	5.91	5.42	16.5	3.9	76.4	148.5	12	1519	2.380	2.476	A	
D82 1965	1/1/82	SM-25T	400T		100	87.3	65.2	48.7	37.2	25.6	14.9	3.5	6.11	5.91	5.60	16.7	3.7	77.8	148.1	12	1570	2.373	2.465	A		
D82 1966	1/1/82	SM-26T	500T		100	87.3	64.9	49.0	35.8	24.6	13.9	3.3	5.99	5.91	5.46	16.4	3.7	77.5	148.7	11	1489	2.383	2.474	A		
D82 1967	1/1/82	SM-27T	500T		100	99.2	86.2	62.2	47.3	35.4	24.5	13.5	2.9	5.94	5.91	5.57	16.6	3.6	78.2	148.4	11	1418	2.379	2.468	A	
D82 1968	1/1/82	SM-28T	1000T		100	87.8	61.2	47.4	35.7	25.4	16.1	3.6	5.99	5.91	5.40	16.2	3.6	77.8	148.9	12	1519	2.387	2.478	A		
D82 1969	1/1/82	SM-29T	500T		100	98.9	85.9	64.4	48.7	36.8	25.8	15.1	3.7	6.18	5.90	5.36	16.4	3.7	77.4	148.8	12	1610	2.385	2.476	A	
D82 1970	1/1/82	SM-30T	500T		100	86.3	64.9	49.2	37.2	26.4	15.9	3.8	6.26	5.91	5.40	16.4	3.8	76.8	148.7	12	1539	2.383	2.478	A		
D82 1971	1/1/82	SM-31T	1000T		100	94.6	63.1	54.0	38.2	26.7	15.5	3.4	6.06	5.90	5.53	16.6	3.8	77.2	148.3	9	1387	2.370	2.470	A		
D82 1972	1/1/82	SM-32T	600T		100	99.1	84.8	66.2	49.2	36.5	25.9	15.5	3.8	6.18	5.90	5.35	16.2	3.7	77.1	149.0	11	1549	2.388	2.480	A	
D82 1973	1/1/82	SM-33T	662T		100	85.7	66.5	48.7	35.9	25.5	15.5	3.6	6.12	5.91	5.51	16.7	3.9	76.6	148.2	10	1468	2.375	2.471	A		
D82 1974	1/1/82	SM-34T	300T		100	87.5	61.1	47.8	35.5	25.0	15.5	3.2	6.17	5.89	5.42	16.3	3.6	77.8	148.9	10	1448	2.387	2.476	A		
Avg				1 test per 627T	100	99.6	86.2	63.5	48.2	35.9	25.2	15.0	3.4	6.10	5.90	5.45	16.3	3.57	78.1	148.9	10.7	1545	2.386	2.475		
PROGRESS SAMPLES																										
D82 1975	1/1/82				100	87.5	66.1	48.8	35.6	23.8	14.9	3.4	6.05													A
D82 1976	1/1/82				100	91.5	62.4	47.6	35.8	23.8	13.9	3.2	5.98													R
Avg					100	89.5	64.3	48.2	35.7	23.3	14.4	3.3	6.02													

Project No. WATERFORD - ST. JOHNS BURY E93-1(4) 5/12
Source PIKE - WATERFORD - 803
Proj. Code No. B1089
Mix Design No. 1772 & 1798

Vermont Agency of Transportation
Materials & Research Division
Bituminous Concrete Sub-division

Report on Bituminous Concrete Pavement

Item 4062 Type II Year (s) 1982

D.Day
1-26-83

Vermont Agency of Transportation
Materials & Research Division
Bituminous Concrete Sub-division

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Project No. WATERFORD-ST.JOHNSBURY I93-(4) 5/2
Source PIKE-WATERFORD-803
Proj.Code No. B1069
Mix Design No. 1772

Report on Bituminous Concrete Pavement

Item 406 Type II Year (s) 1982

D.Day
11/06/83

Job Aim

Lab No.	Date	I.D. No.	Qty. Rep.	100	95/100	70/65	65/70	44/50	34/42	26/34	14/22	6/14	2.0/5.0	5.0/5.1	% Slip AC	% Eff. AC	% VMA	% Air Voids	% Voids Filled	Unit Wt.	Flow	Stab.	Bulk Sp. Gr.	Max. Sp.Gr.	Rej. or Appd.
				1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#200	Ext. AC											
DE2 0145	9/1/82	WS-1D	—	100	85.7	77.0	54.4	39.7	29.6	17.4	9.4	3.2	5.39	5.30	4.19	15.4	5.0	67.4	157.7	10	1457	2.528	2.660	A	
DE2 0221	9/7/82	WS-1B	500T	100	86.4	87.9	69.2	48.8	35.8	27.5	18.2	9.9	2.6	5.23	5.36	4.63	15.2	3.7	75.7	158.1	11	1626	2.549	2.647	A
DE2 0232	9/7/82	WS-2B	500T	100	80.4	71.4	49.0	34.0	26.4	18.0	9.8	2.8	5.30	5.30	4.87	15.3	3.3	76.5	157.8	12	1647	2.529	2.614	A	
DE2 0223	9/7/82	WS-3B	1000T	100	84.9	70.2	50.5	36.8	28.2	19.1	10.5	2.9	5.38	5.28	4.36	15.5	3.3	61.1	156.2	6	1166	2.520	2.648	A	
DE2 0788	7/4/82	WS-4B	500T	100	86.0	68.4	41.8	28.1	20.5	13.3	6.6	2.0	5.39	5.32	4.19	16.6	6.4	61.4	155.4	12	860	2.490	2.660	R	
DE2 0789	7/4/82	WS-5B	500T	100	85.5	65.2	42.3	31.3	23.1	14.9	7.8	2.5	5.42	5.30	4.60	15.3	3.9	74.5	157.8	13	1057	2.529	2.632	R	
DE2 0790	7/4/82	WS-6B	1000T	100	87.8	72.7	53.9	41.3	31.3	20.0	9.7	2.9	5.63	5.29	4.52	16.1	5.0	68.9	156.4	12	1125	2.506	2.637	A	
DE2 0791	7/4/82	WS-7B	1000T	100	86.4	68.4	49.3	37.7	28.9	18.9	10.2	3.1	5.34	5.30	4.54	15.9	4.8	69.2	156.6	12	1161	2.509	2.636	A	
DE2 0792	7/4/82	WS-8B	1016T	100	86.2	68.7	49.3	38.0	29.2	19.3	10.1	3.4	5.40	5.30	4.57	15.9	4.7	70.5	156.7	12	1153	2.511	2.634	A	
DE2 0762	7/17/82	WS-9B	500T	100	84.7	70.2	50.3	40.2	32.7	22.2	10.7	2.8	5.40	5.28	5.08	15.9	4.2	74.6	155.4	11	1133	2.490	2.600	A	
DE2 0763	7/17/82	WS-10B	5.31T	100	88.4	72.0	52.2	39.2	31.1	21.0	10.9	3.5	5.20	5.33	4.65	15.9	4.5	71.7	156.6	9	1417	2.509	2.626	A	
DE2 0764	7/17/82	WS-11B	1000T	100	85.9	70.3	49.2	38.1	30.2	20.6	10.7	3.4	5.51	5.30	4.85	16.1	4.2	73.9	156.3	11	1350	2.505	2.616	A	
DE2 0897	7/26/82	WS-12B	952T	100	81.4	66.3	49.5	41.4	34.9	22.5	9.4	2.1	5.18	5.28	4.70	18.2	7.0	61.6	152.3	8	1167	2.440	2.625	R	
DE2 0898	7/26/82	WS-13B	500T	100	98.3	79.0	65.1	52.1	41.2	31.3	21.2	11.4	2.4	5.06	5.31	4.63	16.1	4.8	70.2	156.2	10	1533	2.503	2.630	A
DE2 0899	7/26/82	WS-14B	500T	100	99.0	85.6	64.3	51.4	39.2	28.5	19.3	10.9	3.3	5.30	5.31	4.56	15.1	3.8	74.8	158.1	11	1577	2.534	2.635	A
DE2 1324	9/31/82	WS-31B	500T	100	96.1	71.2	51.0	37.5	28.3	19.2	10.7	2.9	5.68	5.29	4.67	14.1	2.4	83.0	160.1	12	2500	2.505	2.627	A	
DE2 1325	9/31/82	WS-32B	500T	100	83.1	72.5	51.9	37.1	27.2	18.2	10.1	2.9	5.64	5.32	4.29	13.8	3.0	78.3	160.7	8	1750	2.575	2.654	A	
DE2 1326	9/31/82	WS-33B	1000T	100	89.8	70.4	51.9	36.8	27.4	18.7	10.8	3.3	5.54	5.29	4.31	13.8	3.0	78.3	160.5	9	1938	2.572	2.652	A	
DE2 1327	9/31/82	WS-34B	1000T	100	83.5	72.1	51.3	37.6	37.9	18.4	10.3	3.1	5.60	5.30	4.40	14.0	3.0	78.6	160.2	10	1880	2.567	2.646	A	
DE2 1328	9/31/82	WS-35B	1000T	100	85.4	71.3	49.0	36.8	27.0	17.8	9.3	2.4	5.54	5.29	4.44	14.3	3.2	77.6	158.6	10	2040	2.558	2.643	A	
DE2 1371	9/31/82	WS-36B	2673T	100	82.2	71.0	54.2	39.2	29.0	19.5	11.0	2.7	5.43	5.29	4.46	15.4	4.6	70.5	157.2	11	2337	2.519	2.641	A	

Vermont Agency of Transportation
Materials & Research Division
Bituminous Concrete Sub-division

Sheet 2 of 2

Project No. WATERFORD-SJ Jobshury I93-1C4 5/2
Source Pike-Waterford - 603
Proj. Code No. E1089
Mix Design No. 1798

Report on Bituminous Concrete Pavement

Item 406 Type II Year (s) 1982

DDay
1-11-83

Job Aim

Lab No.	Date	I.D. No.	Qty. Rep.	100	95/100	76/68	65/77	44/50	34/42	26/34	14/22	6/14	2/5	0/0.51	% Ext. AC	% Slip AC	% Eff. AC	% VMA	% Air Voids	% Voids Filled	Unit Wt.	Flow	Stab.	Bulk Sp. Gr.	Max. Sp.Gr.	Rej. or Appd.
				1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#200													
D82 0933	7/24/82	WS-15B3	500T		100	84.9	68.6	51.7	39.3	30.3	20.8	10.6	2.0	5.35	5.25	4.50	16.0	5.0	68.8	156.4	13	1372	2.506	2.638	A	
D82 0934	7/26/82	WS-16B	1200T	100	99.3	84.4	71.5	52.7	40.8	30.6	20.8	11.2	2.7	5.26	5.27	4.64	16.3	5.0	69.4	156.8	12	1783	2.497	2.629	A	
D82 0935	7/27/82	WS-17B	1273T		100	59.0	64.2	50.0	38.0	28.0	19.4	11.3	3.0	5.13	5.27	4.25	15.3	4.8	68.6	157.7	9	1700	2.528	2.655	R	
D82 1059	9/1/82	WS-18B	500T		100	82.6	71.6	54.3	42.1	32.0	21.4	11.1	2.3	5.42	5.29	4.51	15.9	4.7	70.4	157.9	11	1940	2.531	2.635	R	
D82 1060	9/11/82	WS-19B	500T		100	95.1	72.5	52.5	41.1	31.6	20.9	10.5	2.9	5.41	5.22	4.18	15.6	5.3	66.0	157.2	9	1629	2.519	2.660	R	
D82 1061	9/11/82	WS-20B	1T		100	85.2	70.3	56.5	45.2	34.9	22.9	11.1	2.6	5.16	5.27	4.38	16.1	5.4	66.5	156.1	8	1581	2.501	2.646	R	
D82 1062	9/14/82	WS-2D	18T		100	84.4	73.2	51.9	37.5	27.8	16.5	9.4	2.8	5.45	5.28	4.27	14.0	3.3	76.4	160.1	12	2040	2.565	2.653	A	
D82 1063	9/14/82	WS-21B	1000T		100	84.6	73.5	52.1	38.3	27.4	18.2	9.6	2.6	5.43	5.25	4.32	14.4	3.4	76.4	159.7	12	1900	2.557	2.650	A	
D82 1064	9/11/82	WS-22B	1000T		100	87.4	74.4	52.0	38.3	27.6	19.1	11.9	3.8	5.47	5.28	4.27	13.1	2.3	82.5	161.9	9	2038	2.574	2.654	A	
D82 1152	9/13/82	WS-23B	520T	100	91.1	83.7	66.7	49.0	37.9	28.7	20.1	11.4	2.5	5.15	5.28	4.45	14.6	3.1	78.2	159.7	10	1740	2.559	2.644	A	
D82 1153	9/13/82	WS-24B	500T		100	84.6	70.4	49.5	37.7	29.0	20.4	11.8	2.9	5.23	5.29	4.52	14.6	3.3	77.3	159.1	12	2052	2.549	2.637	A	
D82 1154	9/13/82	WS-25B	1000T	100	98.6	84.3	69.1	49.3	38.1	28.9	20.0	11.1	2.6	5.43	5.30	4.36	14.9	3.5	76.5	159.3	11	1951	2.533	2.648	A	
D82 1327	9/24/82	WS-26B	500T	100	99.3	79.8	64.1	47.2	34.0	25.1	17.2	9.7	2.3	5.42	5.28	4.55	15.2	3.9	74.3	158.1	13	1390	2.533	2.635	R	
D82 1330	9/24/82	WS-27B	500T	100	99.0	81.4	65.5	50.3	38.5	30.1	21.3	11.9	2.6	5.45	5.32	4.67	15.4	3.9	74.7	158.2	11	1300	2.525	2.628	A	
D82 1331	9/20/82	WS-28B	1000T	100	99.2	80.6	64.8	48.6	36.6	27.9	19.6	11.1	2.8	5.34	5.34	4.61	15.0	3.5	76.6	159.5	11	1450	2.540	2.632	A	
D82 1332	9/20/82	WS-29B	1000T		100	82.2	65.9	50.9	39.2	30.5	21.6	12.2	2.9	5.50	5.29	4.78	15.6	3.8	75.6	157.3	11	1300	2.521	2.620	A	
D82 1454	9/13/82	WS-37B	500T	100	98.6	81.6	70.5	48.4	34.7	25.9	17.5	10.2	2.8	5.62	5.33	4.15	13.5	3.0	77.8	161.3	13	2162	2.585	2.664	A	
D82 1455	9/13/82	WS-38B	500T	100	99.2	88.4	75.8	55.1	39.4	28.8	19.0	10.4	2.6	5.30	5.31	4.39	14.3	3.3	76.9	159.4	12	1790	2.555	2.647	A	
D82 1456	9/13/82	WS-39B	1000T	100	98.9	85.3	72.9	50.4	37.7	28.0	18.6	10.5	2.8	5.36	5.30	4.39	14.2	3.5	75.4	159.8	12	2020	2.561	2.653	A	
AVG.				100	99.7	84.8	69.3	50.6	38.0	28.8	19.4	10.2	2.8	5.38	5.29	4.49	15.2	4.05	73.2	159.0	10.8	1645	2.532	2.640		

Vermont Agency of Transportation
Materials & Research Division
Bituminous Concrete Sub-division

Sheet 1 of 3

Project No. Waterford-St. Albans 193-1(4) 32
Source Pika-Waterford 603
Proj. Code No. 61069
Mix Design No. 1795

Report on Bituminous Concrete Pavement

Item 406 Type III Year (s) 1982

D. Day
1-12-83

Job Aim

Lab No.	Date	I.D. No.	Qty. Rep.	/	1/8	95/100	78/90	57/66	44/52	33/41	19/27	7/15	2/5	4.0/3.6	%	% Slip AC	% Eff. AC	% VMA	% Air Voids	% Filled	Unit Wt.	Flow	Stab.	Bulk Sp. Gr.	Max. Sp. Gr.	Rej. or Appd.
				1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#200	Ext. AC												
DB2 1188	9/18/82	WS-1T	500T		100	99.0	80.4	56.1	43.6	31.7	21.2	11.8	2.7	6.26	6.41	5.36	15.8	3.2	82.9	156.0	14	20.54	2.500	2.582	R	
DB2 1189	9/18/82	WS-2T	600T		100	99.0	82.1	57.4	45.6	34.1	22.4	11.9	2.6	6.16	6.37	5.57	16.7	3.2	80.9	155.2	8	17.28	2.467	2.568	A	
DB2 1190	9/18/82	WS-3T	1000T		100	98.7	82.0	61.4	46.7	34.7	23.0	12.5	2.7	6.34	6.38	5.77	16.9	2.9	82.8	154.8	10	17.86	2.480	2.555	A	
DB2 1191	9/19/82	WS-4T	500T		100	99.2	80.9	55.9	44.2	33.5	22.2	12.2	3.0	6.29	6.39	5.41	16.5	3.3	80.0	155.6	10	15.66	2.443	2.573	A	
DB2 1192	9/19/82	WS-5T	500T		100	99.3	81.6	59.7	46.7	35.1	23.6	13.0	3.0	6.39	6.39	5.36	16.3	3.2	80.4	156.0	13	20.12	2.500	2.582	A	
DB2 1206	9/19/82	WS-6T	1000T		100	99.3	84.6	57.8	45.4	34.7	24.5	14.1	3.7	6.26	6.37	5.31	15.9	2.8	82.3	156.9	12	21.47	2.514	2.584	A	
DB2 1207	9/24/82	WS-7T	500T		100	98.6	84.0	62.1	47.1	35.2	23.9	13.5	3.3	6.46	6.34	5.66	16.8	3.0	82.1	155.1	10	16.88	2.485	2.561	R	
DB2 1208	9/24/82	WS-8T	500T		100	99.2	81.4	57.4	45.6	34.6	23.6	12.6	2.5	6.30	6.38	5.61	16.7	3.0	82.0	155.3	10	15.17	2.489	2.565	A	
DB2 1209	9/24/82	WS-9T	500T		100	99.3	84.6	60.3	46.7	35.3	24.6	13.6	2.9	6.36	6.39	5.53	16.7	3.2	80.8	155.3	11	17.12	2.489	2.570	A	
DB2 1181	9/23/82	WS-10T	500T		100	99.0	83.5	58.7	45.4	34.1	23.3	12.7	3.6	6.53	6.42	5.54	16.9	3.2	80.8	155.4	11	16.49	2.490	2.571	A	
DB2 1182	9/23/82	WS-11T	238T		100	98.5	84.2	60.0	46.2	35.0	22.0	11.0	2.4	6.36	6.41	5.51	17.1	3.7	78.3	154.6	10	15.43	2.477	2.572	A	
DB2 1183	9/24/82	WS-12T	500T		100	99.0	82.8	55.2	43.3	32.8	21.2	11.3	2.5	6.55	6.41	5.69	16.1	2.1	86.9	156.5	15	17.00	2.508	2.541	R	
DB2 1184	9/24/82	WS-13T	500T		100	99.4	84.1	57.8	45.8	35.6	22.8	12.0	3.4	6.32	6.39	5.60	16.3	2.6	84.0	155.9	11	17.68	2.498	2.566	A	
DB2 1185	9/24/82	WS-14T	536T		100	99.0	81.9	58.8	46.3	34.2	23.8	12.3	3.1	6.39	6.39	5.68	16.4	2.5	84.7	155.6	10	17.68	2.496	2.561	A	
DB2 1179	9/25/82	WS-15T	500T		100	99.0	81.4	56.6	44.4	34.4	21.6	11.2	2.9	5.94	6.41	5.36	17.4	4.5	74.2	153.8	10	14.70	2.465	2.582	A	
DB2 1180	9/25/82	WS-16T	402T		100	99.5	84.5	61.2	44.4	35.1	23.5	11.5	2.5	6.57	6.39	5.47	17.4	4.2	75.9	153.9	11	17.00	2.466	2.575	A	
DB2 1289	9/24/82	WS-17T	500T		100	99.6	84.7	58.7	45.4	34.1	22.5	12.0	3.3	6.55	6.40	5.72	16.1	2.1	87.0	156.3	12	15.62	2.505	2.559	A	
DB2 1290	9/25/82	WS-18T	500T		100	98.9	83.7	59.0	45.8	33.7	22.2	11.9	3.0	6.53	6.34	5.57	17.0	3.5	79.4	154.6	10	15.43	2.477	2.567	A	
DB2 1291	9/26/82	WS-19T	1000T		100	99.3	86.2	63.7	49.9	36.3	23.9	12.6	3.3	6.41	6.31	5.43	17.0	3.9	77.1	154.4	10	14.16	2.475	2.576	A	
DB2 1292	9/26/82	WS-20T	800T		100	99.1	83.3	64.2	52.0	39.4	25.3	12.7	2.9	6.42	6.38	5.96	18.8	4.7	75.0	151.3	10	14.16	2.434	2.543	A	
DB2 1351	9/11/82	WS-21T	500T		100	99.1	84.6	59.0	44.8	33.2	21.8	11.9	2.8	6.46	6.46	5.23	15.2	2.3	84.9	156.0	10	17.01	2.532	2.591	A	
DB2 1352	9/16/82	WS-22T	500T		100	99.4	81.5	60.0	46.6	34.5	23.4	12.4	2.6	6.39	6.38	5.24	15.4	2.5	84.0	157.6	11	18.12	2.525	2.589	A	
DB2 1353	9/18/82	WS-23T	1000T		100	99.1	91.4	60.4	47.5	35.3	23.3	12.2	2.5	6.46	6.37	5.29	15.6	2.5	83.9	151.3	10	18.88	2.521	2.586	A	

Vermont Agency of Transportation
Materials & Research Division
Bituminous Concrete Sub-division

Sheet 2 of 3

Project No. WATERFORD-ST. JOHNSBURY 193-1(C) 1/2
Source Pike-WATERFORD 803
Proj. Code No. 81089
Mix Design No. 1795

Report on Bituminous Concrete Pavement

Item 406 Type III Year (s) 1982

D. Day
1-13-83

Job Aim

Lab No.	Date	I.D. No.	Qty. Rep.	Job Aim													% Slip AC	% Eff. AC	VMA	% Air Voids	% Voids Filled	Unit Wt.	Flow	Stab.	Bulk Sp. Gr.	Max. Sp.Gr.	Rej. or Appd.
				1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#200	Ext. AC	%	100	95/100	75/90	54/60	44/52	33/41	19/27	7/15	2/5	6.0/6.8		
D82 1354	9/1/82	WS-24T	1000T		100	98.8	81.0	59.7	47.3	35.0	22.8	11.6	2.6	6.47	6.39	5.10	15.5	2.9	81.2	157.4	12	2010	2.523	2.599	A		
D82 1598	9/20/82	WS-25T	500T		100	73.9	60.3	47.9	38.0	24.2	11.3	2.4	6.56	6.37	5.61	17.1	3.5	79.6	154.5	10	1572	2.476	2.565	R			
D82 1599	9/24/82	WS-26T	500T		100	99.8	83.4	58.4	47.7	37.7	24.5	12.1	3.3	6.81	6.40	5.40	15.5	2.2	86.0	157.4	14	2002	2.523	2.579	A		
D82 1600	9/29/82	WS-27T	1000T		100	99.7	87.2	62.5	50.8	39.2	25.0	11.6	2.6	6.84	6.35	5.55	17.0	3.5	79.4	154.7	10	1125	2.479	2.569	A		
D82 1601	9/29/82	WS-28T	1000T		100	99.6	84.2	60.9	48.1	37.4	24.3	11.1	2.5	6.68	6.39	5.53	16.9	3.5	79.5	154.9	11	1538	2.482	2.571	A		
D82 1602	9/21/82	WS-29T	500T		100	99.3	82.8	57.8	44.7	35.5	23.2	11.2	2.4	6.58	6.40	5.43	15.1	1.7	88.8	158.0	12	1860	2.532	2.577	R		
D82 1661	9/21/82	WS-30T	500T		100	99.6	87.6	61.9	49.5	39.6	25.7	12.5	2.7	6.64	6.39	5.65	16.5	2.7	83.5	155.6	11	2196	2.493	2.563	A		
D82 1662	9/21/82	WS-31T	1000T		100	99.7	85.0	58.5	45.9	36.0	23.5	11.6	2.6	6.43	6.39	5.51	15.8	2.3	85.5	156.7	10	2016	2.512	2.572	A		
D82 1663	9/21/82	WS-32T	1000T		100	99.6	85.3	59.1	46.3	36.8	24.1	11.4	2.4	6.53	6.41	5.59	16.2	2.6	84.2	156.1	11	1618	2.502	2.568	A		
D82 1664	9/23/82	WS-33T	500T		100	99.6	87.9	60.0	47.8	37.7	24.5	11.8	2.5	6.56	6.38	5.62	16.4	2.7	83.5	155.6	10	1832	2.494	2.564	A		
D82 1665	9/23/82	WS-34T	500T		100	99.6	85.0	59.7	48.4	38.1	24.7	12.0	2.7	6.82	6.35	5.66	16.5	2.7	83.5	155.4	9	1662	2.491	2.561	A		
D82 1666	9/24/82	WS-35T	1000T		100	99.4	84.4	60.5	46.9	36.8	24.5	12.6	3.2	6.75	6.38	5.36	15.4	2.1	86.1	157.7	13	2300	2.527	2.582	A		
D82 1667	9/24/82	WS-36T	1000T		100	99.5	86.3	60.0	47.2	37.5	24.8	11.9	2.7	6.57	6.40	5.57	16.4	2.8	82.9	155.8	10	1738	2.496	2.568	A		
D82 1720	9/23/82	WS-37T	500T		100	98.4	83.2	56.7	44.3	34.8	23.0	12.0	2.8	6.68	6.39	5.37	15.5	2.3	85.3	157.4	12	2288	2.522	2.581	A		
D82 1721	9/23/82	WS-38T	500T		100	98.9	84.1	58.0	45.3	35.9	24.2	11.8	2.6	6.60	6.43	5.40	15.7	2.4	84.7	157.1	11	2100	2.518	2.580	A		
D82 1722	9/23/82	WS-39T	500T		100	99.3	83.9	59.2	46.4	35.9	24.0	12.7	3.3	6.84	6.43	5.34	15.6	2.4	84.4	157.3	10	1824	2.521	2.584	A		
D82 1723	9/24/82	WS-40T	500T		100	99.6	84.7	61.3	47.1	37.2	24.6	12.5	3.0	6.56	6.38	5.44	16.3	3.0	81.6	155.9	10	1656	2.499	2.576	A		
D82 1724	9/24/82	WS-41T	1000T		100	99.6	84.3	60.8	47.5	37.3	24.2	12.4	2.7	6.70	6.38	5.40	16.3	3.2	80.2	155.8	11	1962	2.496	2.579	A		
D82 1725	9/24/82	WS-42T	1000T		100	99.4	84.7	61.1	46.6	37.0	24.4	12.3	2.7	6.58	6.40	5.33	16.0	3.0	81.3	156.1	11	1812	2.501	2.578	A		
D82 1726	9/25/82	WS-43T	500T		100	99.3	84.0	59.1	44.1	34.5	23.0	11.4	3.1	6.60	6.36	5.44	15.6	2.2	85.8	157.2	13	2138	2.519	2.576	A		
D82 1727	9/25/82	WS-44T	500T		100	100	82.8	59.2	45.9	34.9	22.5	11.1	3.4	6.79	6.39	5.38	16.1	2.9	82.1	156.4	12	2221	2.506	2.580	A		
D82 1728	9/25/82	WS-45T	1000T		100	99.4	83.3	59.5	46.5	35.8	23.3	11.6	3.1	6.63	6.38	5.50	16.4	3.0	82.0	155.8	11	1938	2.497	2.573	A		
D82 1745	9/26/82	WS-46T	500T		100	99.3	83.5	58.7	43.0	32.5	22.3	11.7	4.1	6.63	6.41	5.36	15.3	2.0	86.8	157.9	13	2300	2.530	2.582	A		

Project No. WATERFORD ST. JEANSBURG I93-1C(4) 5/2
Source PIKE-WATERFORD B03
Proj. Code No. B1089
Mix Design No. 1795

Vermont Agency of Transportation
Materials & Research Division
Bituminous Concrete Sub-division

Sheet 3 of 3

Report on Bituminous Concrete Pavement

Item 426 Type III Year (s) 1982

D-Day
1-13-03

Job Aim

Project No. Waterford St. Johnsbury 193-14) 5/2
Source PIKE-WATERFORD 706
Proj. Code No. B1089
Mix Design No. 1950

Vermont Agency of Transportation
Materials & Research Division
Bituminous Concrete Sub-division

Sheet 1 of 1

Report on Bituminous Concrete Pavement

Item 4060 Type II Year (s) 1982

Job Aim

Vermont Agency of Transportation
Materials & Research Division
Bituminous Concrete Sub-division

Sheet 1 of 1

Project No. WATERFORD-ST JHNNSBURY E93-14) 52
Source PINE-WATERFORD 706
Proj. Code No. B1089
Mix Design No. 1794

Report on Bituminous Concrete Pavement

Item 406 Type III Year (s) 1982

D. Day
1-17-83

Job Aim

Lab No.	Date	I.D. No.	Qty. Rep.	100	95/100	78/90	54/66	44/52	33/41	19/27	7/15	2/5	6.0/6.5	6.4	%	S11p	%	%	%	%	Unit Wt.	Flow	Stab.	Bulk Sp. Gr.	Max. Sp.Gr.	Rej. or Appd.
				1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#200	Ext. AC	AC	Eff. AC	VMA	Air Voids	Voids Filled	Wt.	Flow	Stab.	Sp. Gr.	Max. Sp.Gr.	Rej. or Appd.	
DB2 1133	9/17/82	WS-1T	500T	100	98.5	82.3	61.6	48.3	36.9	24.8	14.4	3.4	6.73	6.40	5.61	16.6	2.9	82.4	155.5	12	2640	2.491	2.566	A		
DB2 1134	9/17/82	WS-2T	420T	100	99.0	85.8	62.9	51.4	40.1	27.0	16.6	4.0	6.92	6.39	6.28	16.7	1.4	91.6	155.3	15	2550	2.468	2.523	R		
DB2 1135	9/17/82	WS-3T	515T	100	98.7	82.9	58.3	45.1	34.8	23.8	15.4	3.4	6.43	6.40	5.74	16.3	2.3	85.9	156.0	16	2600	2.500	2.555	A		
DB2 1603	9/29/82	WS-4T	500T	100	98.6	82.4	58.0	46.7	36.2	24.1	14.2	3.2	6.67	6.35	5.94	16.7	2.3	86.1	155.1	15	2582	2.485	2.544	A		
DB2 1604	9/29/82	WS-5T	280T	100	99.6	82.3	55.9	43.6	33.8	23.1	14.9	3.5	6.39	6.47	5.74	16.3	2.2	86.5	156.2	16	2590	2.504	2.560	A		
DB2 1605	9/21/82	WS-6T	500T	100	99.4	82.7	57.5	45.5	35.0	23.8	14.7	3.4	6.55	6.41	5.78	16.3	2.1	87.1	156.1	13	2500	2.502	2.555	A		
DB2 1606	9/21/82	WS-7T	443T	100	83.5	55.8	45.2	35.5	24.1	15.3	3.0	6.33	6.40	5.62	16.9	3.3	80.5	154.8	14	2122	2.491	2.565	A			
DB2 1656	9/23/82	WS-8T	500T	100	99.7	81.9	54.0	43.9	34.6	23.2	13.9	2.5	6.42	6.41	5.78	16.7	2.7	84.1	155.2	11	1950	2.487	2.555	A		
DB2 1657	9/23/82	WS-9T	500T	100	98.8	81.5	56.1	45.4	35.5	22.1	12.5	2.4	6.43	6.40	5.80	16.7	2.6	84.5	155.3	13	2125	2.489	2.554	A		
DB2 1658	9/23/82	WS-10T	500T	100	98.2	80.1	57.9	43.9	37.2	24.9	15.0	3.1	6.40	6.40	5.72	17.1	3.3	80.6	154.4	15	2131	2.474	2.559	A		
DB2 1659	9/23/82	WS-11T	167T	100	98.3	83.0	56.8	46.5	36.2	24.4	15.1	3.1	6.58	6.40	5.79	16.6	2.5	85.1	155.5	11	2040	2.492	2.555	A		
DB2 1660	9/24/82	WS-12T	500T	100	99.1	84.2	57.9	47.7	37.2	24.7	15.3	2.8	6.68	6.40	5.75	17.2	3.3	80.8	154.3	14	2050	2.473	2.557	A		
DB2 1877	9/23/82	WS-13T	500T	100	99.5	83.3	61.8	49.9	37.5	24.5	15.2	3.5	7.12	6.40	5.65	16.4	2.6	84.1	155.9	15	2362	2.493	2.564	A		
DB2 1878	9/23/82	WS-14T	500T	100	99.3	83.5	59.1	47.6	36.8	23.5	13.1	3.0	6.54	6.40	5.75	16.7	2.7	83.6	155.1	12	2025	2.484	2.556	A		
DB2 1879	9/24/82	WS-15T	500T	100	80.7	53.7	46.2	36.2	22.1	15.1	2.4	6.50	6.40	5.54	17.1	3.2	81.3	155.2	10	2110	2.487	2.570	A			
DB2 1914	9/24/82	WS-16T	500T	100	78.1	56.9	47.6	36.3	22.1	14.0	2.4	6.57	6.41	5.93	15.7	2.2	86.8	155.3	9	2125	2.489	2.546	A			
DB2 1915	9/24/82	WS-17T	200T	100	78.1	57.3	47.3	36.2	22.1	15.5	2.4	6.94	6.40	5.40	16.7	3.6	78.5	155.2	9	2088	2.487	2.579	A			
DB2 1946	9/13/82	WS-18T	500T	100	98.9	77.5	54.5	46.3	36.5	22.3	14.2	2.4	6.64	6.40	5.62	17.6	4.1	76.8	153.5	10	1907	2.460	2.565	A		
DB2 1947	9/14/82	WS-19T	500T	100	99.1	78.4	55.2	46.5	36.9	22.0	13.8	2.5	6.50	6.41	5.60	17.0	3.5	79.6	154.6	12	1938	2.478	2.567	A		
DB2 1175	9/21/82	WS-1L	50T	100	98.8	81.7	57.6	45.1	33.5	22.4	13.2	3.1	6.56	6.41	5.66	16.9	3.2	81.1	154.8	14	2050	2.481	2.563	A		
Avg.				100	99.2	81.6	57.5	46.6	36.1	23.6	14.6	3.1	6.62	6.40	5.74	16.8	2.8	83.4	155.2	12.8	2224	2.487	2.558			

Vermont Agency of Transportation
Materials & Research Division
Bituminous Concrete Sub-division

Sheet 1 of 1

Project No. WATERFORD - St Johnsbury I93-114
Source Rike-WATERFORD
Proj. Code No. 61059
Mix Design No. 1771

Report on Bituminous Concrete Pavement

Item 406 Type IV Year (s) 1980

Job Aim

Lab No.	Date	I.D. No.	Qty. Rep.	Job Aim												% Slip AC	% Eff. AC	VMA	% Air Voids	% Voids Filled	Unit Wt.	Flow	Stab.	Bulk Sp. Gr.	Max. Sp.Gr.	Rej. or Appd.
				1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#200	Ext. AC	%											

D.92 1175	9/21/82	WS-1R	100T	100	98.7	65.4	43.8	31.6	20.8	12.3	2.4	6.59	6.40	%	4.4	76.1	152.4	10	1924	2.440	2.553	R
D.92 1429	9/10/82	WS-2R	172T	100	99.5	68.9	46.2	33.9	22.0	13.8	3.2	6.62	6.41	%	3.4	82.0	157.8	12	1280	2.465	2.553	A

PROGRESS SAMPLES

				Job Aim												Mix Designt	1794	Type III									
				100	95/100	78/90	54/66	44/52	33/41	19/27	7/15	2/5	6/9														
D.92 1078	9/17/82			100	98.2	80.7	61.0	49.1	38.1	25.7	14.3	4.5	6.05														A
D.92 1623	9/24/82			100	99.5	80.6	57.3	45.4	35.9	23.0	13.2	3.3	6.24														A
D.92 1611	9/24/82			100	99.4	80.9	56.9	46.3	32.0	23.8	13.2	2.9	6.00														A

STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH DIVISION - BITUMINOUS CONCRETE SUBDIVISION

No. 1975

Design of Bituminous Concrete Mixtures

Town GEORGIA - SCHAFFERTON

Project No. IR. 87-3(4)

Gentlemen:

In accordance with the specification requirements for the above project I submit the following job mix formula:

Pavement Type IV Produced By: PIKE IND. INC. Plant Location SCHAFFERTON VT.

Stockpile Gradations — % Passing

Size	% Used	1 1/4	1 1/2	1	1/4	1/2	3/8	1/4	4	8	16	30	50	200
DUST	20								100	74	45	29	23	10
NAT. SA.	41						100	95	90	81	66	46	23	3
SLIME	39						100	97	26	2				
Resultant	100						100	97	17	49	36	25	14	3

Hot Bin Gradation — % Passing

Bin	% Used	1 1/4	1 1/2	1	1/4	1/2	3/8	1/4	4	8	16	30	50	200
S	50								100	90	70	48	26	5
2 DUST	1											100	98	94
3 1/8	49						100	98	35	4				
4														
5														
Resultant	100						100	99	48	48	36	25	14	34

DUST 3/8

Batch Weights	Bin S	Bin No. 2	Bin No. 3	Bin No. 4	Bin No. 5	AC	Total
	2808	56	2752			384	6000

	1 1/4	1 1/2	1	1/4	1/2	3/8	1/4	4	8	16	30	50	200	AC
Job Mix Formula						100	98	68	48	36	25	14	3.5	6.4
Job Aim						100	95	62	44	32	21	10	2	6.0
Specification Limits						100	95	62	31	24	14	6	0.5	6.8

Source of Materials

Aggregates							Asphalt						
Coarse: <u>SCHAFFERTON LIMESTONE</u>							AC-5:						
Fine: DUST - <u>SCHAFFERTON LIMESTONE</u> SAID - <u>PIKE, HIGHEGATE PIT.</u>							AC-10:						
							Other: <u>E.S. OPEN. B.P. MONTREAL CANADA</u>						

Mixing Times — Dry: 6 Wet: 36 Total: 42 Temperature: 260°F / 320°F

Submitted by: Paul B. Ferguson (signature) Date: 6-7-82

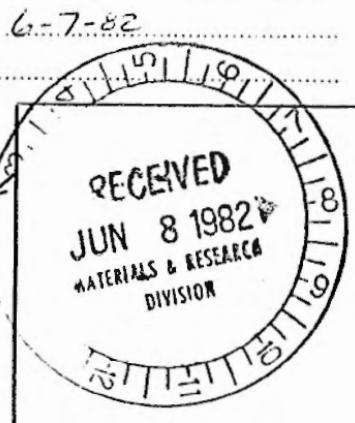
Company PIKE IND. INC. Title MATERIALS ENGR.

FOR STATE OF VERMONT USE ONLY

Approved Rejected

Comments: Trial drop required. Final acceptance contingent on mix producing proper gradation, AC and water and air voids between 2.0 and 5.0%, and Marshall values established in contract.

Signature Charles E. Jeard Title Bituminous Concrete Supervisor



STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH DIVISION - BITUMINOUS CONCRETE SUBDIVISION

No. 1763

Design of Bituminous Concrete Mixtures

Town GEORGIA - Swanton

Project No. I.R. 69-3 (a)

Gentlemen:

In accordance with the specification requirements for the above project I submit the following job mix formula:

Pavement Type IV Produced By: PIKE INDUSTRIES Inc. Plant Location Swanton

Stockpile Gradations — % Passing

P. 801

Size	% Used	1%	1½	1	¼	½	¾	4	8	16	30	50	200
STONE SCREWMIXES	20							100	74	45	29	22	10
NAT. SAND	41					100	95	90	81	66	46	23	3
3/8	39												
Resultant	100				100	97	67	49	36	25	14	3	

Hot Bin Gradation — % Passing

Bin	% Used	1%	1½	1	¼	½	¾	4	8	16	30	50	200
S	54.6							100	84	66	46	26	
2	45.4					100	98	30	3				
3													
4													
5													
Resultant	100				100	99	68	48	36	25	14		

Batch Weights	Bin S	Bin No. 2	Bin No. 3	Bin No. 4	Bin No. 5	AC	Total
						3.564	6000

	1%	1½	1	¼	½	¾	4	8	16	30	50	200	AC
Job Mix Formula					100	98	68	48	37	25	14	3.0	6.4
Job Aim					100	95	62	44	33	21	10	1.5	6.0
Specification Limits					100	95	62	39	24	19	6	0	6.0

Source of Materials

Aggregates							Asphalt						
Coarse: SWANTON LIME							AC-5:						
Fine: STONE SCREWMIXES - SWANTON LIME NAT. SAND HIGCOTE							AC-10:						
							Other: 85/100 PEN BP MONTREAL CANADA						

Mixing Times — Dry: 5 Wet: 3.5 Total: 40 Temperature: 290 ± 20

Submitted by: Jeffrey S. Pachey (signature) Date: 6-29-82

Company: PIKE INDUSTRIES Inc. Title: MATERIALS ENGINEER

FOR STATE OF VERMONT USE ONLY

Approved ✓

Rejected

Comments: Final acceptance contingent on this design to produce all contracts requirements. Test run on 6-28-82 indicates all test value can be met. This design supersedes design # 1975 dated June 19, 1982.

Signature: Charles E. Jerd Title: Bituminous Concrete Supervisor



1954
2551

STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH DIVISION - BITUMINOUS CONCRETE SUBDIVISION No

Design of Bituminous Concrete Mixtures

Town GEORGEIA-SWANTON.....

Project No. I.R. 89-3 (4).....

Gentlemen:

In accordance with the specification requirements for the above project I submit the following job mix formula:

Pavement Type IV Produced By: Pete Ind. Inc. Plant Location Swanton, VT
Stockpile Gradations — % Passing # 806

Size	% Used	1%	1½	1	¼	½	%	4	8	16	30	50	200	
Resultant														

Hot Bin Gradation — % Passing

Bin	% Used	1%	1½	1	¼	½	%	4	8	16	30	50	200	
S														
2														
3														
4														
5														
Resultant														

Batch Weights	Bin S	Bin No. 2	Bin No. 3	Bin No. 4	Bin No. 5	AC	Total

Job Mix Formula	1¾	1½	1	¼	½	%	4	8	16	30	50	200	AC
Job Aim													
Specification Limits													

Source of Materials

Aggregates							Asphalt						
Coarse:							AC-5:						
Fine:							AC-10:						
Other:													

Mixing Times — Dry: Wet: Total: Temperature:

Submitted by: (signature) Date:

Company Title

FOR STATE OF VERMONT USE ONLY

Approved Rejected

Comments: *original design lost. this design was used at the beginning of the project while arriving at the correct job aim. Only 31.9 tons of this material was used on the project. Earle Claffee 3/10/03*

Signature Title

STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH DIVISION - BITUMINOUS CONCRETE SUBDIVISION

No 1991

Design of Bituminous Concrete Mixtures

Town GEORGIA-SWANTON.....

Project No. FR-89-3(4).....

Gentlemen:

In accordance with the specification requirements for the above project I submit the following job mix formula:

Pavement Type III Produced By: PIKE IND. INC. Plant Location SWANTON VT. #806
Stockpile Gradations — % Passing

Size	% Used	1%	1½	1	¼	½	%	4	8	16	30	50	200
ST. Sc.	20							100	74	45	29	23	10
NAT. Sc.	41						100	95	90	81	66	46	23
3/4" Roca	39						100	97	26	2			3
Resultant	100						100	97	67	49	31	25	14
													3

Hot Bin Gradation — % Passing

Bin	% Used	1%	1½	1	¼	½	%	4	8	16	30	50	200
S	50							100	90	70	48	26	5
2	1									100	98	94	
3	49						100	98	35	4			
4													
5													
Resultant	100						100	99	68	48	36	25	14
													34

FINES

Batch Weights	Bin S	Bin No. 2	Bin No. 3	Bin No. 4	Bin No. 5	AC	Total
	936	19	917			128	2000

Job Mix Formula	1%	1½	1	¼	½	%	4	8	16	30	50	200	AC
Job Aim						100	98	68	48	36	25	14	3.5
Specification Limits						100	95	62	44	32	21	10	2

Source of Materials

Aggregates							Asphalt						
Coarse: SWANTON LIMESTONE							AC-5:						
Fine: ST. SC. - SWANTON LIMESTONE NAT. SA - PIKE - HIGHEATE P.R.							AC-10:						
							Other: 85/100 Pen RP MONTREAL CANADA						

Mixing Times — Dry: 6 Wet: 36 Total: 42 Temperature: 200°F/200°F

Submitted by: Paul J. Bergeron (signature) Date: 6-14-82

Company: PIKE IND. INC. Title: NAT'L'S ENGR.

FOR STATE OF VERMONT USE ONLY

Approved Rejected

Comments: Replace mix Design #1947
Trial acceptance contingent on mix producing all job requirements.



Signature: Charles E. Jerd Title: Bituminous Concrete Supervisor

Date: June 17, 1982

STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH DIVISION - BITUMINOUS CONCRETE SUBDIVISION No 1947

Design of Bituminous Concrete Mixtures

Town GEOGIA - Swanton

Project No. IR - 89-3(4)

Gentlemen:

In accordance with the specification requirements for the above project I submit the following job mix formula:

Pavement Type IV Produced By: PIKE INDUSTRIES Inc. Plant Location Swanton Vt.

Stockpile Gradations — % Passing

806

Size	% Used	1%	1½	1	¼	½	¾	4	8	16	30	50	200
SAND	38					100	98	94	87	75	56	30	2.9
DUST	19							100	78	51	34	26	12
3/8 Rock	43					100	97	35	3				
Resultant	100					100	98	70	48	38	28	16	3.4

Hot Bin Gradation — % Passing

Bin	% Used	1%	1½	1	¼	½	¾	4	8	16	30	50	200
S	52							100	90	71	52	31	6
2	48					100	98	38	3				
3													
4													
5													
Resultant	100					100	99	70	48	37	28	16	3

Batch Weights	Bin S	Bin No. 2	Bin No. 3	Bin No. 4	Bin No. 5	AC	Total
	980	904				116	2000

Job Mix Formula	1%	1½	1	¼	½	¾	4	8	16	30	50	200	AC
Job Aim					100	98	69	48	36	28	15	3.5	5.8
Specification Limits					100	95	63	44	32	24	11	2	5.5

Source of Materials

Aggregates							Asphalt						
Coarse: <u>Swanton Lime</u>							AC-5:						
Fine: <u>Dust - Swanton Lime</u>							AC-10: .						
Sand <u>HIGHGATE</u>							Other: <u>85/100 B.P CANADA</u>						

Mixing Times — Dry: 6 Wet: 3.6 Total: 4.2 Temperature: 290 ± 20 F

Submitted by: Jeffrey L. Pooley (signature) Date: May 12, 1982

Company PIKE INDUSTRIES Inc. Title MATERIALS ENG.

FOR STATE OF VERMONT USE ONLY

Approved

Rejected

Comments:

See letter dated May 8, 1982 relative to mix design #1947

Signature Charles E. Jerd Title Bituminous Concrete Supervisor

TA 556 Rev. 500 Dup. 5/79

E-5

Date May 21, 1982



STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH DIVISION - BITUMINOUS CONCRETE SUBDIVISION

No. 1755

Design of Bituminous Concrete Mixtures

Town GEORGIA - Swanton

Project No. I.R. 8943(4)

Gentlemen:

In accordance with the specification requirements for the above project I submit the following job mix formula:

Pavement Type III

Produced By: PIKE INDUSTRIES INC. Plant Location SWANTON

Stockpile Gradations — % Passing

PL. 806

Size	% Used	1%	1½	1	¾	½	⅓	4	8	16	30	50	200
NAT SAND	36					100	96	89	80	65	46	24	1.7
STONE SCREENINGS	24							100	72	44	28	23	10
3/8	23					100	97	24	2				
1/2	17				100	99	20	1.5					
Resultant	100				100	100	84	62	47	34	22	14	3.0

Hot Bin Gradation — % Passing

Bin	% Used	1%	1½	1	¾	½	⅓	4	8	16	30	50	200
S	50							100	90	70	48	26	5
FINE	2	1									100	98	94
3	26					100	99	38	3				
4	23				100	99	31	3					
5													
Resultant					100	84	62	47	35	25	14	3.4	

Batch Weights	Bin S	Bin No. 2	Bin No. 3	Bin No. 4	Bin No. 5	AC	Total
	936	19	487	430		128	2000

Job Mix Formula	1%	1½	1	¾	½	⅓	4	8	16	30	50	200	AC
Job Aim					100	106	84	62	48	36	25	14	3.5
Specification Limits					100	95	78	56	44	32	21	10	6.0

Source of Materials

Aggregates							Asphalt						
Coarse: <u>SWANTON LIME</u>							AC-5:						
Fine: <u>STONE SCREENINGS - Swanton Lime</u>							AC-10:						
<u>NATURAL SAND - HYGATE</u>							Other: <u>85/100</u>						

Mixing Times — Dry: 6 Wet: 3 C. Total: 42 Temperature: 290 ± 20

Submitted by: Jeffrey S. Poole (signature) Date: 6-9-82

Company PIKE INDUSTRIES INC. Title MATERIALS ENGINEER

FOR STATE OF VERMONT USE ONLY

Approved

Rejected

Comments: Trial drop required. Final acceptance contingent on trial drop producing proper gradation, asphalt content 2.0 to 5.0% air voids and all other design criteria.

Signature Charles E. Jerd Title Bituminous Concrete Supervisor

TA 556 Rev. 500 Dup. 5/79

E-6 Date June 14, 1982



STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH DIVISION - BITUMINOUS CONCRETE SUBDIVISION

No 1769

Design of Bituminous Concrete Mixtures

Town NEWBURY - WATERFORD

Project No. I 91-2 (65) ST. II

Gentlemen:

In accordance with the specification requirements for the above project I submit the following job mix formula:

Pavement Type III Produced By: PIKE IND. INC. Plant Location WATERFORD VT
Stockpile Gradations — % Passing

Size	% Used	1%	1½	1	¼	½	%	4	8	16	30	50	200		
MAN. SA.	28						100	98	96	51	35	23	5		
SCR. SA.	29						100	95	90	78	45	19	4		
3/8 RK.	18						100	97	26	2					
1/2 RK.	25						100	93	38	2					
Resultant	100						100	98	84	61	47	37	23	12	3

Hot Bin Gradation — % Passing

Bin	% Used	1%	1½	1	¼	½	%	4	8	16	30	50	200			
S	54							100	88	69	42	23	6			
2	26							100	28	4						
3	20							100	98	24	5					
4																
5																
Resultant	100							100	100	84	62	48	37	23	12	3

Batch Weights	Bin S	Bin No. 2	Bin No. 3	Bin No. 4	Bin No. 5	AC	Total
	2028	977	751			244	4000

Job Mix Formula	1%	1½	1	¼	½	%	4	8	16	30	50	200	AC			
						100	98	84	60	48	37	23	11	3.5	6.1	
Job Aim	/	/	/			100 / 100	95 / 100	78 / 90	54 / 66	44 / 52	33 / 41	19 / 27	7 / 15	2 / 5	6.9	6.5

Specification Limits	1%	1½	1	¼	½	%	4	8	16	30	50	200	AC			
	/	/	/			100 / 108	95 / 100	78 / 90	54 / 74	39 / 60	24 / 45	14 / 35	6 / 34	0 / 5	6.5	6.8

Source of Materials

6.0 - 6.7

Aggregates	Asphalt
Coarse: WATERFORD QUARRY	AC-5:
Fine: MAN. SA. - WATERFORD QUARRY SCR. SA. - NUTTER PIT - WATERFORD	AC-10:
	Other: 85-100 B.P. CANADA

Mixing Times — Dry: 6 Wet: 36 Total: 42 Temperature: 290 ± 20

Submitted by: Charles C. Heffrich (signature) Date: May 17, 1982

Company PIKE IND. INC. Title VICE PRES-MATERIALS

FOR STATE OF VERMONT USE ONLY

Approved

Rejected ✓

Comments: Values in midrange of job requirements are more desirable in this design presentation particularly in the area of % voids filled/AC.

Signature Charles E. Jerd Title Bituminous Concrete Supervisor



STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH DIVISION - BITUMINOUS CONCRETE SUBDIVISION

No. 1793

Design of Bituminous Concrete Mixtures

Town NEWBURY - WATERFORD

Project No. I 91-2 (65) ST. III

Gentlemen:

In accordance with the specification requirements for the above project I submit the following job mix formula:

Pavement Type III Produced By: PIKE FND. INC. Plant Location WATERFORD VT

Stockpile Gradations — % Passing

Size	% Used	1 1/4	1 1/2	1	3/4	1/2	3/8	4	8	16	30	50	70	200
MAN. SA.	28							100	98	76	51	35	23	5
SCR. SA.	29							100	95	90	78	45	19	4
3/8 R.R.	18							100	97	26	2			
1/2 R.R.	25							100	93	38	2			
Resultant	100							100	98	84	61	47	37	23

Hot Bin Gradation — % Passing

Bin	% Used	1 1/4	1 1/2	1	3/4	1/2	3/8	4	8	16	30	50	70	200
S	54							100	88	69	42	23	6	
2	26							100	28	4				
3	20							100	98	24	5			
4														
5														
Resultant	100							100	100	84	62	48	37	23

Batch Weights	Bin S	Bin No. 2	Bin No. 3	Bin No. 4	Bin No. 5	AC	Total
	2022	973	749			256	4000

	1 1/4	1 1/2	1	3/4	1/2	3/8	4	8	16	30	50	70	200	AC
Job Mix Formula					100	98	84	60	48	37	23	11	3.5	6.4
Job Aim					100	95	78	54	44	33	19	7	2	6.0
Specification Limits					100	95	78	54	44	33	19	7	2	6.8

Source of Materials

Aggregates							Asphalt						
Coarse: WATERFORD QUARRY							AC-5:						
Fine: MAN. SA. - WATERFORD QUARRY							AC-10:						
SCR. SA. - NUTTER PIT - WATERFORD							Other: 85-100 B.P. CANADA						

Mixing Times — Dry: 4 Wet: 34 Total: 38 Temperature: 290±20

Submitted by: Charles C. Hefner (signature) Date: July 20, 1982

Company: PIKE FND. INC. Title: VICE PRES. - MATERIALS

FOR STATE OF VERMONT USE ONLY

Approved Rejected

Comments: Satisfactorily produced on previous project

Signature: Earl L. Chaffee

Title: Trans. Tech C

TA 556 Rev. 500 Dup. 5/79



STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH DIVISION - BITUMINOUS CONCRETE SUBDIVISION

No. 1949

Design of Bituminous Concrete Mixtures

Town NEWBURY - WATERFORD

Project No. I-91-2 (65) ST. III

Gentlemen:

In accordance with the specification requirements for the above project I submit the following job mix formula:

Pavement Type III Produced By: PIKE IND. INC. Plant Location WATERFORD VT.

Stockpile Gradations — % Passing

Size	% Used	1%	1½	1	¼	½	¾	4	8	16	30	50	200
MAN.SA.	28							100	98	76	51	35	23 5
SCR.SA.	29							100	95	90	78	45	19 4
3/8 RK.	18							100	97	26	2		
1/2 RK.	25							100	93	38	2		
Resultant	100							100	98	84	61	47	37 23 12 3

Hot Bin Gradation — % Passing

Bin	% Used	1%	1½	1	¼	½	¾	4	8	16	30	50	200
S	54							100	86	67	41	22	6
2	26							100	98	28	3		
3	20							100	98	30	3		
4													
5													
Resultant	100							100	100	83	62	48	37 23 12 3

Batch Weights	Bin S	Bin No. 2	Bin No. 3	Bin No. 4	Bin No. 5	AC	Total
	4553	2183	1687			567576	9000

	1%	1½	1	¼	½	¾	4	8	16	30	50	200	AC
Job Mix Formula							100	98	84	60	48	37	23 11 3.5 6.4
Job Aim							100	95	78	54	44	33	19 7 2 5 6.8
Specification Limits							100	95	78	54	44	33	19 7 2 5 6.8

Source of Materials

Aggregates							Asphalt						
Coarse: WATERFORD QUARRY							AC-5:						
Fine: MAN. SA. - WATERFORD QUARRY SCR. SA. - NUTTER PIT - WATERFORD							AC-10:						
							Other: 85-100 B.P. CANADA						

Mixing Times — Dry: 6 Wet: 36 Total: 42 Temperature: 290 ± 20

Submitted by: Charles C. Helfrich (signature) Date: May 27, 1982

Company: PIKE IND. INC. Title: VICE PRES-MATERIALS

FOR STATE OF VERMONT USE ONLY

Approved ✓

Rejected

Comments:

Lined acceptance of this design is contingent on the mixture producing all ~~as~~ contracted requirements.

Signature: Charles E. Jerd Title: Bituminous Concrete Supervisor

TA 556 Rev. 500 Dup. 5/79

E-9

Date: July 13, 1982



STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH DIVISION - BITUMINOUS CONCRETE SUBDIVISION

No 1766

Design of Bituminous Concrete Mixtures

Town SUNDERLAND - MANCHESTER

Project No. F.L.H. - F.O.19-1(2) S-III

Gentlemen:

In accordance with the specification requirements for the above project I submit the following job mix formula:

Pavement Type **II**

Produced By: **PIKE INDUSTRIES INC.** Plant Location **S. SHAFTSBURY VT.**
Stockpile Gradations — % Passing

P. 910

Size	% Used	1%	1½	1	¼	½	%	4	8	16	30	50	200			
S. S. 2	8						100	98	95	90	82	65	17			
1½ S. 2	43						100	96	65	43	27	14	2			
¾ G.R.	19						100	99	30	6						
½ G.R.	4						100	98	45	3						
⅓ G.R.	26						100	96	33	6						
Resultant	100						100	99	83	73	55	37	26	18	11	32

Hot Bin Gradation — % Passing

Bin	% Used	1%	1½	1	¼	½	%	4	8	16	30	50	200			
S	44							100	78	55	37	24	6			
2	26						100	99	33	6						
3	6						100	99	35	5						
4	23						100	97	20	6						
BIN 5 FINES	1								100	99	96	91	40			
Resultant	100						100	99	82	73	53	37	25	17	12	30

Batch Weights	Bin S	Bin No. 2	Bin No. 3	Bin No. 4	Bin No. 5	AC	Total
	339.2	198.6	447	175	4.5 seconds	4.24	8000

Job Mix Formula	1%	1½	1	¼	½	%	4	8	16	30	50	200	AC
			100	98	82	74	55	38	24	18	12	3.5	5.3
Job Aim			100	95	76	68	49	39	22	14	8	2	4.9
Specification Limits			100	95	76	62	44	30	20	13	6	0	4.5

Source of Materials

Aggregates	Asphalt
Coarse: Wm. F. DAILEY Inc. S. SHAFTSBURY	AC-5:
Fine: Wm. F. DAILEY Inc. S. SHAFTSBURY	AC-10:
	Other: BE/LLP PEO B.P MONTREAL CANADA

Mixing Times — Dry: 1 Wet: 3.4 Total: 3.8 Temperature: 290 ± 20 F°

Submitted by: *Jeffrey S. Roddy* (signature) Date: SEPT 17 1982

Company: PIKE INDUSTRIES INC. Title: MATERIALS ENGINEER

FOR STATE OF VERMONT USE ONLY

Approved

Rejected

Comments: Supersedes design #2407

Charles E. Jerd

Title: Bituminous Concrete Supervisor
E-11 Date: Sept 17, 1982



STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH DIVISION - BITUMINOUS CONCRETE SUBDIVISION No 2466

Design of Bituminous Concrete Mixtures

Town SUNDERLAND-MANCHESTER...

Project No. F.L.H.-F.019-1(21) ST. II

Gentlemen:

In accordance with the specification requirements for the above project I submit the following job mix formula:

Pavement Type ... III

Produced By: PIKE IND. INC.

Plant Location S. SHAFTSBURY VT.

#910

Stockpile Gradations — % Passing

Size	% Used	1%	1½	1	¼	½	%	4	8	16	30	50	200	
Sc. SA.	10						100	98	95	90	82	65	17	
WA. SA.	55						100	96	65	43	27	14	2	
3/8. GR.	5						100	99	30	6				
1/2. GR.	30				100	98	45	3						
Resultant	100				100	99	84	65	46	33	23	14	2.8	

Hot Bin Gradation — % Passing

Bin	% Used	1%	1½	1	¼	½	%	4	8	16	30	50	200	
S	55.5							100	79	56	37	23	5	
2	19.0						100	99	35	6				
3	24.0				100	97	35	8						
B.H. 4 FINES	1.5								100	99	96	91	40	
5														
Resultant	100				100	99	84	66	47	33	22	14	3.4	

Batch Weights	Bin S	Bin No. 2	Bin No. 3	Bin No. 4	Bin No. 5	AC	Total
	4291	1430	1807	6.8 SEC.		472	8000

Job Mix Formula	1%	1½	1	¼	½	%	4	8	16	30	50	200	AC	
				100	99	84	66	47	34	23	14	3.5	5.9	
Job Aim				100	95	78	60	43	30	19	10	2	5.5	
Specification Limits				100	95	78	54	39	24	14	6	0	5.5	

Source of Materials

Aggregates	Asphalt
Coarse: Wm. E. DAILEY, INC. S. SHAFTSBURY VT.	AC-5:
Fine: Wm E. DAILEY INC. S. SHAFTSBURY VT.	AC-10:
	Other: 85/100 PEN BP MONTREAL CANADA

Mixing Times — Dry: 4 Wet: 34 Total: 38 Temperature: 290°F ± 20°F

Submitted by: Paul B. Johnson (signature) Date: 9-14-82

Company: PIKE IND. INC. Title: MATER'S ENGR.

FOR STATE OF VERMONT USE ONLY

Approved ✓

Rejected

Comments: Trial drop required. Trial acceptance

Contingent on trial drop producing the proper gradation, AC content, air voids between 2.0 and 5.0% and all other design criteria established for this project.

Signature: Charles E. Jerd Title: Bituminous Concrete Supervisor

TA 556

E-12

Date Sept. 24, 1981



STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH DIVISION - BITUMINOUS CONCRETE SUBDIVISION No 2402
Design of Bituminous Concrete Mixtures

Town SUNDERLAND-MANCHESTER

Project No. FLH-F 019-1(21) ST II

Gentlemen:

In accordance with the specification requirements for the above project I submit the following job mix formula:

Pavement Type FF Produced By: PIKE IND. INC. Plant Location S. SHAFTSBURY VT.
Stockpile Gradations — % Passing

Size	% Used	1%	1½	1	%	½	%	4	8	16	30	50	200
SC, SA.	8						100	98	95	90	82	6.5	17
WA, SA.	43						100	96	65	43	27	14	2
3/8 GR.	19					100	99	30	6				
1/2 GR.	4					100	98	45	3				
3/4 GR.	26			100	96	33	6						
Resultant	100			100	99	83	73	55	37	26	18	11	2.2

Hot Bin Gradation — % Passing

Bin	% Used	1%	1½	1	%	½	%	4	8	16	30	50	200
S	46							100	78	55	37	24	6.0
2	23					100	99	33	6				
3	8				100	99	35	5					
4	22			100	97	20	6						
B.H. 5 FINES	1								100	99	96	91	40
Resultant	100			100	99	82	74	55	38	26	18	12	3.2

Batch Weights	Bin S	Bin No. 2	Bin No. 3	Bin No. 4		AC	Total
	3568	1796	607	1671	4.5 SEC.	408	8000

Job Mix Formula	1%	1½	1	%	½	%	4	8	16	30	50	200	AC
			100	98	82	74	55	38	26	18	12	3.5	5.1
Job Aim			100	95	76	68	49	34	22	14	8	2	4.7

Specification Limits	1%	1½	1	%	½	%	4	8	16	30	50	200	AC
			100	95	76	62	44	30	20	13	6	0	4.5

Source of Materials

Aggregates	Asphalt
Coarse: Wm. E. DAILEY INC., S. SHAFTSBURY VT.	AC-5:
Fine: Wm. E. DAILEY INC., S. SHAFTSBURY VT.	AC-10:
Other: 85/100 PEN BP MONTREAL CANADA	

Mixing Times — Dry: 4 Wet: 30 Total: 34 Temperature: 290°F ± 20°F

Submitted by: Paul D. Bergeron (signature)

Company: PIKE IND. INC. Title:

FOR STATE OF VERMONT USE ONLY

Approved

Rejected ✓

Comments:

See letter of Sept 2, 1982 relative to mix design #2402.

Signature: Charles E. Jend

Title: Bituminous Concrete Supervisor

E-10

Date: Sept. 14, 1982



STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH DIVISION - BITUMINOUS CONCRETE SUBDIVISION

No 1772

Design of Bituminous Concrete Mixtures

Town WATERFORD - ST. JOHNSBURY

Project No. I 9.3 - 1(4) ST. II

Gentlemen:

In accordance with the specification requirements for the above project I submit the following job mix formula:

Pavement Type II Produced By: PIKE IND. INC. Plant Location WATERFORD VT.
803
Stockpile Gradations — % Passing

Size	% Used	1%	1½	1	%	½	%	4	8	16	30	50	200
MAN. SA.	23						100	98	76	51	35	23	5
SCR. SA.	23						100	95	90	78	45	19	4
3/8 RK.	23					100	97	26	2				
1/2 RK.	5				100	93	38	2					
3/4 RK.	26			100	97	33	4	1					
Resultant	100			100	99	82	71	50	38	30	18	10	2

Hot Bin Gradation — % Passing

Bin	% Used	1%	1½	1	%	½	%	4	8	16	30	50	200
S	43							100	86	67	41	22	6
2	25					100	98	28	3				
3	8				100	98	30	3					
4	24			100	98	29	4						
5													
Resultant	100			100	100	83	71	50	38	29	18	10	3

Batch Weights	Bin S	Bin No. 2	Bin No. 3	Bin No. 4	Bin No. 5	AC	Total
	3666	2131	681	2045		477	9000

Job Mix Formula	1%	1½	1	%	½	%	4	8	16	30	50	200	AC
Job Aim	/	/	100	95	76	65	44	34	26	14	6	2	5.0
Specification Limits	/	/	100	95	76	62	44	30	20	13	6	0	5.8

Source of Materials

Aggregates							Asphalt						
Coarse: WATERFORD QUARRY							AC-5:						
Fine: MAN. SA. - WATERFORD QUARRY							AC-10:						
SCR. SA. - NUTTER PIT - WATERFORD							Other: B5-100 B.P. CANADA						

Mixing Times — Dry: 6 Wet: 36 Total: 42 Temperature: 290 ± 20

Submitted by: Charles C. Helfrich (signature) Date: May 21, 1982

Company PIKE IND. INC. Title VICIE PCBS - MATERIALS MGR

FOR STATE OF VERMONT USE ONLY

Approved

Rejected

Comments: Trial drop required. Limit acceptance contingent on trial drop producing proper gradation, AC content and air voids between 2.0 and 5.0%.

Signature Charles E. Jerd Title Bituminous Concrete Supervisor

E-13 Date May 28, 1982



STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH DIVISION - BITUMINOUS CONCRETE SUBDIVISION

No 1798

Design of Bituminous Concrete Mixtures

Town WATERFORD - ST. JOHNSBURY Project No. I-93-1(4) ST. 26

Gentlemen:

In accordance with the specification requirements for the above project I submit the following job mix formula:

Pavement Type **II** Produced By: PIKE IND. INC. Plant Location WATERFORD VT
Stockpile Gradations — % Passing

Size	% Used	1 1/4	1 1/2	1	3/4	1/2	3/8	4	8	16	30	50	200	
MAN. SA.	23						100	98	76	51	35	23	5	
SCR. SA.	23						100	95	80	78	45	19	4	
3/8 RK.	23					100	97	26	2					
1/2 RK.	5				100	93	38	2						
3/4 RK.	26			100	97	33	4	1						
Resultant	100			100	99	82	71	50	38	30	18	10	2	

Hot Bin Gradation — % Passing

Bin	% Used	1 1/4	1 1/2	1	3/4	1/2	3/8	4	8	16	30	50	200	
S	43							100	86	67	41	22	6	
2	25					100	98	28	3					
3	8				100	98	30	3						
4	24			100	98	29	4							
5														
Resultant	100			100	100	83	71	50	38	29	18	10	3	

Batch Weights	Bin S	Bin No. 2	Bin No. 3	Bin No. 4	Bin No. 5	AC	Total
	366.6	2131	681	2045		477	9000

	1 1/4	1 1/2	1	3/4	1/2	3/8	4	8	16	30	50	200	AC
Job Mix Formula			100	98	82	71	50	38	30	18	10	3.5	5.3
Job Aim			100	95	76	65	44	34	26	14	6	2	5.0
Specification Limits			100	95	76	62	44	30	20	13	6	0	5.1

Source of Materials

Aggregates				Asphalt									
Coarse: WATERFORD QUARRY				AC-5:									
Fine: MAN. SA. - WATERFORD QUARRY SCR. SA. - NOTTER PIT - WATERFORD				AC-10:									
				Other: 85-100 B.P. CANADA									

Mixing Times — Dry: 4 Wet: 34 Total: 38 Temperature: 290° 20°

Submitted by: Charles C. Hefrich (signature) Date: July 21, 1982

Company PIKE IND. INC. Title: VICE PRES - MATERIALS

FOR STATE OF VERMONT USE ONLY

Approved

Rejected

Comments: Satisfactory produced on previous project



Title Trans Tech C

E-14 Date 7/24/82

Signature Erle Chaffee

MA 556 Rev 500 Dated 5/79

STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH DIVISION - BITUMINOUS CONCRETE SUBDIVISION No 1795
Design of Bituminous Concrete Mixtures

Town WATERFORD ST. JOHNSBURY Project No. F.93-1(4) ST. II

Gentlemen:

In accordance with the specification requirements for the above project I submit the following job mix formula:

Pavement Type III Produced By: PIKE IND. INC. Plant Location WATERFORD VT.
Stockpile Gradations — % Passing

Size	% Used	1 1/4	1 1/2	1	3/4	1/2	3/8	4	8	16	30	50	200	
MAN. SA.	28							100	98	76	51	35	23	5
SCR. SA.	29							100	95	90	78	45	19	4
3/8 PK.	18							100	97	26	2			
1/2 PK.	25							100	93	38	2			
Resultant	100							100	98	84	61	47	37	23

Hot Bin Gradation — % Passing

Bin	% Used	1 1/4	1 1/2	1	3/4	1/2	3/8	4	8	16	30	50	200
S	54							100	86	67	41	22	6
2	26							100	98	28	3		
3	20							100	98	30	3		
4													
5													
Resultant	100							100	100	83	62	48	37

Batch Weights	Bin S	Bin No. 2	Bin No. 3	Bin No. 4	Bin No. 5	AC	Total
	4549	2190	1685			576	9000

Job Mix Formula	1 1/4	1 1/2	1	3/4	1/2	3/8	4	8	16	30	50	200	AC
Job Aim				100	95	78	54	44	33	19	7	2	6.0
Specification Limits				100	100	90	66	52	41	27	15	.5	6.8
				100	95	78	54	39	24	14	6	0.5	6.8

Source of Materials

Aggregates							Asphalt						
Coarse: WATERFORD QUARRY							AC-5:						
Fine: MAN. SA. - WATERFORD QUARRY SCR. SA. - WATER PIT - WATERFORD							AC-10:						
							Other: 85-NO B.P. CANADA						

Mixing Times — Dry: 4 Wet: 34 Total: 38 Temperature: 290±20

Submitted by: Charles C. Helfrich (signature) Date: July 20, 1982

Company PIKE IND. INC. Title VIC. PRES. MATERIALS

FOR STATE OF VERMONT USE ONLY

Approved Rejected

Comments: Satisfactorily produced on previous project.

Signature Earle Cliffe

Title Trans. Tech. C.

TA 556 Rev. 500 Dup. 5/79

E-15 Date 7/24/82



STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH DIVISION - BITUMINOUS CONCRETE SUBDIVISION No 1950
Design of Bituminous Concrete Mixtures

Town WATERFORD - ST. JOHNSBURY

Project No. I 93-1(4) ST. II

Gentlemen:

In accordance with the specification requirements for the above project I submit the following job mix formula:

Pavement Type II Produced By: PIKE IND. INC. Plant Location WATERFORD VT.

Stockpile Gradations — % Passing

Size	% Used	1%	1½	1	¼	½	¾	4	8	16	30	50	200
M.A.N. SA.	23							100	98	76	51	35	23
S.C.R. SA.	23							100	95	90	78	45	19
3/8 PK.	23					100	97	26	2				
1/2 PK.	5				100	93	38	2					
3/4 PK.	26			100	97	33	4	1					
Resultant	100			100	99	82	71	50	38	30	18	10	2

Hot Bin Gradation — % Passing

Bin	% Used	1%	1½	1	¼	½	¾	4	8	16	30	50	200
S	42							100	88	69	42	23	6
2	23							100	98	30	3		
3	10				100	98	32	2					
4	25				100	98	26	2					
5													
Resultant	100			100	99	82	67	49	38	29	18	10	3

Batch Weights	Bin S	Bin No. 2	Bin No. 3	Bin No. 4	Bin No. 5	AC	Total
	1590	871	379	948		212	4000

Job Mix Formula	1%	1½	1	¼	½	¾	4	8	16	30	50	200	AC
			100	98	82	68	50	38	30	18	10	3.5	5.3
Job Aim			100	95	76	62	44	34	26	14	6	2	5.0
Specification Limits			100	95	76	62	44	30	20	13	6	0	5.7

Source of Materials

Aggregates	Asphalt
Coarse: WATERFORD QUARRY	AC-5:
Fine: M.A.N. SA. - WATERFORD QUARRY SCR. SA. - NUTTER PIT - WATERFORD	AC-10:
	Other: B5-100 B.P. CANADA

Mixing Times — Dry: 6 Wet: 36 Total: 42 Temperature: 290±20

Submitted by: Charles C. Hechels (signature) Date: May 27, 1982

Company: PIKE IND. INC. Title: VICE PRES - MATERIALS

FOR STATE OF VERMONT USE ONLY

Approved ✓

Rejected

Comments: Trial drop required. Final acceptance contingent on trial drop producing proper gradation, AC content and air voids between 2.0 and 5.0%.

Signature: Charles C. Jerd Title: Bituminous Concrete Supervisor

TA 556 Rev. 500 Dup. 5/79

E-16 Date June 2, 1982



STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH DIVISION - BITUMINOUS CONCRETE SUBDIVISION

No 1794

Design of Bituminous Concrete Mixtures

Town WATERFORD ST. JOHNSBURY Project No. I-93-1A ST. II

Gentlemen:

In accordance with the specification requirements for the above project I submit the following job mix formula:

Pavement Type III Produced By: PINE EVO. INC. Plant Location WATERFORD VT.

Stockpile Gradations — % Passing

Size	% Used	1 1/4	1 1/2	1	1/4	1/2	3/8	1/4	8	16	30	50	200
MAN. SA.	28							100	98	76	51	35	23
SCR. SA.	29							100	95	90	78	45	19
3/8 PK.	18						100	97	26	2			
1/2 PK.	25				100	93	38	2					
Resultant	100				100	98	84	61	47	37	23	12	3

Hot Bin Gradation — % Passing

Bin	% Used	1 1/4	1 1/2	1	1/4	1/2	3/8	1/4	8	16	30	50	200
S	54							100	88	69	42	23	6
2	26						100	28	4				
3	20				100	98	24	5					
4													
5													
Resultant	100				100	100	84	62	48	37	23	12	3

Batch Weights	Bin S	Bin No. 2	Bin No. 3	Bin No. 4	Bin No. 5	AC	Total
	2022	973	749			256	4000

	1 1/4	1 1/2	1	1/4	1/2	3/8	1/4	8	16	30	50	200	AC
Job Mix Formula				100	98	84	60	48	37	23	11	3.5	6.4
Job Aim				NO	95	78	54	44	33	19	7	2	6.0
Specification Limits				100	100	90	66	52	41	37	15	5	6.8

Source of Materials

Aggregates							Asphalt						
Coarse: WATERFORD QUARRY							AC-5:						
Fine: MAN. SA. - WATERFORD QUARRY							AC-10:						
SCR. SA. - NOTTER PIT - WATERFORD							Other: 85-100 B.P. CANADA						

Mixing Times — Dry: 4 Wet: 34 Total: 38 Temperature: 290°F

Submitted by: C. H. Helfrich (signature) Date: July 20, 1982

Company: PINE EVO. INC. Title: VICE PRES - WATERFORD

FOR STATE OF VERMONT USE ONLY

Approved Rejected

Comments: Satisfactorily produced on previous project.

Signature Earl L Chaffee

Title Trans Tech C

TA 556 Rev. 500 Dup. 5/79

E-17 Date 7/24/82



STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH DIVISION - BITUMINOUS CONCRETE SUBDIVISION

No 1771

Design of Bituminous Concrete Mixtures

Town WATERFORD - ST. JOHNSBURY Project No. I. 93-1(4) ST. II

Gentlemen:

In accordance with the specification requirements for the above project I submit the following job mix formula:

Pavement Type IV Produced By: PIKE IND. INC. Plant Location WATERFORD VT

Stockpile Gradations — % Passing

Size	% Used	1%	1½	1	¼	½	%	4	8	16	30	50	200	
MAN. SA.	29						100	98	76	51	35	23	5	
SCR. SA.	29						100	95	90	78	45	19	4	
BB PK.	42						100	97	26	2				
Resultant	100						100	99	67	49	37	23	12	2.5

Hot Bin Gradation — % Passing

Bin	% Used	1%	1½	1	¼	½	%	4	8	16	30	50	200	
S	54							100	88	69	42	23	6	
2	46						100	28	4					
3														
4														
5														
Resultant	100						100	100	67	48	37	23	12	3

Batch Weights	Bin S	Bin No. 2	Bin No. 3	Bin No. 4	Bin No. 5	AC	Total
	2024	1724				252	4000

Job Mix Formula	1%	1½	1	¼	½	%	4	8	16	30	50	200	AC
						100	98	68	48	37	23	12	3.5
Job Aim						100	95	62	44	33	19	8	6.0
Specification Limits						100	100	74	52	41	27	16	6.7

Source of Materials

Aggregates							Asphalt						
Coarse: WATERFORD QUARRY							AC-5:						
Fine: MAN. SA. - WATERFORD QUARRY							AC-10:						
SCR. SA. - NUTTER PIT - WATERFORD							Other: 85-100 B.P. CANADA						

Mixing Times — Dry: 6 Wet: 36 Total: 42 Temperature: 290±20

Submitted by: Charles E. Jerd (signature) Date: May 17, 1982

Company PIKE IND. INC. Title VIC/3 PRES-MATERIALS

FOR STATE OF VERMONT USE ONLY

Approved

Rejected

Comments: mix used satisfactorily on a previous project with 6.4% asphalt content. Approval of mix is contingent on using 6.4% asphalt content.

Signature Charles E. Jerd Title Bituminous Concrete Supervisor



MATERIALS LIST

I	PROJECT NAME & NUMBER	-	GEORGIA - SWANTON IR 89-3(4)
	SOURCE OF COARSE AGGREGATE	-	SWANTON LIME, SWANTON, VT.
	TYPE	-	CRUSHED STONE
	AVG. BULK SP.GR. OF COARSE AGGREGATE	-	2.721
	SOURCE OF FINE AGGREGATE NO. 1	-	BUSHEY PIT, HIGHGATE, VT.
	TYPE	-	SCREENED SAND
	SOURCE OF FINE AGGREGATE NO. 2	-	SWANTON LIME, SWANTON, VT.
	TYPE	-	MANUFACTURED SAND (Stone Screenings)
	AVG. BULK SP.GR. OF FINE AGGREGATE	-	#1 - 2.575 #2 - 2.525
	SOURCE OF ASPHALT CEMENT	-	BP - MONTREAL, QUEBEC
	GRADE	-	85-100 PENETRATION
	AVERAGE PENETRATION	-	91.4
	AVG. ABSOLUTE VIS. @ 140 ⁰ F., POISES	-	1401
	AVG. KINEMATIC VIS. @ 275 ⁰ F., C.S.	-	340
II	PROJECT NAME & NUMBER	-	NEWBURY - WATERFORD I91-2(65) S/III
	SOURCE OF COARSE AGGREGATE	-	WATERFORD SAND & GRAVEL, WATERFORD, VT.
	TYPE	-	CRUSHED STONE
	AVG. BULK SP.GR. OF COARSE AGGREGATE	-	2.954
	SOURCE OF FINE AGGREGATE NO. 1	-	NUTTER PIT, WATERFORD, VT.
	TYPE	-	SCREENED SAND
	SOURCE OF FINE AGGREGATE NO. 2	-	WATERFORD SAND & GRAVEL, WATERFORD, VT.
	TYPE	-	MANUFACTURED SAND (Stone Screenings)
	AVG. BULK SP.GR. OF FINE AGGREGATE	-	#1 - 2.539 #2 - 2.824
	SOURCE OF ASPHALT CEMENT	-	BP MONTREAL, QUEBEC
	GRADE	-	85 - 100 PENETRATION
	AVERAGE PENETRATION	-	94
	AVG. ABSOLUTE VIS. @ 140 ⁰ F., POISES	-	1348
	AVG. KINEMATIC VIS. @ 275 ⁰ F., C.S.	-	334.5

MATERIALS LIST

III	PROJECT NAME & NUMBER	- SUNDERLAND-MANCHESTER FLH F 019-1(21) S/2
	SOURCE OF COARSE AGGREGATE	- W. E. DAILEY, S. SHAFTSBURY, VT.
	TYPE	- CRUSHED GRAVEL
	AVG. BULK SP.GR. OF COARSE AGGREGATE	- 2.704
	SOURCE OF FINE AGGREGATE NO. 1	- W. E. DAILEY, S. SHAFTSBURY, VT.
	TYPE	- SCREENED SAND
	SOURCE OF FINE AGGREGATE NO. 2	- W. E. DAILEY, S. SHAFTSBURY, VT.
	TYPE	- WASHED SAND
	AVG. BULK SP.GR. OF FINE AGGREGATE	- #1 - 2.693 #2 - 2.665
	SOURCE OF ASPHALT CEMENT	- BP - MONTREAL, QUEBEC
	GRADE	- 85 - 100 PENETRATION
	AVERAGE PENETRATION	- 91.1
	AVG. ABSOLUTE VIS. @ 140 ⁰ F., POISES	- 1303
	AVG. KINEMATIC VIS. @ 275 ⁰ F., C.S.	- 321
IV	PROJECT NAME & NUMBER	- WATERFORD-ST.JOHNSBURY I93-1(4) S/2
	SOURCE OF COARSE AGGREGATE	- WATERFORD SAND & GRAVEL, WATERFORD, VT.
	TYPE	- CRUSHED STONE
	AVG. BULK SP.GR. OF COARSE AGGREGATE	- 2.954
	SOURCE OF FINE AGGREGATE NO. 1	- NUTTER PIT, WATERFORD, VT.
	TYPE	- SCREENED SAND
	SOURCE OF FINE AGGREGATE NO. 2	- WATERFORD SAND & GRAVEL, WATERFORD, VT.
	TYPE	- MANUFACTURED SAND (Stone Screenings)
	AVG. BULK SP.GR. OF FINE AGGREGATE	- #1 - 2.539 #2 - 2.824
	SOURCE OF ASPHALT CEMENT	- BP - MONTREAL, QUEBEC
	GRADE	- 85 - 100 PENETRATION
	AVERAGE PENETRATION	- 90.7
	AVG. ABSOLUTE VIS. @ 140 ⁰ F., POISES	- 1365
	AVG. KINEMATIC VIS. @ 275 ⁰ F., C.S.	- 335.5