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DEPARTMENT OF HIGHWAYS
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September 29, 1972

H.2.49

Memorandum to: J. R. Harbison
State Highway Engineer
Chairman, Research Committee

Subject: Research Report No. 340; "Construction of Full-Depth Asphaltic Concrete Pavements;" KYHPR-70-49; HPR-1(8), Part II.

The brief, interim report submitted herewith documents the history of the experimental, full-depth, asphaltic concrete paving project (US 60, Ashland-Cannonsburg) through the construction phase. Progress reports are required by PPM 20-6.2. An advance report on the project was made to the Kentucky Highway Conference last March by W. B. Drake; his report was published in the conference proceedings (Bulletin 99, College of Engineering, University of Kentucky, June 1972).

Since the conception of this project, full-depth designs have been employed on some sections of the Green River Valley and Cumberland Parkways. Some tests and evaluations planned for the US 60 project may be conducted also on the Parkway sections to obtain extended data.

A weighing-vehicles-in-motion system will be installed on the US 60 project within the next few months. Other measurements are proceeding according to schedule. Significant developments will be reported from time to time during the next five years.

Respectfully submitted,

Jas. H. Havens
Director of Research

JHH:dw
Attachment
cc's: Research Committee

TECHNICAL REPORT STANDARD TITLE PAGE

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4. Title and Subtitle	5. Report Date
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Prepared in cooperation with the US Department of Transportation, Federal Highway Administration

Study Title: Full-Depth Asphaltic Concrete Pavements

16. Abstract

Considerable attention has been devoted to the design and use of full-depth asphaltic concrete pavements. An experimental full-depth pavement was constructed on the Cannonsburg-Ashland Road (US 60), and the mechanical response of each asphaltic concrete layer to static and dynamic loading has been tested during construction.

This report is a documentation of section designs and construction procedures and summarily presents construction test results to be used in future analyses.

17. Key Words	18. Distribution Statement
Full-depth asphaltic concrete pavements, CBR, Density, Benkelman beam, Road Rater, DGA, crushed slag aggregate, deflection	

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Research Report
340

CONSTRUCTION OF FULL-DEPTH ASPHALTIC CONCRETE PAVEMENTS

KYHPR 70-49, HPR-1(8), Part II
Interim Report

by

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and

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Division of Research
DEPARTMENT OF HIGHWAYS
Commonwealth of Kentucky

in cooperation with the
U. S. Department of Transportation
Federal Highway Administration

September 1972

PROJECT DESCRIPTION

Project F 1(10), SP 10-165 and SP 10-145, Boyd County, Cannonsburg-Ashland Road (US 60), was chosen in 1970 by the Division of Design for the investigation of full-depth asphaltic concrete pavement designs and performance (see Figure 1). The eastbound lanes were constructed according to Figures 2 and 3, which show CBR's, total section depths, construction lift thicknesses, test sections and project termini, conventional control section at the east end, and shoulder designs. Existing US 60 lanes were salvaged and incorporated into the westbound lanes from Station 128+00 to Station 321+50. The remainder of the westbound lanes to the Ashland city limits utilized the same design as for the eastbound lanes. Design cross sections are shown in APPENDIX A.

This project was designed as a four-lane, divided highway having two 12- foot lanes in each direction and 10-foot outer shoulders and 4-foot inner shoulders (Figure 4). The center area was designed as a depressed grass median (Figure 5) from Station 128+00 to Station 312+00; and from Station 312+00 to Station 329+50, a paved flush median (Figure 6) was constructed to allow easy access to a shopping center. The section from Station 329+50 to the Ashland city limits was designed with a lip curb and gutter and a paved, 16-foot, mountable median (Figures 7 through 9).

The eastbound lanes from Station 80+00 to Station 128+00 were constructed using conventional designs. This section was not a part of the research study but can be used as a control correlation with the full-depth asphaltic concrete sections.

The contract for this project was awarded to Kentucky Road Oiling Company, Georgetown, Kentucky on May 12, 1970. Paving was subcontracted to Ashland Asphalt Paving, Ashland, Kentucky. Construction was to begin no later than June 12, 1970, and was to be completed by December 1, 1971.

CONSTRUCTION EQUIPMENT

The subgrade was compacted with a sheepsfoot roller and a vibrating roller and cut to grade with a CMI machine (Figures 10 and 11). Final compaction was accomplished with a RayGo "Rascal" vibratory roller and a pneumatic-tired roller.

Slag DGA base, where used, was laid with an aggregate spreader box and was compacted with a RayGo "Rascal" vibratory roller. Final grade was cut with a CMI machine and final compaction was also accomplished with the RayGo "Rascal".

A Barber Greene Model SB-50 paver with a 24-foot capacity (Figure 12) was used to lay both lanes in a single pass, thus eliminating a centerline construction joint. Continuous skids on the SB-50 paver (Figure 13) created a few problems in controlling lift thicknesses. A slight irregularity in the subgrade would cause a thickness change for the length of the skid. For example, as the skid would start over a high area, the thickness of asphaltic material being laid would increase until the skid cleared the raised area. The problem was eliminated by replacing the long, continuous skid with a series of short, articulating skids as shown in Figure 14. Individual skid units would pass over an irregularity in the subgrade without causing a significant change in the pavement thickness. Pavement breakdown rolling was accomplished with a Huber ten-ton, two-axle tandem roller followed by Galion nine-wheel, pneumatic-tired roller for intermediate compaction. Finish rolling was accomplished with a Galion eight-ton, two-axle tandem roller -- in the eastbound lanes from Station 373+50 to Station 399+50, a RayGo "Rustler" 404 vibratory roller was used (Figure 15). (For a complete report on the use of the vibratory roller, see Research Report 328 entitled *Comparative Evaluation of RayGo 404 Vibratory Roller*.)

CONSTRUCTION MATERIALS

Construction supervision and inspection of materials were accomplished in accordance with standard procedures. Tests by Division of Research personnel were for research purposes only and were not used in the control, or acceptance, of materials or construction.

Two types of subgrade material were anticipated in design and construction of the project. From Station 128+00 to Station 210+00, the material was a shale credited with a CBR of 9. This material is found along the alluvial terraces of the East Fork of the Little Sandy River and its tributaries. The remainder of the project was constructed on soil subgrade having a CBR of 3. The soil is derived from materials found in the middle to upper portions of the Breathitt Formation of Middle Pennsylvanian Age. Top portions of exposed cuts may be in the lowest part of the Conemaugh Formation of Upper Pennsylvanian Age.

Dense graded aggregate (DGA) used in the construction was crushed slag. The crushed slag had a specific gravity of 2.33 and was obtained from Standard Slag of Ashland.

Aggregate for the asphaltic concrete was the same as that used for the DGA. Asphalt used as a binder varied from 5.7 percent in the upper lifts of the base to 7.5 percent in the surface mix for the paved median. The slag aggregate contained excessive moisture and created some problems. Moisture was first detected by excessive bleeding of the asphaltic concrete (Figures 16 and 17). PAC 5 asphaltic cement was used in all asphaltic concrete paving, except that PAC 7 was used in the final one-inch seal coat treatment on the shoulders.

SELECTION OF TEST STATIONS

Seventy-four stations were chosen as test stations throughout the project (Table 1). From Station 80+00 to Station 210+00, every fifth station was selected. If one of these stations was located at an intersection, the next station was tested. From Station 210+00 to the end of the project, the same number of stations per section were tested, but these test stations and alternate sites were chosen randomly. Alternate test stations were used wherever one of the chosen test stations was located at an intersection. Locations across the mainline width for the nuclear density tests were selected on a random basis.

At each test station, nuclear density, Benkelman beam, and California Road Rater tests were run. Benkelman beam and Road Rater measurements were taken in each wheel track. Shoulders at each of these stations were also tested.

RESEARCH TESTING

Density tests were run with a Seaman nuclear density meter (Figure 18). Tests were performed on the subgrade, DGA, and each lift of asphaltic concrete. Moisture and density values and the percent of maximum laboratory densities of the subgrade are given in APPENDIX B. Table 2 summarizes moisture-density data and specific gravities of subgrade material obtained from laboratory tests on samples taken from borrow pits. Results of moisture-density tests on DGA are given in Table 3. APPENDIX C gives the moisture content, density, and percent compaction of the asphaltic concrete. Very few problems were encountered with density testing, and almost all planned tests were completed.

Benkelman beam tests (Figure 19) were conducted on each lift of asphaltic concrete. An 18,000-pound, single axleload was used, and tests were performed using the creep speed method. It was found that the asphaltic concrete must cure for two or more days before tests could be run. Tests taken prior to the two-day curing time usually resulted in permanent deformations to the pavements. These deformations were caused by the tires, the Benkelman beam probe points, or both. More than two days curing time was required when the surface temperature rose to 120°F or above. Tests were usually run during the early morning or late afternoon to take advantage of cooler pavement temperatures and to prevent permanent deformations. Due to the paving schedule (APPENDIX D), several tests could not be completed. The Benkelman beam testing schedule is given in APPENDIX E. Table 4 summarizes test data and age of the asphaltic concrete when tested.

California Road Rater tests (Figure 20) were performed on the subgrade, DGA, and each lift of asphaltic concrete. A static loading of 1600 pounds was used as a standard for the tests. Tests were conducted at frequencies of 20, 25, and 30 cps, using a dynamic force of 600 pounds peak to peak. It was found that the asphaltic concrete had to cure for 24 hours before the tests could be run. Several Road Rater tests were not performed due to the paving schedule (APPENDIX D). Several other tests were not performed because of mechanical problems with the Road Rater. The Road Rater testing schedule is listed in APPENDIX F, and Table 5 a summary of the tests obtained and those not performed and the age of the asphaltic concrete when tested.

TEST RESULTS

All inspection and surveying was done by the Division of Construction for construction control.

Subgrade densities are given in APPENDIX B along with the average percent compaction for each section; Table 3 summarizes DGA densities. Density results and the percent compaction on each lift of asphaltic concrete is given in APPENDIX C.

Three different asphaltic concrete base mixes and two surface mixes were used. A special mix was used for leveling, and a surface mix was used in the median of the curb-and-gutter section. These mix designs are listed in APPENDIX G along with the actual average gradations and asphalt contents. The standard deviation of each mix from the mean is also given. In APPENDIX H, the asphalt content of each construction lift, as obtained from nuclear density tests and by extractions, are compared to design values.

All 10-inch and 16-inch sections had a 2-inch lift immediately over the subgrade. As these two- or three-day-old lifts were being overlaid, deformation was noted under loaded trucks.

Roughness measurements of the full-depth asphaltic concrete pavement were made on December 1, 1971, with the automobile roughness-measuring system. The roughness indexes for the four lanes ranged from 235 to 245, giving an equivalent verbal smoothness rating of excellent. The final profilometer tests have not been completed at this time due to mechanical problems with that equipment.

The roadway between Stations 368+00 and 374+00 was located in a valley. During construction, the subgrade in the eastbound lanes in that area drained poorly and was usually soft and(or) covered by standing water. After the final surface was laid, the eastbound lanes still drained slowly and at times were covered by standing water (Figure 21). The area is thus a potential early failure area.

After final completion of the construction, each test section was cored to obtain the as-constructed thickness. Design and actual thicknesses are summarized in Table 6.

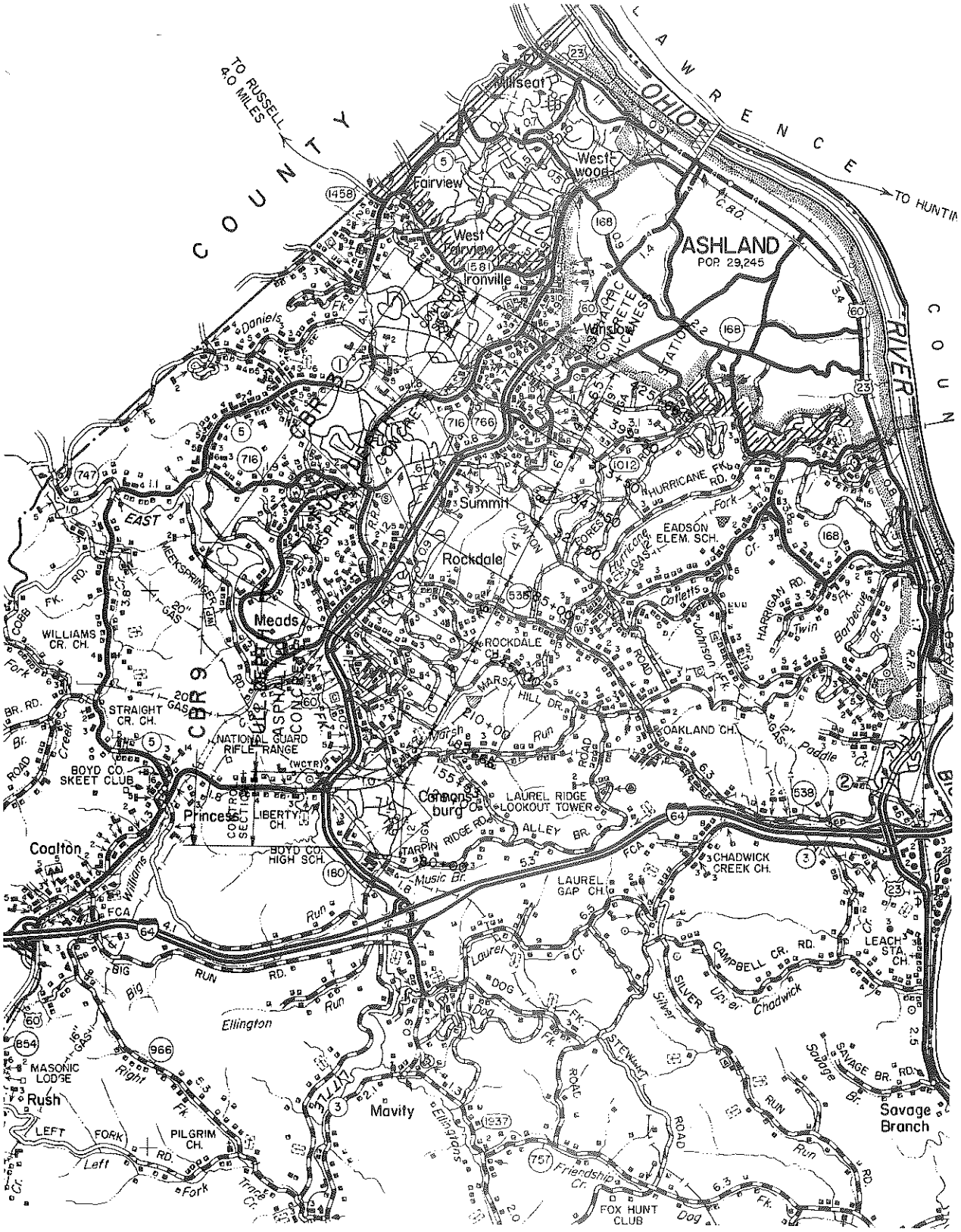


Figure 1. Project Location

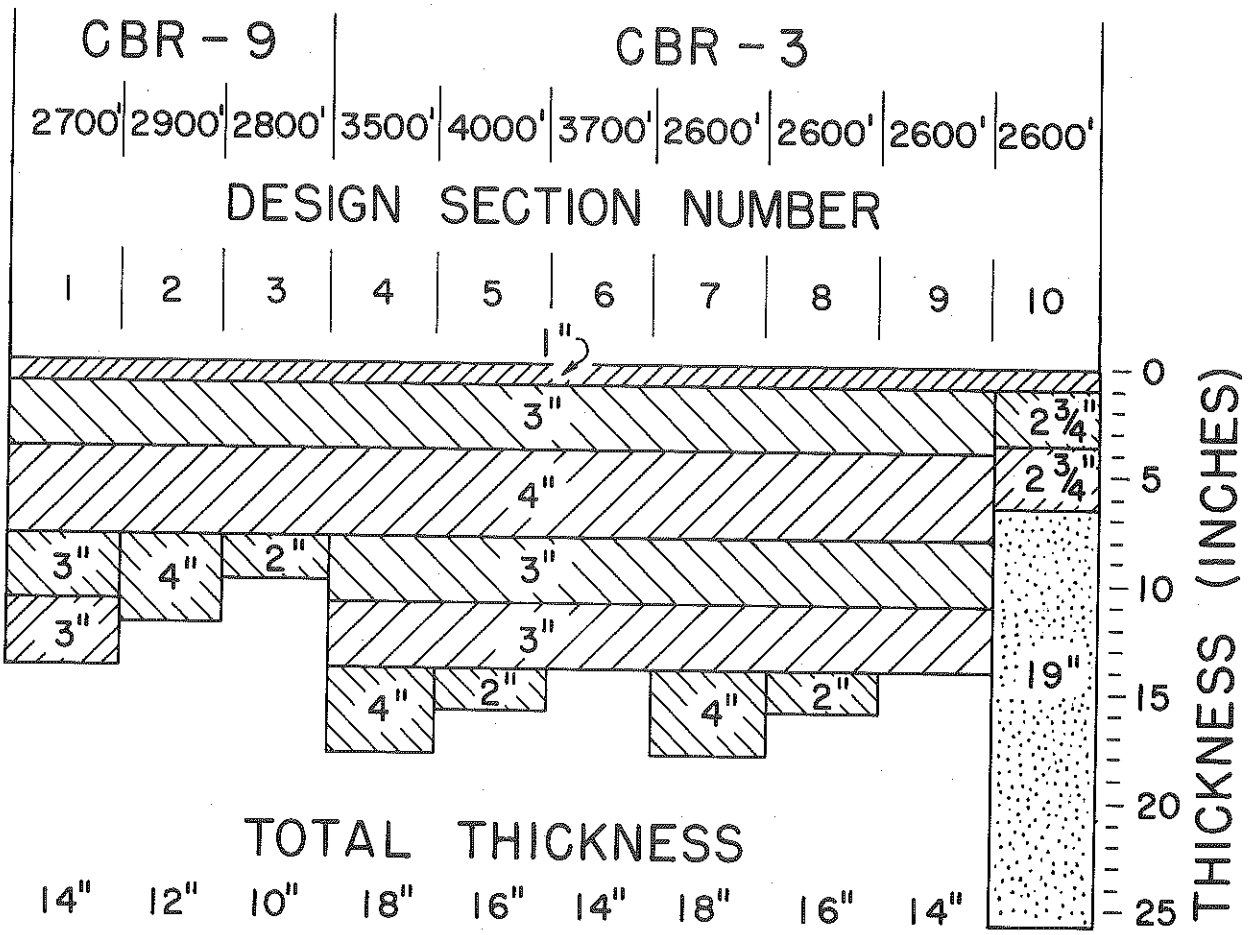


Figure 2. Mainline Design

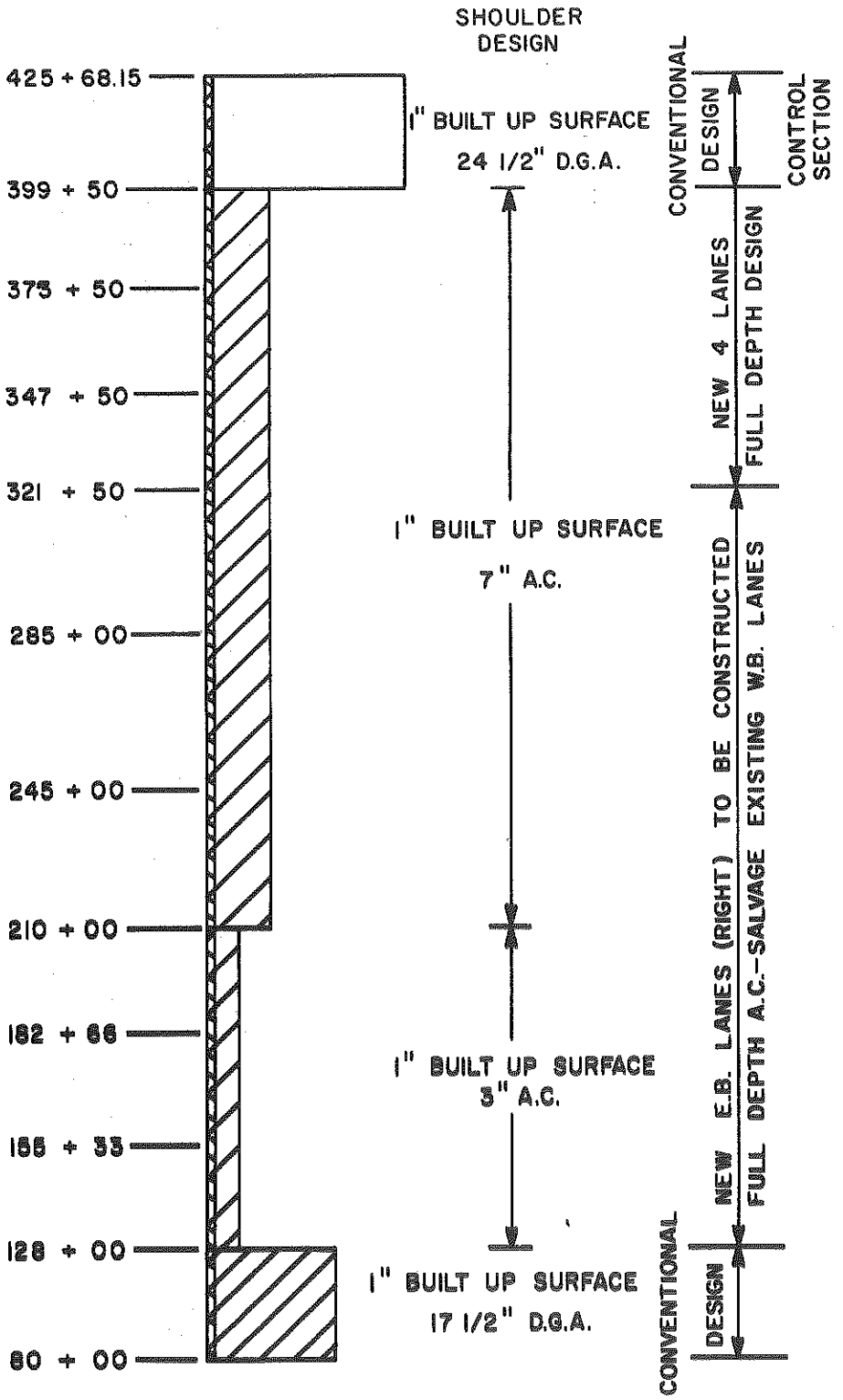


Figure 3. Shoulder Design

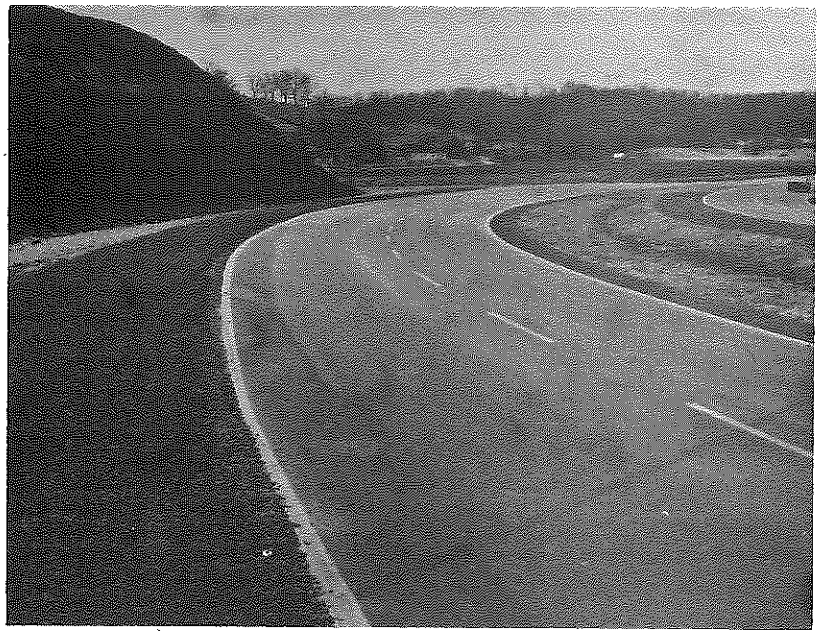


Figure 4. Lane and Shoulder Design

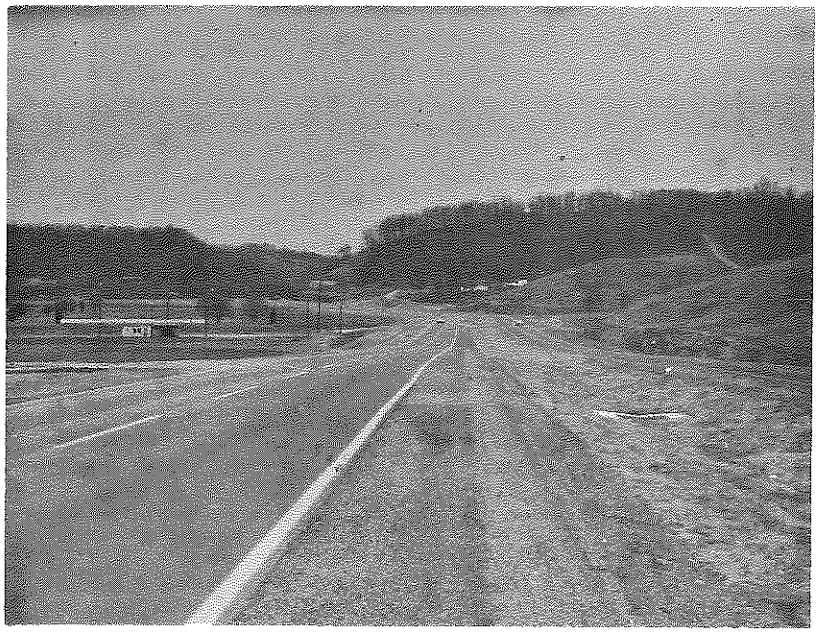


Figure 5. Depressed Grass Median

Figure 6. Paved Flush Median

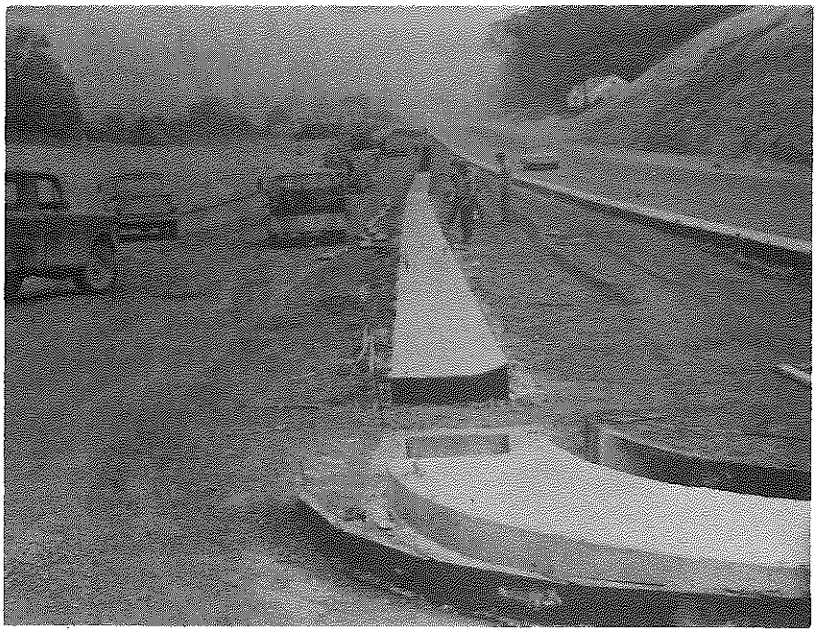


Figure 7. Construction of Lip Curve and Gutter Mountable Median

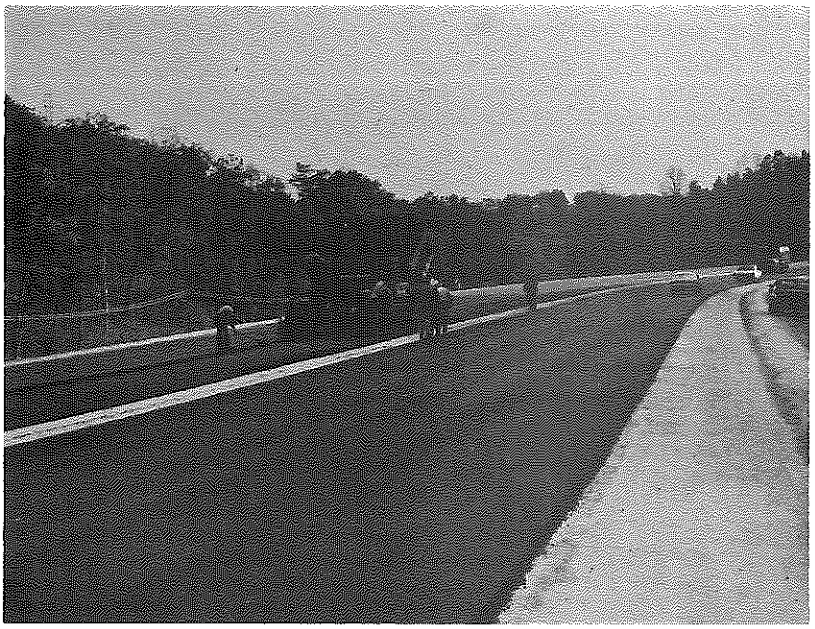


Figure 8. **Paving of Lip Curve and Gutter Mountable Median**

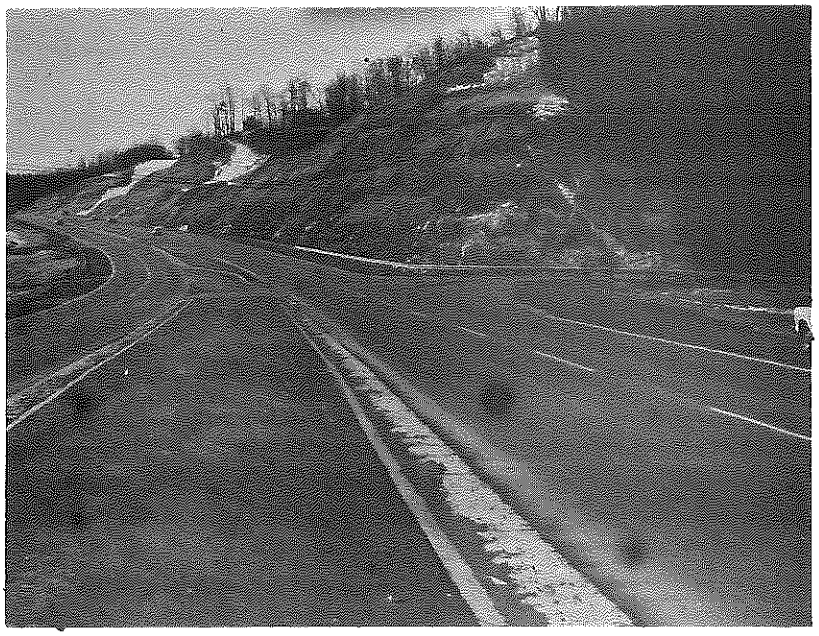


Figure 9. **Lip Curve and Gutter Mountable Median**

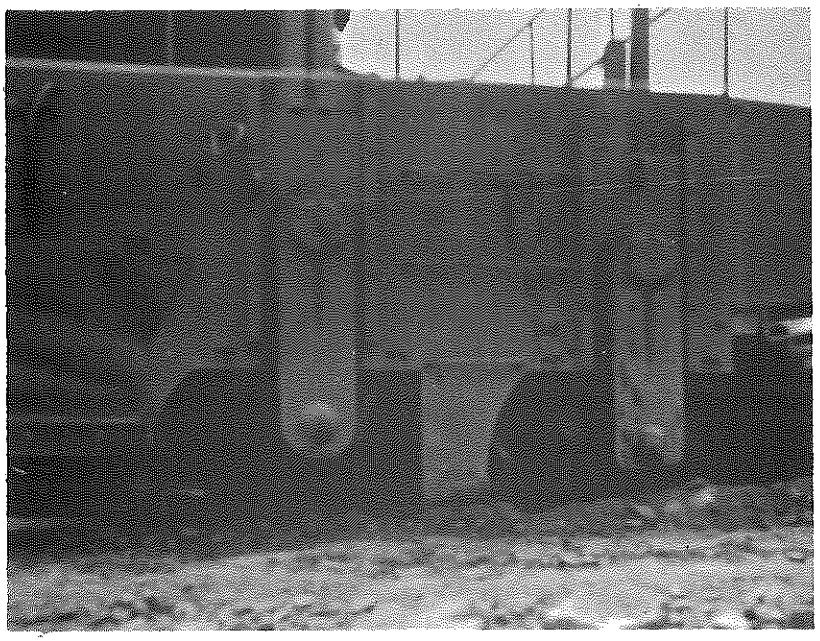


Figure 10. CMI Machine

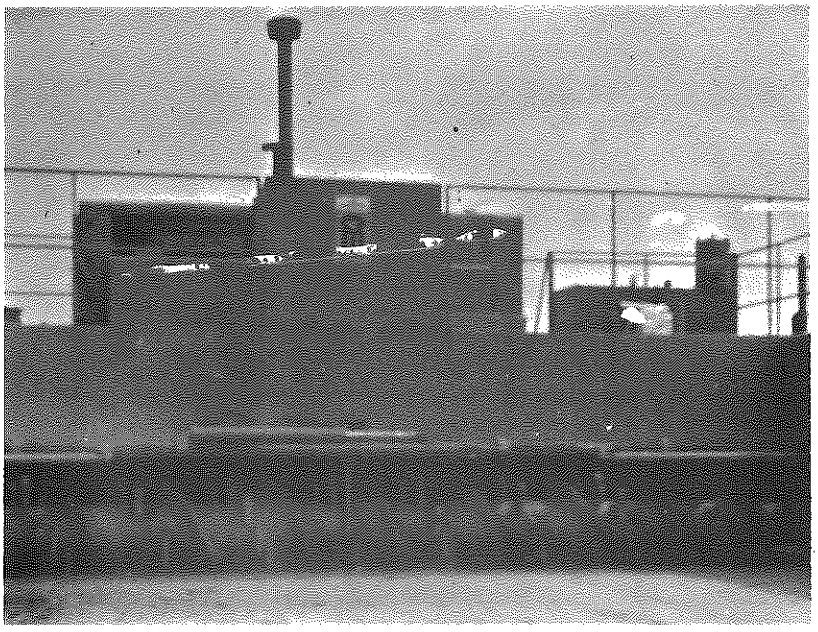


Figure 11. CMI Machine

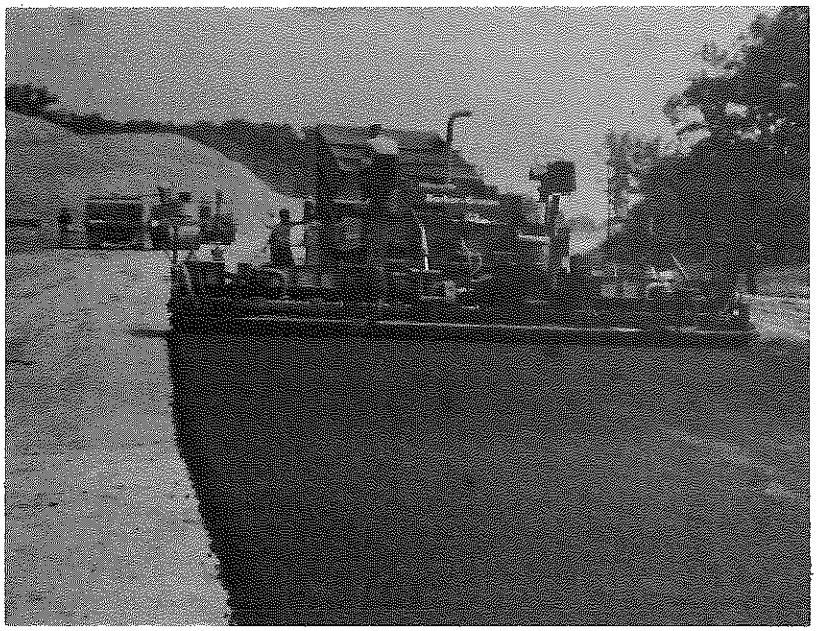


Figure 12. Barber Green 24 Foot Capacity Paver

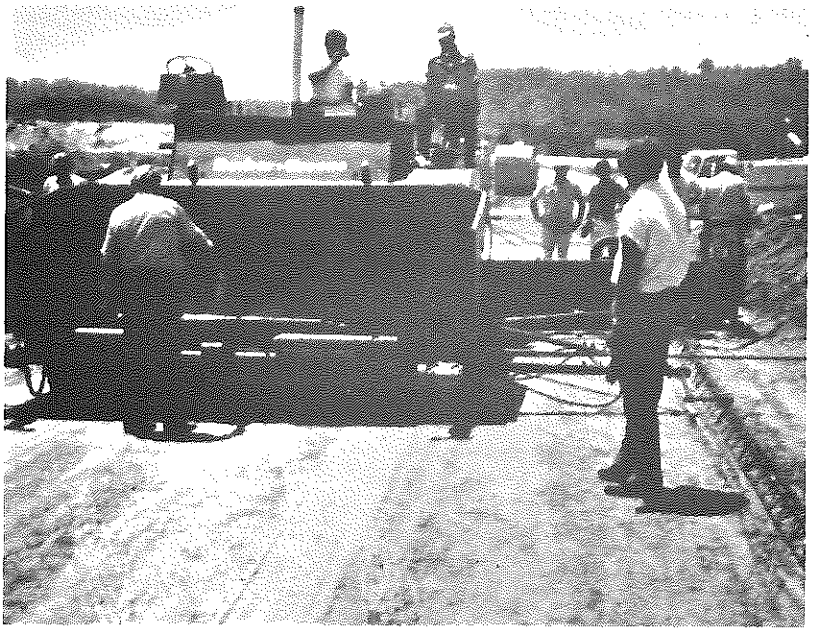


Figure 13. Barber Green SB-50 Paver with Continuous Skids

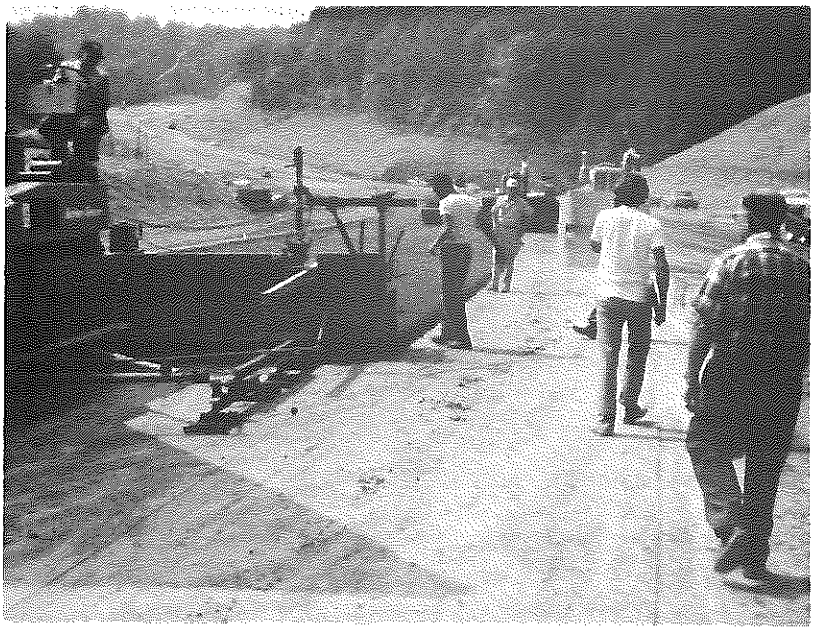


Figure 14. Barber Green SB-50 Paver with Articulating Skids

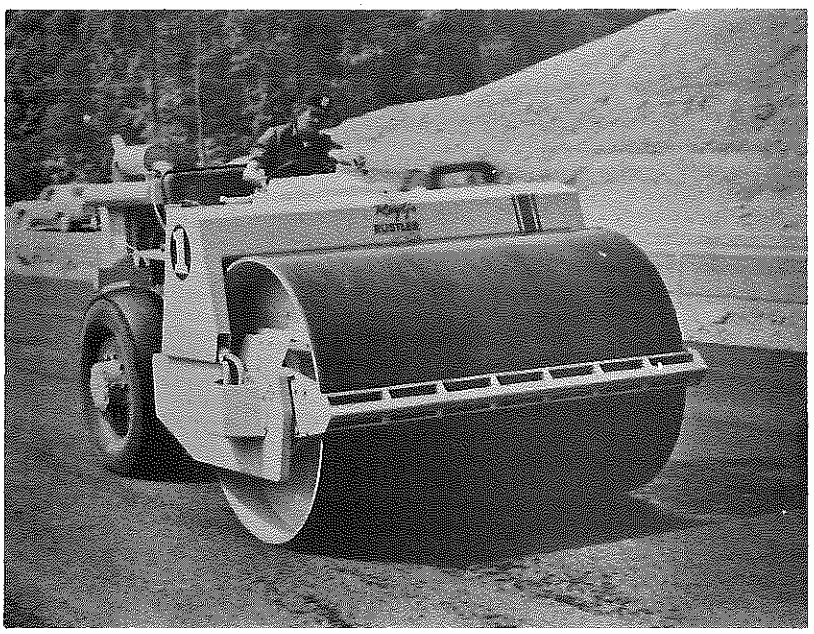


Figure 15. RayGO "Rustler" 404 Vibratory Roller

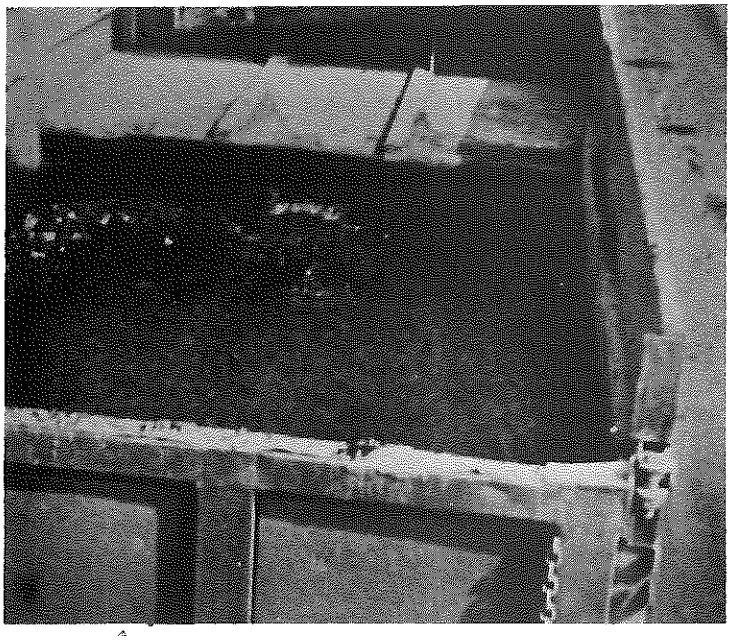


Figure 16. Excessive Bleeding of Asphaltic Concrete

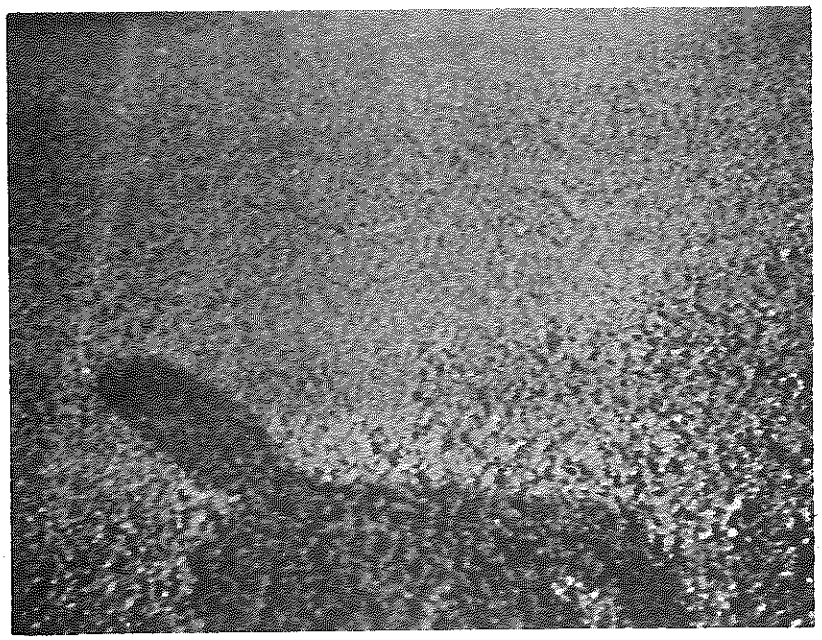


Figure 17. Excessive Bleeding of Asphaltic Concrete

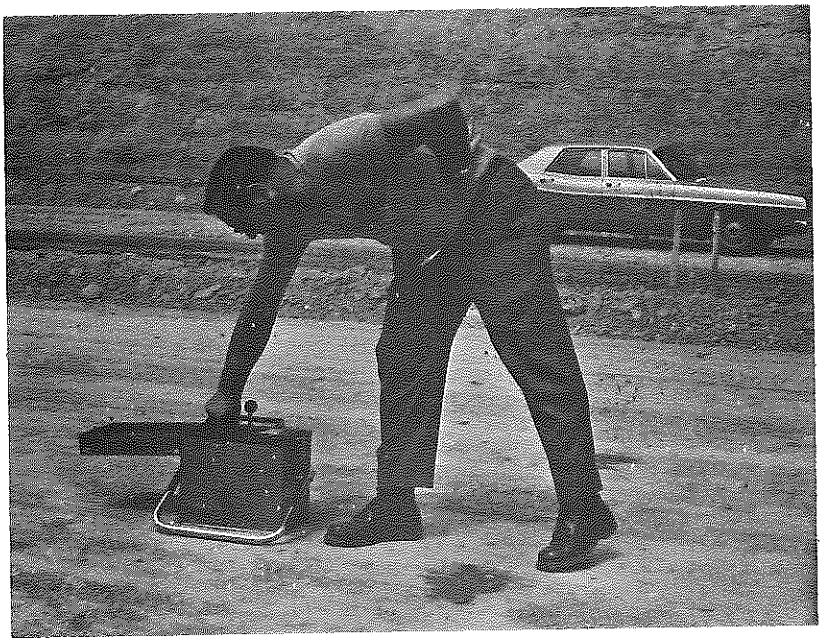


Figure 18. Seaman Nuclear Density Meter

Figure 19. Benkelman Beam Testing

Figure 20. California Road Rater

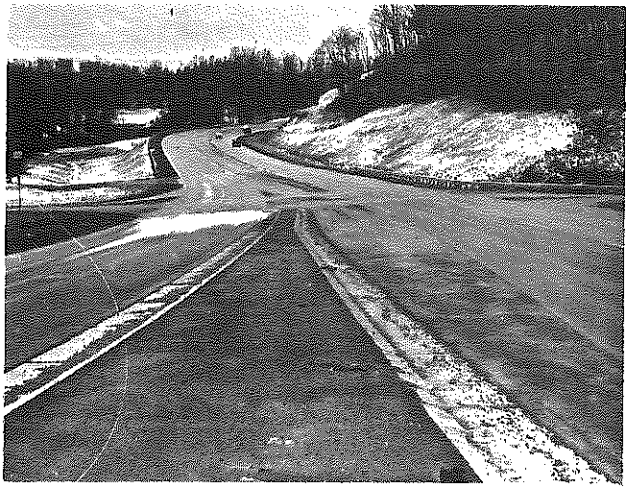


Figure 21. Standing Water on Pavement

TABLE 1.

PAVEMENT DESIGNS AND RESEARCH TEST LOCATIONS

SECTION NUMBER	DIRECTION OF TRAVEL	BEGINNING STATION	ENDING STATION	CBR**	THICKNESS (INCHES)* CONSTRUCTION LIFT 1	2	3	4	5	TOTAL BASE THICKNESS (INCHES)	RESEARCH TEST STATIONS				
1	EB	128+00	155+33	9	3	3	4	3		13	130+00	135+00	145+00	150+00	155+00
2	EB	155+33	182+66	9	4	4	3			11	160+00	165+00	170+00	175+00	180+00
3	EB	182+66	210+00	9	2	4	3			9	186+00 210+00	190+00	195+00	200+00	205+00
4	EB	210+00	245+00	3	4	3	3	4	3	17	213+00 232+00	215+00 237+50	215+00 241+50	217+00 242+50	222+00 243+50
5	EB	245+00	285+00	3	2	3	3	4	3	15	257+50 271+00	262+00 273+50	264+00 276+00	265+00 279+50	268+50
6	EB	285+00	321+50	3	3	3	4	3		13	289+50 307+00	295+50 314+00	299+00 315+00	306+00	306+50
7	EB+WB	321+50	347+50	3	4	3	3	4	3	17	323+00	323+50	334+00	338+50	341+50
8	EB+WB	347+50	373+50	3	2	3	3	4	3	15	349+00	355+00	359+00	360+50	372+00
9	EB+WB	373+50	399+50	3	3	3	4	3		13	376+50	379+50	388+00	391+50	396+50
10	EB+WB	399+50	425+68.15	3	6	6½	6½	2¾	2¾	5½ AC 19 DGA	403+50	405+50	407+50	410+00	414+00

*One-inch surface on all sections.
Layer thicknesses are in order from bottom to top.

** California Bearing Ratio as determined by the Kentucky Department of Highways laboratory method.

TABLE 2.

CHARACTERISTICS OF BORROW MATERIALS

SAMPLE STATION IN BORROW PIT	LIMITING STATIONS BETWEEN WHICH BORROW MATERIAL WAS UTILIZED		MAXIMUM DENSITY* (PCF)	OPTIMUM MOISTURE CONTENT* (PERCENT)	SPECIFIC GRAVITY	PERCENT OF PLUS NO. 4 SIEVE MATERIAL
83+00	78+00	88+00	119.7	11.3	2.65	21
93+00	88+00	98+00	117.9	11.3	2.65	24
103+00	98+00	108+00	128.9	11.1	2.65	21
113+00	108+00	118+00	122.0	8.6	2.65	21
123+00	118+00	128+00	125.3	10.3	2.65	27
168+00	128+00	180+00	112.4	12.6	2.63	22
193+00	180+00	210+00	114.1	15.1	2.70	42
201+50	210+00	230+00	118.5	12.7	2.70	0
271+50	230+00	274+00	113.5	15.4	2.74	0
306+00	274+00	315+00	106.5	12.5	2.70	0
377+50	315+00	380+00	112.5	16.0	2.74	0
396+00	380+00	399+00	114.1	15.0	2.74	0
391+00	399+00	411+00	109.1	17.5	2.74	0
	411+00	425+68.15	116.1	13.2	2.67	0

* AASHO T99-70

TABLE 3.

NUCLEAR DENSITY-MOISTURE TESTS ON DENSE GRADED AGGREGATE

BEGINNING STATION	ENDING STATION	LAYER NUMBER	NUMBER OF TESTS	AVERAGE PERCENT MOISTURE	AVERAGE DRY DENSITY (PCF)	AVERAGE PERCENT COMPACTION
81+00	125+00		23	2.7	111.2	77.5
403+50	414+00	1	5	5.4	117.2	81.6
403+50	414+00	2	5	4.6	111.8	77.9
403+50	414+00	3	10	4.9	119.1	83.0
AVERAGE FOR STATIONS 403+50 TO 414+00				5.0	116.8	81.4*

*Specifications require 85% compaction.

TABLE 4.

AGE OF ASPHALTIC CONCRETE AT TIME OF BENKELMAN BEAM TESTS

LAYER NUMBER	DIRECTION OF TRAVEL	NUMBER OF STATIONS	NUMBER OF STATIONS TESTED	NUMBER OF STATIONS MISSED	PERCENT OF STATIONS TESTED	AGE OF ASPHALTIC CONCRETE AT TIME OF BENKELMAN BEAM TESTS							
						ONE DAY		TWO DAYS		THREE DAYS		MORE THAN THREE DAYS	
						NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
1	EB	56	5	51	8.9	0	0	0	0	3	60.0	2	40.0
2	EB	56	46	10	82.1	3	6.5	18	39.2	4	8.7	21	45.6
3	EB	66	57	9	86.4	5	8.8	4	7.0	2	3.5	46	80.7
4	EB	60	48	12	80.0	1	2.1	17	35.4	2	4.2	28	58.3
5	EB	31	29	2	93.5	0	0	7	24.1	0	0	22	75.9
Surface	EB	71	71	0	100.0	0	0	6	8.5	2	2.8	63	88.7
1	WB	15	0	15	0	0	0	0	0	0	0	0	0
2	WB	15	14	1	93.3	0	0	3	21.4	0	0	11	78.6
3	WB	15	14	1	93.3	0	0	0	0	3	21.4	11	78.6
4	WB	20	15	5	75.0	0	0	9	60.0	0	0	6	40.0
5	WB	15	15	0	100.0	0	0	5	33.3	0	0	10	66.7
Surface	WB	20	20	0	100.0	0	0	0	0	0	0	20	100.0

TABLE 5.

AGE OF ASPHALTIC CONCRETE AT TIME OF ROAD RATER TESTS

LAYER NUMBER	DIRECTION OF TRAVEL	NUMBER OF STATIONS	NUMBER OF STATIONS TESTED	NUMBER OF STATIONS MISSED	PERCENT OF STATIONS TESTED	AGE OF ASPHALTIC CONCRETE AT TIME OF ROAD RATER TESTS									
						0 DAYS		ONE DAY		TWO DAYS		THREE DAYS		MORE THAN THREE DAYS	
						NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
1	EB	59	24	35	40.7	1	4.2	15	62.5	2	8.3	0	0	6	25.0
2	EB	69	59	10	85.5	0	0	27	45.8	8	13.6	4	6.8	20	33.8
3	EB	74	73	1	98.6	0	0	27	37.0	10	13.7	13	17.8	23	31.5
4	EB	63	59	4	93.7	2	3.4	18	30.5	8	13.6	0	0	31	52.5
5	EB	34	34	0	100.0	0	0	12	35.3	4	11.8	0	0	18	52.9
Surface	EB	74	74	0	100.0	0	0	0	0	0	0	2	2.7	72	97.3
1	WB	15	2	13	13.3	0	0	2	100.0	0	0	0	0	0	0
2	WB	15	14	1	93.3	0	0	5	35.7	3	21.4	6	42.9	0	0
3	WB	20	20	0	100.0	0	0	1	5.0	0	0	0	0	19	95.0
4	WB	20	20	0	100.0	0	0	9	45.0	6	30.0	0	0	5	25.0
5	WB	15	15	0	100.0	0	0	9	60.0	0	0	0	0	6	40.0
Surface	WB	20	20	0	100.0	0	0	0	0	0	0	0	0	20	100.0

TABLE 6.

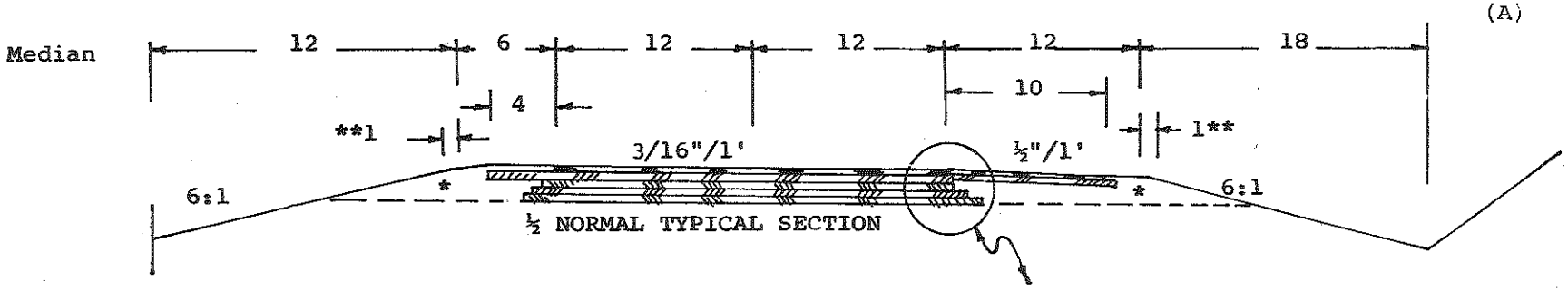
THICKNESSES OF THE DESIGN SECTIONS AS DETERMINED BY CORES

DESIGN SECTION		DIRECTION	TOTAL DESIGN THICKNESS (INCHES)	ACTUAL TOTAL THICKNESS (INCHES)	DESIGN LIFT THICKNESSES (INCHES)						ACTUAL LIFT THICKNESSES (INCHES)					
BEGINNING STATION	ENDING STATION				1	2	3	4	5	SURFACE	1	2	3	4	5	SURFACE
80+00	128+00	EB	6.5	5.6	2.75	2.75				1.0	2.1	2.4				1.1
128+00	155+33	EB	14.0	14.8	3.0	3.0	4.0	3.0		1.0	2.6	3.1	3.1	3.1	1.8	1.1
155+33	182+66	EB	12.0	12.0	4.0	4.0	3.0			1.0	3.5	3.4	2.6	1.4		1.1
182+66	210+00	EB	10.0	10.3	2.0	4.0	3.0			1.0	2.2	3.8	2.7			1.6
210+00	245+00	EB	18.0	17.4	4.0	3.0	3.0	4.0	3.0	1.0	3.6	3.1	3.0	3.8	2.8	1.1
245+00	285+00	EB	16.0	16.9	2.0	3.0	3.0	4.0	3.0	1.0	1.9	3.5	3.3	3.9	3.2	1.1
285+00	321+50	EB	14.0	13.7	3.0	3.0	4.0	3.0		1.0	2.8	3.1	3.8	3.0		1.0
321+50	347+50	EB	18.0	18.2	4.0	3.0	3.0	4.0	3.0	1.0	4.4	3.0	2.9	3.9	3.0	1.0
321+50	347+50	WB	18.0	17.1	4.0	3.0	3.0	4.0	3.0	1.0	3.9	2.8	2.9	3.7	2.7	1.1
347+50	373+50	EB	16.0	17.5	2.0	3.0	3.0	4.0	3.0	1.0	2.0	3.1	4.1	3.7	3.5	1.1
347+50	373+50	WB	16.0	17.5	2.0	3.0	3.0	4.0	3.0	1.0	2.6	3.4	3.4	3.5	3.3	1.3
373+50	399+50	EB	14.0	16.3	3.0	3.0	4.0	3.0		1.0	3.0	3.2	5.0	4.1		1.0
373+50	399+50	WB	14.0	14.0	3.0	3.0	4.0	3.0		1.0	3.1	2.9	3.8	3.2		1.0
399+50	425+68	EB	6.5	6.8	2.75	2.75				1.0	2.8	2.9				1.1
399+50	425+68	WB	6.5	6.2	2.75	2.75				1.0	2.5	2.4				1.3

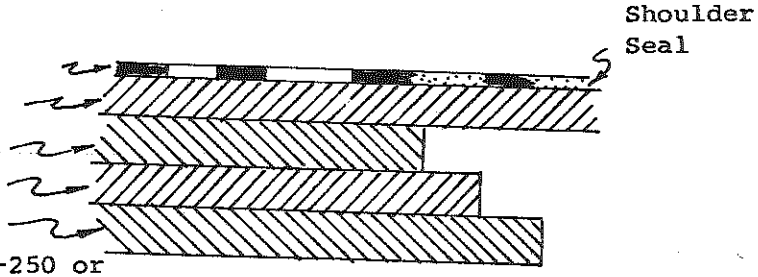
APPENDIX A

DESIGN CROSS SECTIONS

(A)



BOYD COUNTY
F 1 (10), SP 10-165-23L, & SP 10-145-3L
Cannonsburg-Ashland Road (US 60)
Station 128+00 to Station 155+33
(Right side of Roadway)



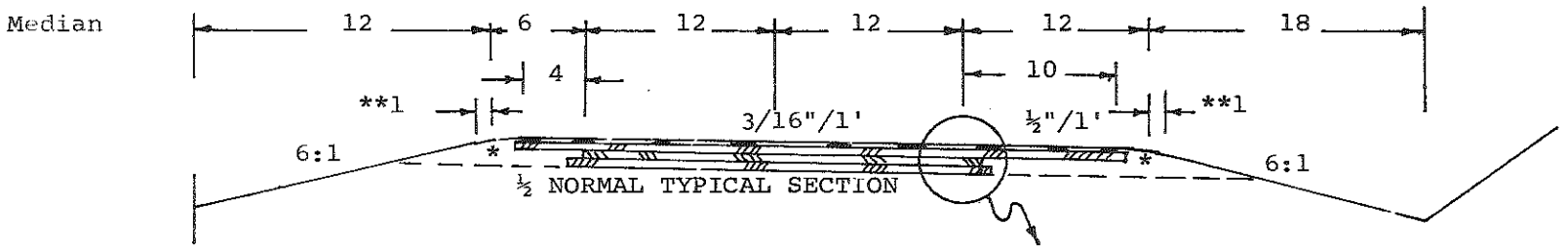
1" Cl. I Surface
3" Cl. I Base
4" Cl. I Base
3" Cl. I Base
3" Cl. I Base
0.1 gal./s.y. RC-250 or
0.05 gal./s.y. SS-1h (Tack)

Shoulders
One lift of rock subgrade
3" compt. depth Cl. I Base
Bit. Surface Class A-2
0.45 gal./s.y. PAC-7
50 lbs./s.y. Size No. 57 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
0.15 gal./s.y. PAC-7
20 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
** 0.20 gal./s.y. PAC-7
** 15 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers

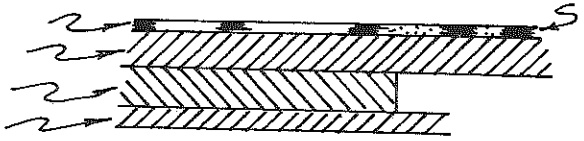
** The last application of PAC-7 and stone shall be extended down the slope for erosion control.

*This shoulder portion shall be constructed with rock subgrade in accordance with Special Provision No. 41.

(B)



BOYD COUNTY
F] (10), SP 10-165-23L, & SP 10-145-3L
Cannonsburg-Ashland Road (US 60)
Station 155+33 to Station 182+66
(Right side of Roadway)

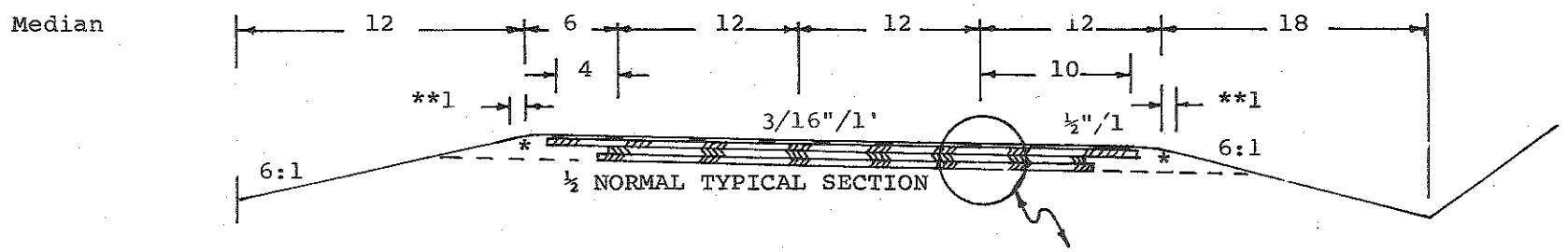


0.1 gal./s.y. RC-250 or
0.05 gal./s.y. SS-1h Tack

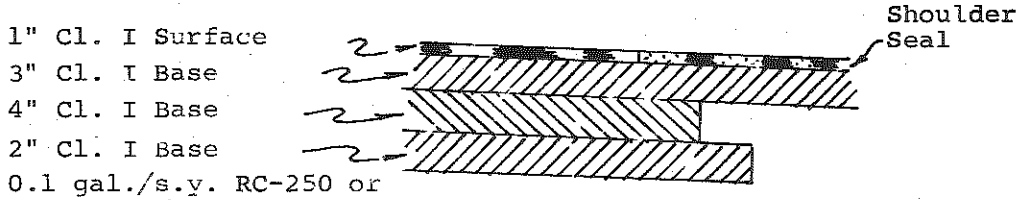
Shoulders (Same Design as shown on Sheet A)

*This shoulder portion shall be constructed with rock subgrade in accordance with Special Provision No. 41.

(C)

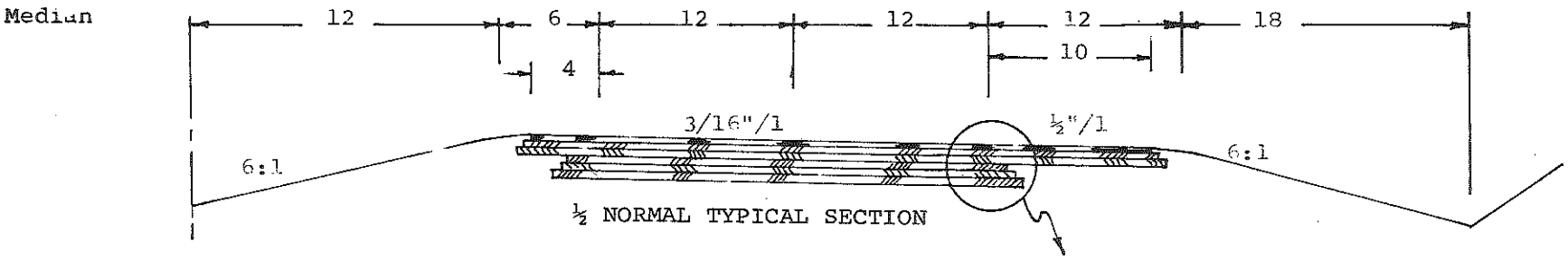


BOYD COUNTY
F 1 (10), SP 10-165-23L, & SP 10-145-3L
Cannonsburg-Ashland Road (US 60)
Station 182+66 to Station 210+00
(Right side of Roadway)

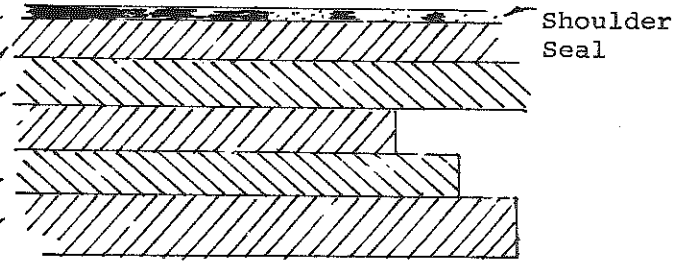


Shoulders (Same Design as shown on Sheet A)

(D)

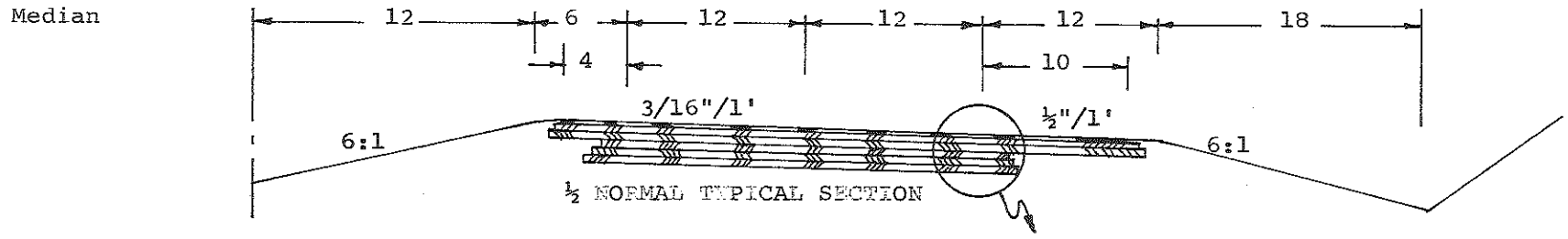


BOYD COUNTY
F 1 (10), SP 10-165-23L, & SP 10-145-3L
Cannonsburg-Ashland Road (US 60)
Station 210+00 to Station 245+00
(Right side of Roadway)

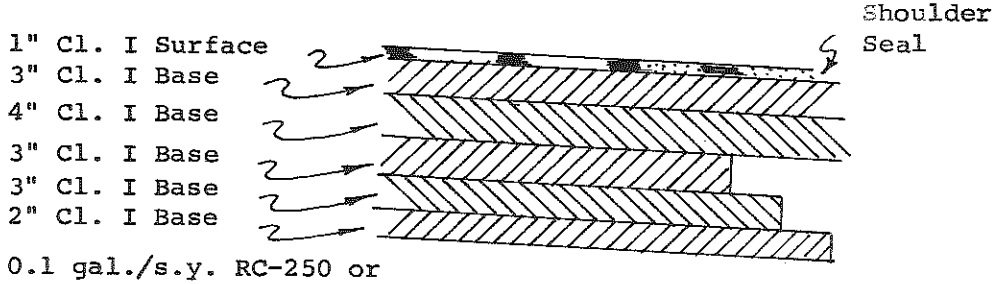


0.1 gal./s.y. RC-250 or
0.05 gal./s.y. SS-1h Tack

Shoulders
7" compt. depth Cl. I Base (4" + 3" course)
Bit. Surface Class A-2
0.45 gal./s.y. PAC-7
50 lbs./s.y. Size No. 57 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
0.15 gal./s.y. PAC-7
20 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
0.20 gal./s.y. PAC-7
15 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers



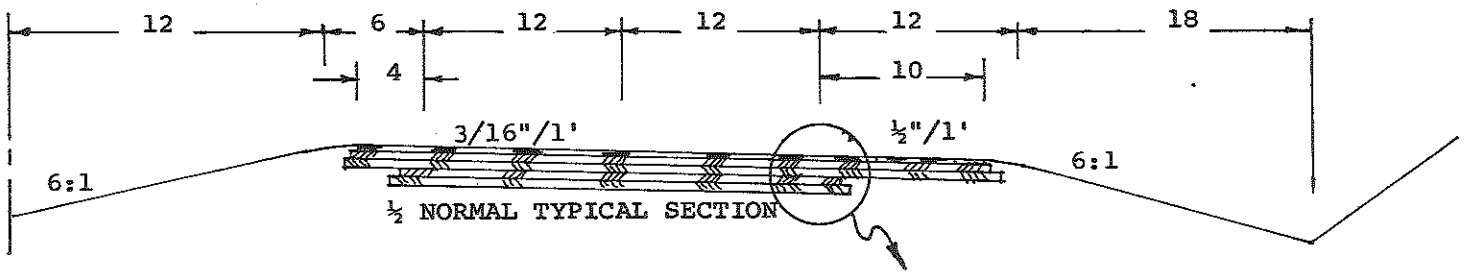
F 1 (10), SP 10-165-23L, and SP 10-145-3L
Cannonsburg-Ashland Road (US 60)
Station 245+00 to Station 285+00
(Right side of Roadway)



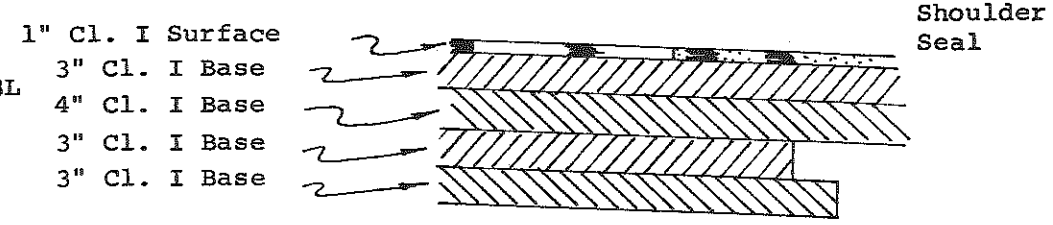
0.1 gal./s.y. RC-250 or
0.05 gal./s.y. SS-1h Tack

Shoulders (Same Design as shown on Sheet D)

(F)

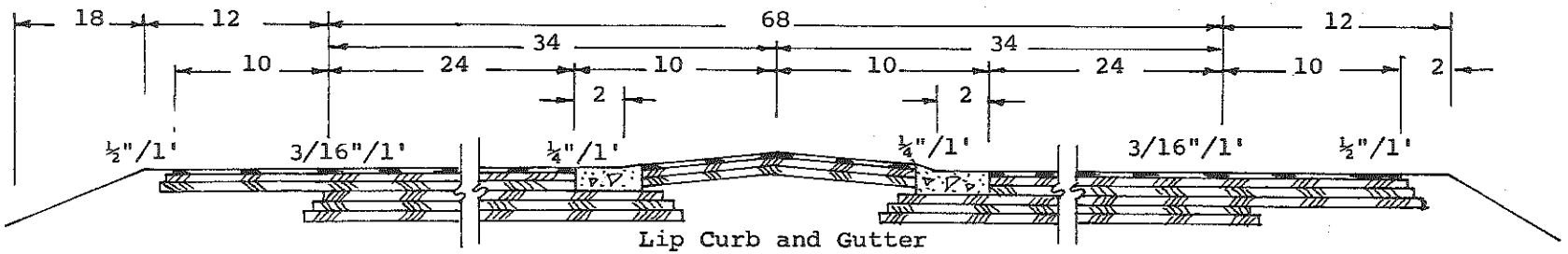


BOYD COUNTY
F 1 (10), SP 10-165-23L, and SP 10-145-3L
Cannonsburg-Ashland Road (US 60)
Station 285+00 to Station 321+50
(Right side of Roadway)



0.1 gal./s.y. RC-250 or
0.05 gal./s.y. SS-1h Tack

Shoulders (Same Design as shown on Sheet D)



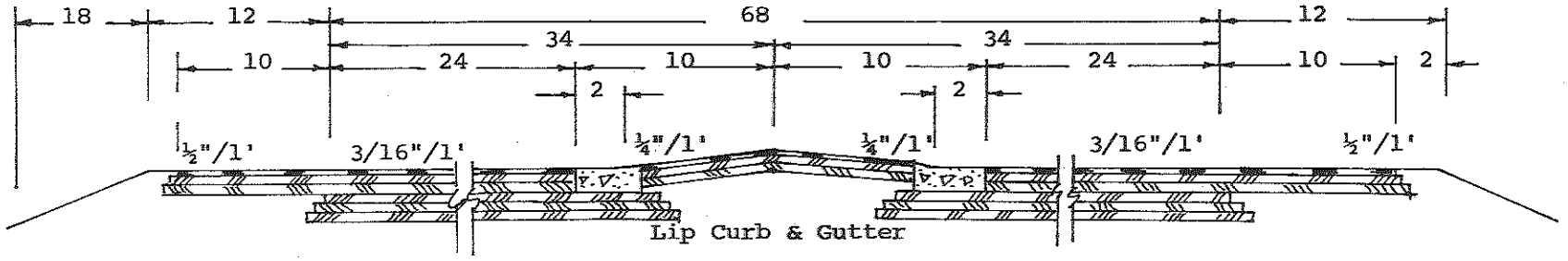
BOYD COUNTY
F 1 (10), SP 10-165-23L, and SP 10-145-3L
Cannonsburg-Ashland Road (US 60)
Station 321+50 to Station 347+50

Pavement
1" Cl. I Surface
3" Cl. I Base
4" Cl. I Base
3" Cl. I Base
3" Cl. I Base
4" Cl. I Base
0.1 gal./s.y. RC-250 or
0.05 gal./s.y. SS-1h (Tack)

Median
0.5 gal./s.y. RT-2 or AE Primer L (Prime)
1" Cl. I Surface
3" Cl. I Base
4" Cl. I Base

Shoulders (Same Design as Shown on Sheet D)

(H)

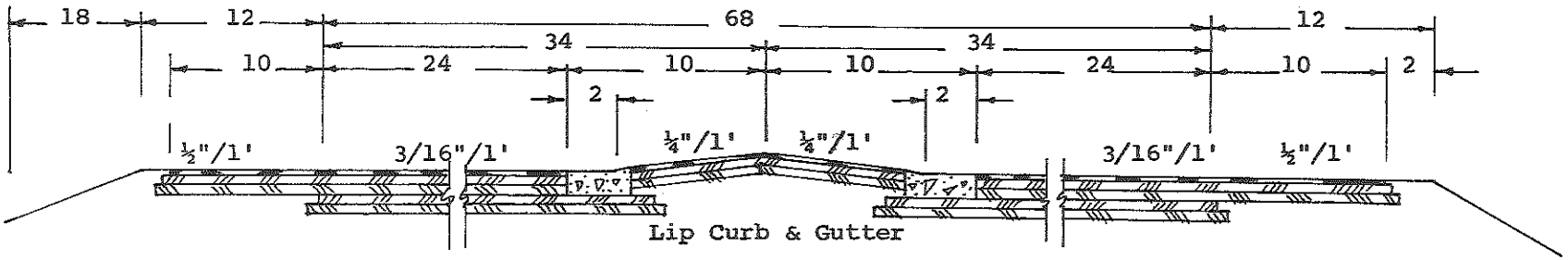


BOYD COUNTY
F 1 (10), SP 10-165-23L, and SP 10-145-3L
Cannonsburg-Ashland Road (US 60)
Station 347+50 to Station 373+50

Pavement
1" Cl. I Surface
3" Cl. I Base
4" Cl. I Base
3" Cl. I Base
3" Cl. I Base
2" Cl. I Base
0.1 gal./s.y. RC-250 or
0.05 gal./s.y. SS-1h (Tack)

Median
0.05 gal./s.y. RT-2 or AE Primer L
1" Cl. I Surface
3" Cl. I Base
4" Cl. I Base

Shoulders (Same Design as Shown on Sheet D)

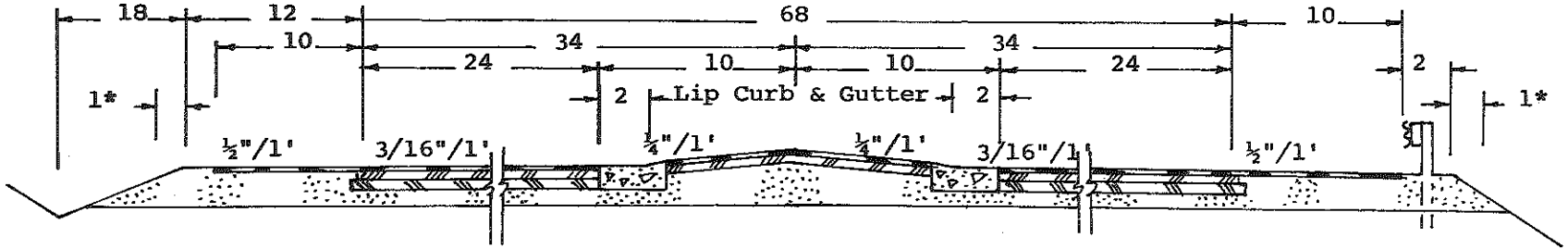


BOYD COUNTY
F 1 (10), SP 10-165-23L, and SP 10-145-3L
Cannonsburg-Ashland Road (US 60)
Station 373+50 to Station 399+50

Pavement
1" Cl. I Surface
3" Cl. I Base
4" Cl. I Base
3" Cl. I Base
3" Cl. I Base
0.1 gal./s.y. RC-250 or
0.05 gal./s.y. SS-1h (Tack)

Median
0.05 gal./s.y. RT-2 or AE Primer L
1" Cl. I Surface
3" Cl. I Base
4" Cl. I Base

Shoulders (Same Design as shown on Sheet D)



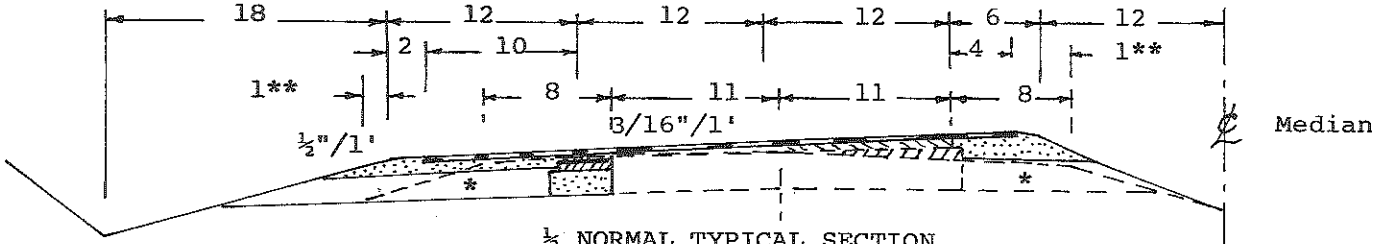
BOYD COUNTY
F 1 (10), SP 10-165-23L, and SP 10-145-3L
Cannonsburg-Ashland Road (US 60)
Station 399+50 to Station 425+68.15

Pavement
19" compt. depth D.G.A. Base
5½" compt. depth Cl. I Base (2- 2 3/4" courses)
1" compt. depth Cl. I Surface
0.1 gal./s.y. RC-250 or 0.05 gal./s.y. SS-1h

Shoulders
Full depth D.G.A. Base
0.5 gal./s.y. RT-2 or AE Primer L (Prime)
Bit. Surface Class A-2
0.45 gal./s.y. PAC-7
50 lbs./s.y. Size No. 57 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
0.15 gal./s.y. PAC-7
20 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
*0.20 gal./s.y. PAC-7
*15 lbs./s.y. Size No. 8 (spread immediately)

Median
Full depth D.G.A. Base
3" compt. depth Cl. I Base
1" compt. depth Cl. I Surface
0.1 gal./s.y. RC-250 or
0.05 gal./s.y. SS-1h

Shoulders (continued)
Roll immediately with steel wheel and pneumatic rollers
*The last application of PAC-7 and stone shall be extended down the slope for erosion control.



½ NORMAL TYPICAL SECTION
(Left Side of Roadway)

BOYD COUNTY
F 1 (10), SP 10-165-23L, and SP 10-145-3L
Cannonsburg-Ashland Road (US 60)
Station 128+00 to Station 210+00

Pavement

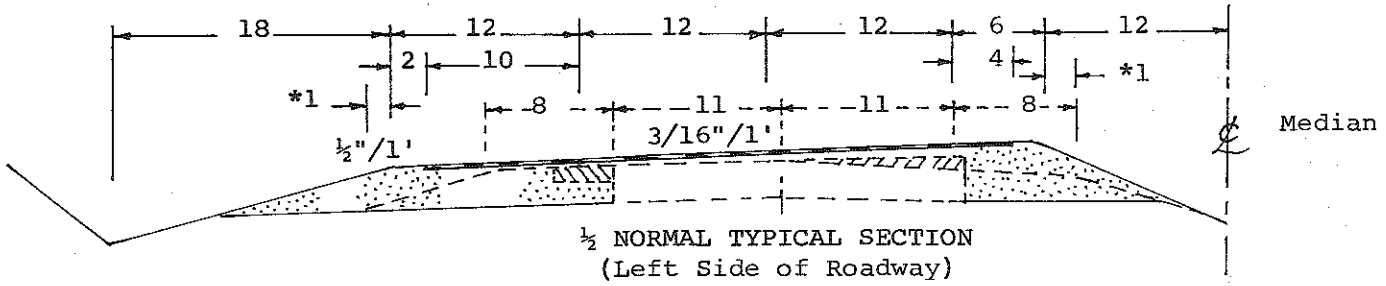
Widening (trench)
11" compt. depth D.G.A. Base
4½" compt. depth Cl. I Base

Overall Surfacing
0.1 gal./s.y. RC-250 or
0.05 gal./s.y. SS-1h Tack
Add sufficient tonnage of Cl. I Base and/or Surface for correcting adverse crown and add 500 ton/mile for leveling
2½" compt. depth Cl. I Base
1" compt. depth Cl. I Surface
0.1 gal./s.y. RC-250 or
0.05 gal./s.y. SS-1h Tack

Shoulders
One lift of rock subgrade
5" compt. depth D.G.A. Base
Bit. Surface Class A-2
0.5 gal./s.y. RT-2 or AE Primer L (Prime)
0.45 gal./s.y. PAC-7
50 lbs./s.y. Size No. 57 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
0.15 gal./s.y. PAC-7
20 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
**0.20 gal./s.y. PAC-7
**15 lbs./s.y. Size No. 8 (spread immediately)

*This shoulder portion shall be constructed with rock subgrade in accordance with Special Provision No. 41.
**The last application of PAC-7 and stone shall be extended down the slope for erosion control.

(L)



½ NORMAL TYPICAL SECTION
(Left Side of Roadway)

BOYD COUNTY
F 1 (10), SP 10-165-23L, and SP 10-145-3L
Cannonsburg-Ashland Road (US 60)
Station 210 to Station 321+50

Pavement (Same Design as shown on Sheet K)

Shoulders
Full depth D.G.A. Base
Bit. Surface Class A-2
0.5 gal./s.y. RT-2 or AE Primer L (Prime)
0.45 gal./s.y. PAC-7
50 lbs./s.y. Size No. 57 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
0.15 gal./s.y. PAC-7
20 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
* 0.20 gal./s.y. PAC-7
* 15 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers

*The last application of PAC-7 and stone shall be extended down the slope for erosion control.

APPENDIX B

MOISTURE-DENSITY DATA FOR THE SUBGRADE

BEGINNING STATION	ENDING STATION	DIRECTION OF TRAVEL	LOCATION*	NUMBER OF TESTS	AVERAGE PERCENT MOISTURE	MOISTURE RANGE (PERCENT)		AVERAGE DRY DENSITY (PCF)	DRY DENSITY RANGE (PCF)		AVERAGE PERCENT COMPACTION	COMPACTION RANGE (PERCENT)	
						MINIMUM	MAXIMUM		MINIMUM	MAXIMUM		MINIMUM	MAXIMUM
128+00	155+33	EB	ML	12	9.2	7.4	12.0	110.6	101.5	120.4	98.4	90.3	107.1
155+33	182+66	EB	ML	10	9.4	5.0	14.2	112.0	100.3	122.3	101.4	89.2	112.3
182+66	210+00	EB	ML	10	9.2	7.4	12.1	107.8	91.0	114.4	96.9	84.9	106.7
210+00	245+00	EB	ML	9	11.4	10.0	13.5	109.4	103.6	115.8	98.5	92.2	103.4
245+00	285+00	EB	ML	9	10.1	7.9	13.0	109.6	103.4	119.8	96.2	90.0	104.0
285+00	321+50	EB	ML	8	10.4	9.3	13.6	107.0	96.7	120.5	100.5	90.8	113.1
321+50	347+50	EB	ML	2	8.1	6.7	9.5	101.7	96.7	106.6	95.5	90.8	100.1
347+50	373+50	EB	ML	4	9.9	7.9	12.3	112.9	106.5	119.8	95.3	89.9	101.1
373+50	399+50	EB	ML	5	12.4	10.8	15.1	103.5	99.1	109.3	91.3	86.9	95.9
399+50	428+68.15	EB	ML	5	10.7	7.4	13.4	112.4	108.9	117.0	98.5	95.5	102.6
321+50	347+50	WB	ML	5	9.8	8.2	12.7	110.3	89.5	120.0	98.0	79.6	106.7
347+50	373+50	WB	ML	2	10.3	9.9	10.6	112.0	106.3	117.7	99.6	94.5	104.6
373+50	399+50	WB	ML	5	9.5	8.7	11.3	109.9	102.8	113.4	96.9	90.1	99.4
WEIGHTED AVERAGE				86	10.5	5.0	15.1	109.4	91.0	122.3	97.8	84.9	112.3
128+00	155+33	EB	SH	10	8.1	6.9	10.9	117.9	105.1	129.0	104.8	93.5	114.8
155+33	182+66	EB	SH	7	9.3	6.5	12.0	108.4	99.7	123.5	96.1	87.4	109.9
182+66	210+00	EB	SH	12	8.2	6.7	10.4	108.5	94.3	120.8	94.5	82.6	105.9
210+00	245+00	EB	SH	7	10.3	8.2	12.1	103.6	99.7	108.7	87.4	84.1	91.7
245+00	285+00	EB	SH	7	8.8	6.7	11.8	105.2	99.1	114.0	94.6	87.3	100.4
285+00	321+50	EB	SH	11	8.4	3.8	12.3	112.0	94.3	126.8	105.2	88.5	119.1
321+50	347+50	EB	SH	5	8.7	8.1	9.5	112.5	106.5	116.4	100.0	94.7	103.5
347+50	373+50	EB	SH	4	12.6	10.1	15.0	115.8	113.7	121.1	102.9	101.1	107.6
373+50	399+50	EB	SH	5	12.6	10.4	14.6	115.2	111.2	119.3	101.6	97.5	106.0
347+50	373+50	WB	SH	5	13.3	11.7	16.4	114.7	103.8	125.8	102.0	92.3	111.8
373+50	399+50	WB	SH	5	12.6	10.6	13.9	113.6	107.3	117.6	100.2	94.0	103.1
WEIGHTED AVERAGE				78	9.7	3.8	16.4	111.2	94.3	129.0	98.9	82.6	119.1

*ML - Main Line; SH - Shoulders

APPENDIX C

COMPACTION DATA FOR ASPHALTIC CONCRETE

BEGINNING STATION	ENDING STATION	LAYER NUMBER	DIRECTION OF TRAVEL	LOCATION*	NUMBER OF TESTS	AVERAGE ASPHALT CONTENT (PERCENT)	ASPHALT CONTENT RANGE (PERCENT)		AVERAGE BULK DENSITY (PCF)	BULK DENSITY RANGE (PCF)		AVERAGE** PERCENT COMPACTION	COMPACTION RANGE (PERCENT)	
							MINIMUM	MAXIMUM		MINIMUM	MAXIMUM		MINIMUM	MAXIMUM
128+00	155+33	1	EB	ML	12	5.7	5.0	6.6	131.0	119.6	137.2	93.8	85.7	98.3
		2			12	4.9	4.2	5.3	130.6	125.4	135.2	94.2	90.4	97.5
		3			12	5.8	5.1	6.8	130.8	123.5	139.1	94.3	89.0	100.3
		4			12	5.3	4.8	6.1	128.7	121.6	135.2	92.8	87.6	97.5
		SURFACE			5	5.8	5.2	6.2	134.6	128.8	139.6	97.1	92.9	100.7
155+33	182+66	1	EB	ML	8	6.6	6.0	7.1	133.0	125.4	135.2	95.3	90.4	96.8
		2			8	5.1	3.8	5.6	128.6	125.4	131.3	97.9	90.4	94.7
		3			6	6.5	5.3	7.8	128.1	121.5	133.3	92.3	87.6	96.1
		4			4	5.0	4.0	5.6	126.5	119.6	127.4	90.5	86.2	91.8
		SURFACE			6	5.9	5.6	6.1	130.6	126.9	134.2	94.2	91.6	96.8
182+66	210+00	1	EB	ML	12	6.2	5.0	7.6	130.2	121.5	141.1	93.2	87.0	101.1
		2			10	5.4	4.3	6.2	130.9	125.4	137.2	94.4	90.4	98.8
		3			10	6.0	5.6	6.6	127.6	123.5	133.3	92.0	89.0	96.1
		SURFACE			6	5.6	5.4	5.7	131.4	122.8	134.7	94.8	88.6	97.2
210+00	245+00	1	EB	ML	5	5.4	4.7	5.9	128.2	123.5	133.3	91.8	88.5	95.5
		2			11	5.3	5.0	5.6	130.8	125.4	137.2	94.3	90.4	98.9
		3			9	4.5	3.8	5.0	127.2	117.6	133.3	91.7	84.8	96.1
		4			9	5.9	4.9	6.7	128.6	123.5	133.3	92.3	89.0	96.1
		5			10	4.4	3.7	5.3	126.0	121.5	129.3	90.9	87.6	93.2
		SURFACE			7	5.8	5.3	6.2	131.1	124.8	132.8	94.6	90.0	95.8
245+00	285+00	1	EB	ML	8	6.2	5.4	6.7	124.2	116.7	128.3	89.0	82.9	92.8
		2			8	4.9	4.3	5.6	125.4	117.6	129.3	90.4	84.8	93.2
		3			6	5.3	4.5	6.3	130.3	125.4	137.2	94.0	90.4	98.9
		4			7	5.1	4.1	6.1	129.6	119.6	133.3	93.5	86.2	96.1
		5			8	5.6	5.4	6.4	132.5	129.3	137.2	95.6	93.2	98.9
		SURFACE			10	5.9	5.2	6.4	133.0	128.8	134.7	95.9	92.9	97.2
285+00	321+50	1	EB	ML	8	5.7	5.4	6.0	129.1	123.5	133.3	92.5	88.5	95.5
		2			8	5.4	4.8	6.0	130.6	127.4	133.3	94.2	91.9	96.1
		3			8	5.4	4.9	6.2	132.1	127.4	137.2	95.2	91.9	98.9
		4			8	5.3	4.7	5.7	132.3	127.4	137.2	95.4	91.9	98.9
		SURFACE			8	5.6	4.9	6.5	132.8	124.8	137.8	95.7	90.0	99.4
321+50	347+50	1	EB	ML	2	5.2	4.2	6.2	128.4	127.4	129.3	92.0	91.3	92.6
		2			5	5.9	5.6	6.1	128.6	119.6	133.3	92.7	86.2	96.1
		3			7	5.7	4.5	7.0	132.1	127.4	137.2	95.3	91.9	98.9
		4			5	4.9	4.5	5.7	126.6	121.5	131.3	91.3	87.6	94.7
		5			5	4.5	3.5	5.5	130.1	121.5	135.2	93.8	87.6	97.5
		SURFACE			5	6.2	5.9	6.6	138.9	138.0	141.4	100.2	98.1	102.0
347+50	373+50	1	EB	ML	3	6.8	6.3	7.8	127.4	119.6	133.3	91.3	85.7	95.5
		2			4	5.9	5.6	6.6	130.3	127.4	135.2	94.0	91.9	97.5
		3			5	5.3	4.4	7.0	134.4	129.3	139.1	96.9	93.2	100.3
		4			4	5.2	4.8	5.7	128.9	125.4	133.3	92.9	90.4	96.1
		5			5	3.8	3.6	4.5	127.0	121.5	133.3	91.6	87.6	96.1
		SURFACE			5	6.0	5.4	7.1	137.1	136.0	139.6	98.9	98.1	100.7
373+50	399+50	1	EB	ML	3	7.0	6.5	7.3	129.3	125.4	133.3	92.6	89.8	95.5
		2			5	4.7	4.1	5.4	132.1	127.4	138.1	95.2	91.9	100.3
		3			5	4.0	3.6	4.4	124.3	119.6	129.3	89.6	86.2	93.2
		4			5	3.8	3.2	4.3	123.1	119.6	129.3	88.7	86.2	93.2
		SURFACE			5	5.8	5.3	6.2	134.6	130.6	141.4	97.1	94.2	102.0
399+50	425+68.15	4	EB	ML	5	4.5	4.1	5.0	127.0	123.5	131.3	91.6	88.5	94.1
		5			5	3.6	3.0	4.0	122.7	115.7	131.3	88.0	81.0	94.7
		SURFACE			5	5.4	5.1	5.8	137.1	134.2	139.6	98.9	96.8	100.7
321+50	347+50	1	WB	ML	3	5.3	5.0	5.5	131.3	127.4	135.2	94.0	91.2	96.8
		2			6	4.2	3.6	4.4	129.3	123.5	131.3	93.3	89.0	94.7
		3			5	3.9	2.8	4.5	129.3	115.7	135.2	93.3	83.4	97.5
		4			6	3.4	2.7	3.9	128.8	124.8	134.7	92.9	90.0	97.1
		5			5	4.2	4.6	4.8	131.7	128.8	132.4	95.0	92.9	95.5
		SURFACE			5	5.7	5.3	6.2	137.1	134.2	139.6	98.8	96.8	100.7
347+50	373+50	1	WB	ML	0									
		2			4	3.8	3.3	4.4	125.5	115.7	131.3	90.5	83.4	94.7
		3			5	4.0	3.4	4.4	128.2	121.5	133.3	92.4	87.6	96.1
		4			5	4.0	3.4	5.0	128.0	126.9	128.8	92.3	91.5	92.9
		5			5	5.0	4.6	5.7	131.5	126.9	132.4	93.4	91.5	95.5
		SURFACE			5	5.9	5.6	6.3	135.6	130.6	141.4	97.8	94.2	102.0
373+50	399+50	1	WB	ML	5	5.9	5.0	6.9	123.9	117.6	129.3	89.7	84.2	92.6
		2			5	4.7	4.3	5.2	128.9	119.6	133.3	93.0	86.2	96.1
		3			5	4.6	4.3	5.0	132.0	128.8	136.0	95.2	92.9	98.1
		4			5	5.0	4.8	5.1	130.6	128.8	134.2	94.8	92.9	96.8
		5			5	5.7	4.9	6.2	137.1	134.2	139.6	98.9	96.8	100.7
		SURFACE			5	5.7	4.9	6.3	137.4	134.2	141.4	99.2	96.8	102.0
399+50	414+00	4	WB	ML	5	4.8	4.3	5.1	121.7	109.0	128.8	87.2	78.1	92.3
		5			5	3.4	3.0	3.7	127.8	122.8	132.4	92.0	88.5	95.5
		SURFACE			5	5.7	5.2	6.3	138.7	134.2	141.4	99.7	96.8	102.0
128+00	155+33	1	EB	SH	6	5.8	4.4	7.4	125.7	121.5	129.3	90.1	87.0	92.6
155+33	182+66	1	EB	SH	8	6.0	4.9	6.4	122.5	111.7	129.3	87.8	80.0	92.6
182+66	210+00	1	EB	SH	10	5.9	4.5	7.3	121.9	111.7	129.3	87.3	80.0	92.6
210+00	245+00	1	EB	SH	13	5.8	4.9	6.4	124.1	113.7	133.3	88.9	81.4	95.5
		2			16	4.3	2.8	4.8	124.8	119.6	131.3	90.0	86.2	94.7
245+00	285+00	1	EB	SH	13	4.8	3.5	6.2	121.1	109.8	131.3	86.7	78.7	94.1
		2			13	4.7	3.6	6.1	126.3	113.7	136.2	91.1	82.0	97.5
285+00	321+50	1	EB	SH	11	5.0	4.1	5.9	125.4	117.6	129.3	89.8	84.2	92.6
		2			11	4.8	3.9	6.1	123.5	115.7	137.2	89.0	83.4	98.9
321+50	347+50	1	EB	SH	0									
		2			5	4.4	3.7	5.7	129.3	123.5	135.2	93.3	89.0	97.5
347+50	373+50	1	EB	SH	0									
		2			5	3.2	2.5	3.7	126.2	117.6	131.3	91.0	84.9	94.7
373+50	399+50	1	EB	SH	5	4.1	3.0	5.0	123.1	115.7	129.3	88.2	82.9	92.6
		2			5	3.8	2.9	4.2	131.7	121.5	136.2	95.0	87.6	97.5
321+50	347+50	1	WB	SH	5	4.3	4.2	4.7	127.2	124.8	130.8	91.1	89.4	93.7
		2			5	4.6	4.3	5.6	126.3	118.0	132.4	91.0	85.1	95.5
347+50	373+50	1	WB	SH	4	4.7	3.9	5.5	128.7	120.8	134.2	92.2	86.5	96.1
		2			4	4.8	3.8	5.4	131.5	125.2	136.0	94.8	90.3	98.1
373+50	399+50	1	WB	SH	5	5.4	4.1	6.1	129.5	125.2	136.0	92.8	89.7	97.4
		2			5	4.5	3.8	4.8	131.0	128.8	132.4	94.4	92.9	95.5
128+00	425+68.15	1	COMBINED	ML	69	5.9	4.2	7.8	129.1	115.7	141.1	92.4	82.9	101.1
		2			85	5.1	3.3	6.6	129.5	115.7	139.1	93.4	83.4	100.3
		3			83	4.7	2.8	7.8	129.7	115.7	139.1	93.5	83.4	100.3
		4			79	4.9	2.7	6.7	127.9	109.0	137.2	92.3	78.1	98.9
		5			53	4.6	3.0	6.4	129.4	115.7	139.6	93.2	81.0	100.7
		SURFACE			82	5.8	4.9	7.1	134.6	122.8	141.4	97.0	88.6	102.0
128+00	425+68.15	1	COMBINED	SH	80	5.3	3.0	7.4	124.2	109.8	136.0	88.9	78.7	97.4
		2			69	4.4	2.5	6.1	126.8	115.7	137.2	91.4	82.0	98.9

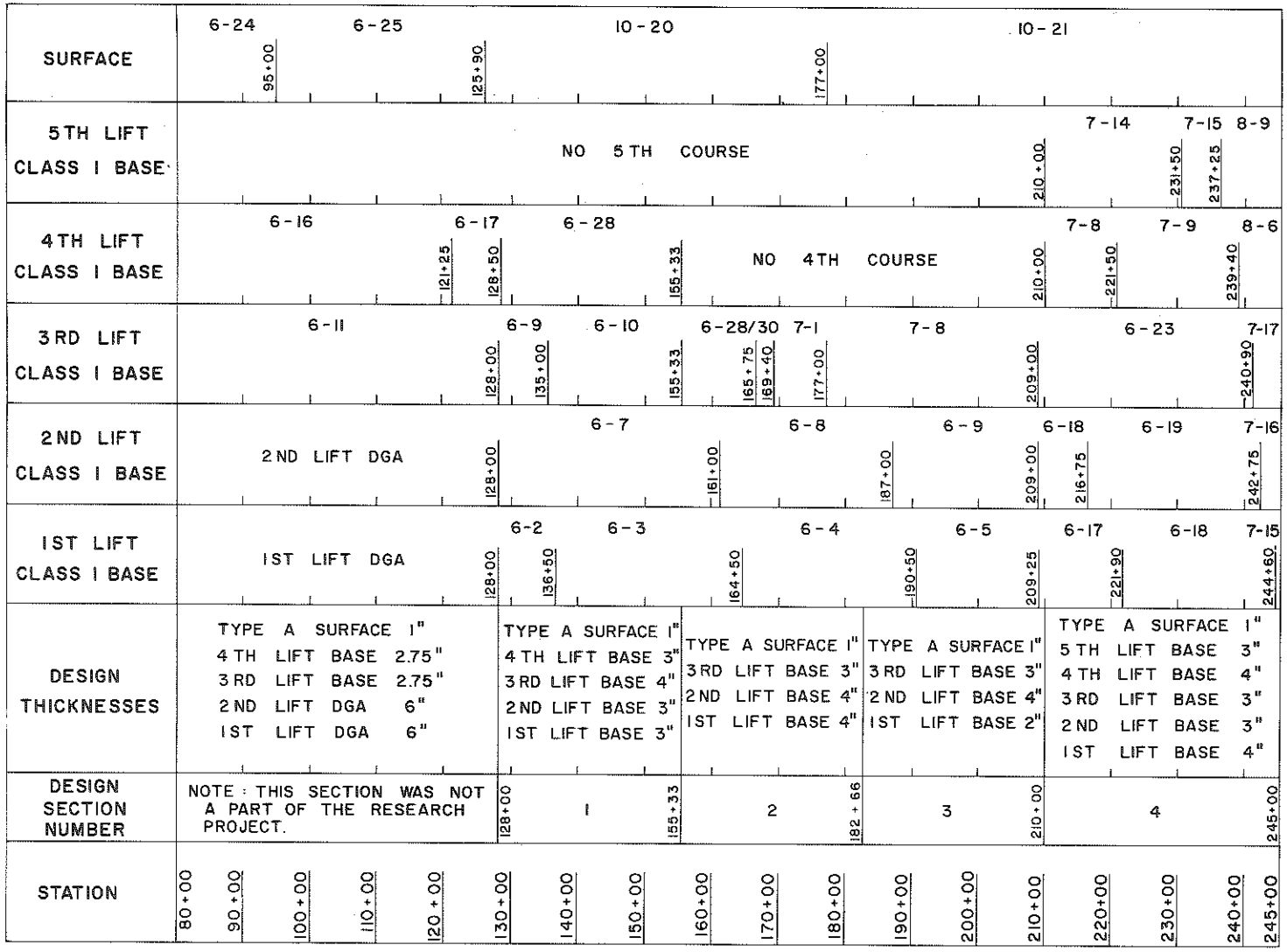
* - ML - Mainline; SH - Shoulder
** - Based on mix design values: 1st Lift = 139.6 PCF, remainder = 138.7 PCF

APPENDIX D

PAVING SCHEDULE

1971 PAVING SCHEDULE

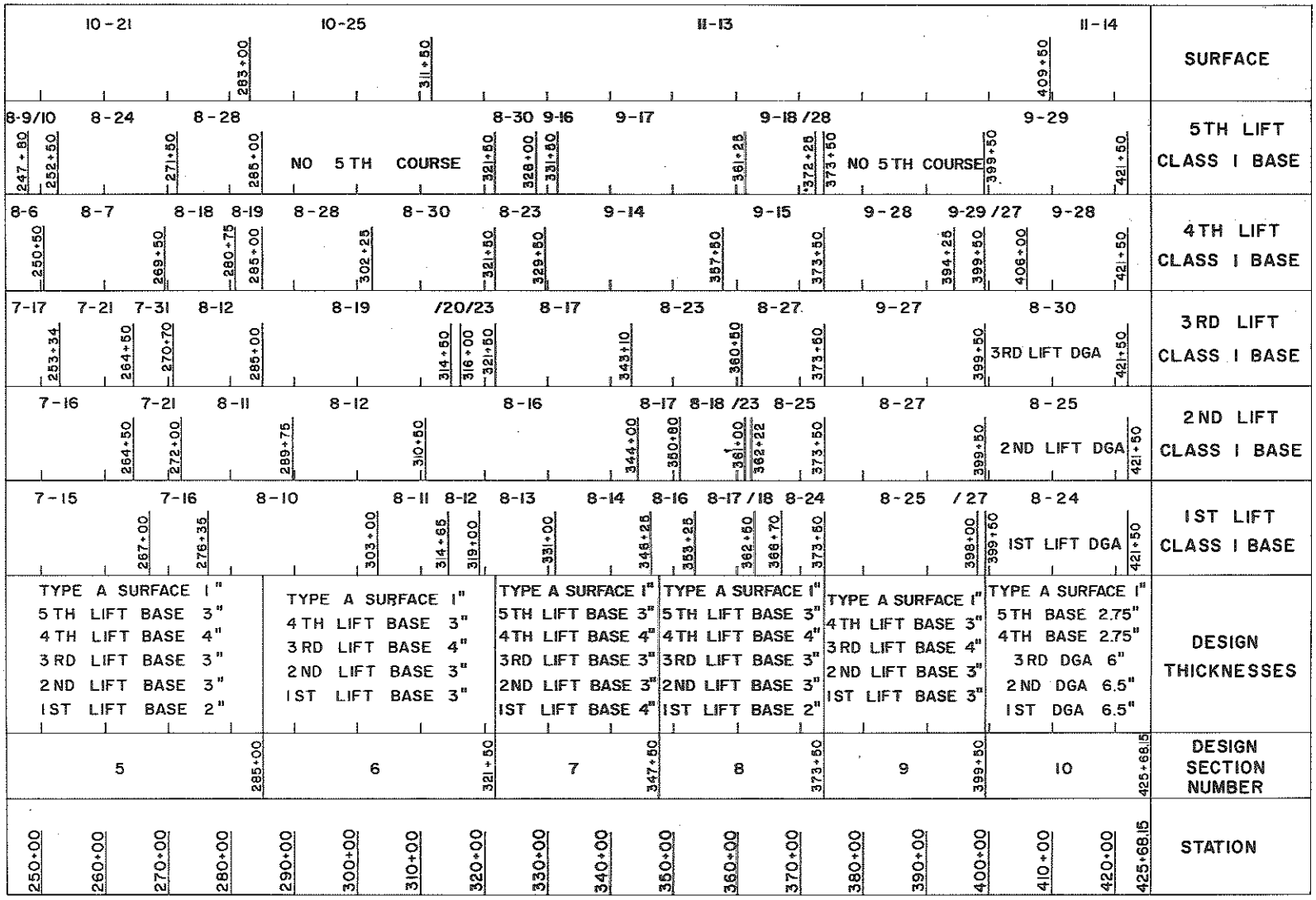
EASTBOUND LANES



NOTE : A / indicates the same month as the previous date.
6-28 / 30 means 6-28 and 6-30.

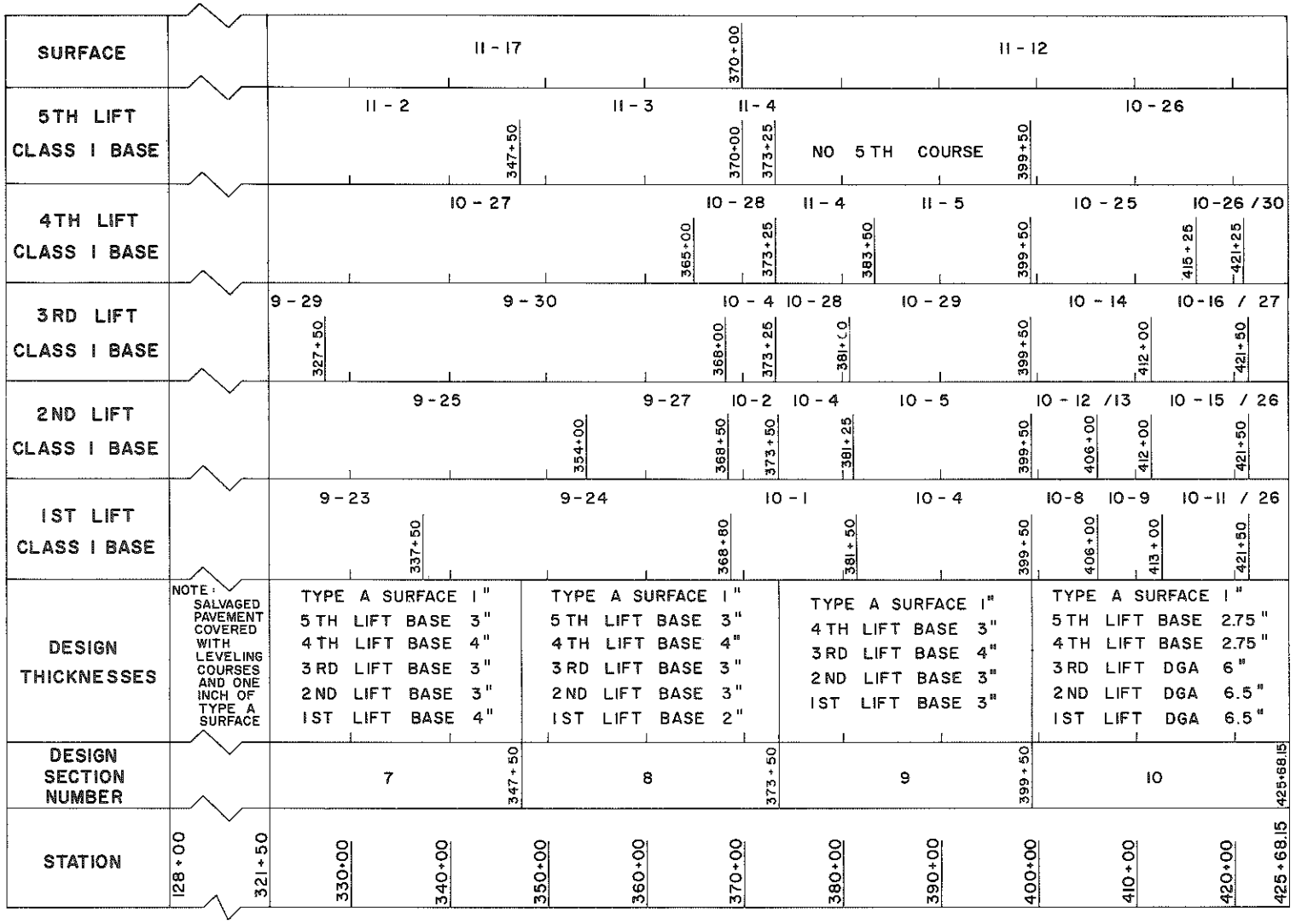
1971 PAVING SCHEDULE

EASTBOUND LANES



1971 PAVING SCHEDULE

WESTBOUND LANES



APPENDIX E

BENKELMAN BEAM TESTING SCHEDULE

TEST STATION	DIRECTION OF TRAVEL	DESIGNED NUMBER OF LAYERS	1st LAYER	2nd LAYER	3rd LAYER	4th LAYER	5th LAYER	SURFACE
81+00	EB	4	DGA	DGA	June 15, 1971	June 18, 1971		July 7, 1971
85+00	EB	4	DGA	DGA	June 15, 1971	June 18, 1971		July 7, 1971
90+00	EB	4	DGA	DGA	June 15, 1971	June 18, 1971		July 7, 1971
95+00	EB	4	DGA	DGA	June 15, 1971	June 18, 1971		July 7, 1971
100+00	EB	4	DGA	DGA	June 15, 1971	June 18, 1971		July 7, 1971
105+00	EB	4	DGA	DGA	June 15, 1971	June 18, 1971		July 7, 1971
110+00	EB	4	DGA	DGA	June 15, 1971	June 18, 1971		July 7, 1971
116+50	EB	4	DGA	DGA	June 15, 1971	June 18, 1971		July 7, 1971
120+00	EB	4	DGA	DGA	**	June 18, 1971		July 7, 1971
125+00	EB	4	DGA	DGA	**	June 18, 1971		July 7, 1971
130+00	EB	4	*	June 9, 1971	June 11, 1971	July 7, 1971		Oct. 26, 1971
135+00	EB	4	*	June 9, 1971	June 11, 1971	July 7, 1971		Oct. 26, 1971
140+00	EB	4	*	June 9, 1971	June 15, 1971	July 7, 1971		Oct. 26, 1971
145+00	EB	4	*	June 9, 1971	June 15, 1971	July 7, 1971		Oct. 26, 1971
150+00	EB	4	*	June 9, 1971	June 15, 1971	July 7, 1971		Oct. 27, 1971
155+00	EB	4	*	June 9, 1971	June 15, 1971	July 7, 1971		Oct. 27, 1971
160+00	EB	3	*	June 9, 1971	July 7, 1971			Oct. 27, 1971
165+00	EB	3	*	June 10, 1971	July 7, 1971			Oct. 27, 1971
170+00	EB	3	*	June 10, 1971	July 7, 1971			Oct. 27, 1971
175+00	EB	3	*	June 10, 1971	July 7, 1971			Oct. 26, 1971
180+00	EB	3	*	June 10, 1971	July 13, 1971			Oct. 26, 1971
186+00	EB	3	June 8, 1971	June 10, 1971	July 13, 1971			Oct. 26, 1971
190+00	EB	3	June 8, 1971	June 11, 1971	July 13, 1971			Oct. 26, 1971
195+00	EB	3	June 8, 1971	June 11, 1971	July 13, 1971			Oct. 26, 1971
200+00	EB	3	June 8, 1971	June 11, 1971	****			Oct. 26, 1971
205+00	EB	3	June 8, 1971	June 11, 1971	****			Oct. 26, 1971
210+00	EB	3	***	June 22, 1971	July 13, 1971			Oct. 26, 1971
213+00	EB	5	***	June 22, 1971	June 28, 1971	July 13, 1971	July 16, 1971	Oct. 26, 1971
215+00	EB	5	***	June 22, 1971	June 28, 1971	July 13, 1971	July 16, 1971	Oct. 26, 1971
215+50	EB	5	***	June 22, 1971	June 28, 1971	July 13, 1971	July 16, 1971	Oct. 26, 1971
217+00	EB	5	***	June 22, 1971	June 28, 1971	July 13, 1971	July 16, 1971	Oct. 26, 1971
222+00	EB	5	***	June 22, 1971	June 28, 1971	July 13, 1971	July 16, 1971	Oct. 26, 1971
241+50	EB	5	***	June 22, 1971	July 20, 1971	***	Aug. 11, 1971	Oct. 26, 1971
242+50	EB	5	***	June 22, 1971	July 20, 1971	***	Aug. 11, 1971	Oct. 26, 1971
257+50	EB	5	***	July 20, 1971	Aug. 2, 1971	Aug. 11, 1971	Sept. 8, 1971	Oct. 26, 1971
262+00	EB	5	***	July 20, 1971	Aug. 2, 1971	Aug. 11, 1971	Sept. 8, 1971	Oct. 26, 1971
264+00	EB	5	***	July 20, 1971	Aug. 2, 1971	Aug. 11, 1971	Sept. 8, 1971	Oct. 26, 1971
265+00	EB	5	***	July 20, 1971	Aug. 2, 1971	Aug. 11, 1971	Sept. 8, 1971	Oct. 26, 1971
268+50	EB	5	***	July 20, 1971	Aug. 2, 1971	Aug. 11, 1971	Sept. 8, 1971	Oct. 26, 1971
271+00	EB	5	***	July 20, 1971	Aug. 17, 1971	Aug. 24, 1971	Sept. 8, 1971	Oct. 26, 1971
273+50	EB	5	***	***	Aug. 17, 1971	Aug. 24, 1971	Sept. 8, 1971	Oct. 26, 1971
276+00	EB	5	***	***	Aug. 17, 1971	Aug. 24, 1971	**	Oct. 27, 1971
279+50	EB	5	***	***	Aug. 17, 1971	Aug. 24, 1971	Sept. 8, 1971	Oct. 27, 1971
289+50	EB	4	***	Aug. 17, 1971	Aug. 24, 1971	Sept. 8, 1971		Oct. 27, 1971
295+50	EB	4	***	Aug. 17, 1971	Aug. 24, 1971	Sept. 8, 1971		Oct. 27, 1971
299+00	EB	4	***	Aug. 17, 1971	Aug. 24, 1971	Sept. 8, 1971		Oct. 27, 1971
306+00	EB	4	***	Aug. 17, 1971	Aug. 24, 1971	Sept. 8, 1971		Nov. 17, 1971
306+50	EB	4	***	Aug. 17, 1971	Aug. 24, 1971	Sept. 8, 1971		Nov. 17, 1971
307+00	EB	4	***	Aug. 17, 1971	Aug. 24, 1971	Sept. 8, 1971		Nov. 17, 1971
314+00	EB	4	***	Aug. 18, 1971	Aug. 24, 1971	Sept. 8, 1971		Nov. 17, 1971
315+00	EB	4	***	Aug. 18, 1971	Aug. 24, 1971	Sept. 8, 1971		Nov. 17, 1971
323+00	EB	5	***	***	Aug. 18, 1971	**	Sept. 8, 1971	Nov. 17, 1971
323+50	EB	5	***	***	Aug. 18, 1971	**	Sept. 8, 1971	Nov. 17, 1971
334+00	EB	5	***	***	Aug. 18, 1971	***	Sept. 22, 1971	Nov. 17, 1971
338+50	EB	5	***	***	Aug. 18, 1971	***	Sept. 22, 1971	Nov. 17, 1971
341+50	EB	5	***	***	Aug. 18, 1971	***	Sept. 22, 1971	Nov. 17, 1971
349+00	EB	5	***	***	Sept. 9, 1971	***	Sept. 22, 1971	Nov. 17, 1971
355+00	EB	5	***	Aug. 23, 1971	Sept. 9, 1971	***	Sept. 22, 1971	Nov. 17, 1971
359+00	EB	5	***	Aug. 23, 1971	Sept. 9, 1971	***	Sept. 22, 1971	Nov. 17, 1971
360+50	EB	5	***	Aug. 23, 1971	Sept. 9, 1971	***	Sept. 22, 1971	Nov. 17, 1971
372+00	EB	5	***	***	Sept. 9, 1971	***	**	Nov. 17, 1971
376+50	EB	4	***	Sept. 9, 1971	***	Sept. 30, 1971		Nov. 17, 1971
379+50	EB	4	***	Sept. 9, 1971	***	Sept. 30, 1971		Nov. 17, 1971
388+00	EB	4	***	Sept. 9, 1971	***	Sept. 30, 1971		Nov. 17, 1971
391+50	EB	4	***	Sept. 9, 1971	***	Sept. 30, 1971		Nov. 17, 1971
396+50	EB	4	***	Sept. 9, 1971	***	Sept. 30, 1971		Nov. 17, 1971
403+50	EB	5	DGA	DGA	DGA	Sept. 30, 1971	Oct. 27, 1971	Nov. 17, 1971
405+50	EB	5	DGA	DGA	DGA	Sept. 30, 1971	Oct. 27, 1971	Nov. 17, 1971
407+50	EB	5	DGA	DGA	DGA	Sept. 30, 1971	Oct. 27, 1971	Nov. 17, 1971
410+00	EB	5	DGA	DGA	DGA	Sept. 30, 1971	Oct. 27, 1971	Nov. 17, 1971
414+00	EB	5	DGA	DGA	DGA	Sept. 30, 1971	Oct. 27, 1971	Nov. 17, 1971
323+00	WB	5	***	Sept. 28, 1971	Oct. 5, 1971	Oct. 29, 1971	Nov. 8, 1971	Nov. 30, 1971
323+50	WB	5	***	Sept. 28, 1971	Oct. 5, 1971	Oct. 29, 1971	Nov. 8, 1971	Nov. 30, 1971
334+00	WB	5	***	Sept. 28, 1971	Oct. 5, 1971	Oct. 29, 1971	Nov. 8, 1971	Nov. 30, 1971
338+50	WB	5	***	Sept. 28, 1971	Oct. 5, 1971	Oct. 29, 1971	Nov. 8, 1971	Nov. 30, 1971
341+50	WB	5	***	Sept. 28, 1971	Oct. 5, 1971	Oct. 29, 1971	Nov. 8, 1971	Nov. 30, 1971
349+00	WB	5	***	Sept. 28, 1971	Oct. 5, 1971	Oct. 29, 1971	Nov. 8, 1971	Nov. 30, 1971
355+00	WB	5	***	Sept. 28, 1971	Oct. 5, 1971	Oct. 29, 1971	Nov. 8, 1971	Nov. 30, 1971
359+00	WB	5	***	Sept. 28, 1971	Oct. 5, 1971	Oct. 29, 1971	Nov. 8, 1971	Nov. 30, 1971
360+50	WB	5	***	Sept. 28, 1971	Oct. 5, 1971	Oct. 29, 1971	Nov. 8, 1971	Nov. 30, 1971
372+25	WB	5	***	***	**	Nov. 1, 1971	Nov. 8, 1971	Nov. 30, 1971
376+50	WB	4	***	Oct. 6, 1971	Nov. 1, 1971	Nov. 10, 1971		Nov. 30, 1971
379+50	WB	4	***	Oct. 6, 1971	Nov. 1, 1971	Nov. 10, 1971		Nov. 30, 1971
388+00	WB	4	***	Oct. 6, 1971	Nov. 1, 1971	Nov. 10, 1971		Nov. 30, 1971
391+50	WB	4	***	Oct. 6, 1971	Nov. 1, 1971	Nov. 10, 1971		Nov. 30, 1971
396+50	WB	4	***	Oct. 6, 1971	Nov. 1, 1971	Nov. 10, 1971		Nov. 30, 1971
403+50	WB	5	DGA	DGA	DGA	***	Oct. 28, 1971	Nov. 30, 1971
405+50	WB	5	DGA	DGA	DGA	***	Oct. 28, 1971	Nov. 30, 1971
407+50	WB	5	DGA	DGA	DGA	***	Oct. 28, 1971	Nov. 30, 1971
410+00	WB	5	DGA	DGA	DGA	***	Oct. 28, 1971	Nov. 30, 1971
414+00	WB	5	DGA	DGA	DGA	***	Oct. 28, 1971	Nov. 30, 1971

* - Testing suspended because tests caused permanent deformation in the pavement
** - Missed
*** - Asphalt laid too fast
**** - Not tested due to excessive superelevation

APPENDIX F

ROAD RATER TESTING SCHEDULE

TEST STATION	DIRECTION OF TRAVEL	DESIGNED NUMBER OF LAYERS	1st LAYER	2nd LAYER	3rd LAYER	4th LAYER	5th LAYER	SURFACE
81+00	EB	4	DGA	May 27, 1971	June 14, 1971	June 23, 1971		July 7, 1971
85+00	EB	4	DGA	May 27, 1971	June 14, 1971	June 23, 1971		July 7, 1971
90+00	EB	4	DGA	May 27, 1971	June 14, 1971	June 23, 1971		July 7, 1971
95+00	EB	4	DGA	May 27, 1971	June 14, 1971	June 23, 1971		July 7, 1971
100+00	EB	4	DGA	May 27, 1971	June 14, 1971	June 23, 1971		July 7, 1971
105+00	EB	4	DGA	June 11, 1971	June 14, 1971	June 23, 1971		July 7, 1971
110+00	EB	4	DGA	June 11, 1971	June 14, 1971	June 23, 1971		July 7, 1971
116+50	EB	4	DGA	**	June 14, 1971	June 23, 1971		July 7, 1971
120+00	EB	4	DGA	**	June 14, 1971	June 23, 1971		July 7, 1971
125+00	EB	4	DGA	**	June 14, 1971	June 23, 1971		July 7, 1971
130+00	EB	4	*	June 9, 1971	June 10, 1971	June 30, 1971		Nov. 15, 1971
135+00	EB	4	*	June 9, 1971	June 10, 1971	June 30, 1971		Nov. 15, 1971
140+00	EB	4	*	June 9, 1971	June 11, 1971	June 30, 1971		Nov. 15, 1971
145+00	EB	4	*	June 9, 1971	June 11, 1971	June 30, 1971		Nov. 15, 1971
150+00	EB	4	*	June 9, 1971	June 11, 1971	June 30, 1971		Nov. 15, 1971
155+00	EB	4	*	June 9, 1971	June 11, 1971	June 30, 1971		Nov. 15, 1971
160+00	EB	3	*	June 9, 1971	June 30, 1971			Nov. 15, 1971
165+00	EB	3	*	June 9, 1971	June 30, 1971			Nov. 15, 1971
170+00	EB	3	*	June 9, 1971	July 15, 1971			Nov. 15, 1971
175+00	EB	3	*	June 9, 1971	July 15, 1971			Nov. 15, 1971
180+00	EB	3	*	June 9, 1971	July 13, 1971			Nov. 15, 1971
186+00	EB	3	*	June 9, 1971	July 13, 1971			Nov. 15, 1971
190+00	EB	3	*	June 10, 1971	July 13, 1971			Nov. 15, 1971
195+00	EB	3	*	June 10, 1971	July 13, 1971			Nov. 16, 1971
200+00	EB	3	*	June 10, 1971	July 13, 1971			Nov. 16, 1971
205+00	EB	3	**	June 10, 1971	July 13, 1971			Nov. 16, 1971
210+00	EB	3	**	**	July 13, 1971			Nov. 16, 1971
213+00	EB	5	**	June 21, 1971	June 24, 1971	July 13, 1971	July 15, 1971	Nov. 16, 1971
215+00	EB	5	**	June 21, 1971	June 24, 1971	July 13, 1971	July 15, 1971	Nov. 16, 1971
215+50	EB	5	**	June 21, 1971	June 24, 1971	July 13, 1971	July 15, 1971	Nov. 16, 1971
217+00	EB	5	**	June 21, 1971	June 24, 1971	July 13, 1971	July 15, 1971	Nov. 16, 1971
222+00	EB	5	**	June 21, 1971	June 24, 1971	July 13, 1971	July 15, 1971	Nov. 16, 1971
232+00	EB	5	**	June 21, 1971	June 24, 1971	July 14, 1971	July 15, 1971	Nov. 16, 1971
237+50	EB	5	**	June 21, 1971	June 24, 1971	July 14, 1971	Aug. 11, 1971	Nov. 16, 1971
241+50	EB	5	**	June 21, 1971	July 20, 1971	**	Aug. 11, 1971	Nov. 16, 1971
242+50	EB	5	**	June 21, 1971	July 20, 1971	**	Aug. 11, 1971	Nov. 16, 1971
243+50	EB	5	**	***	July 20, 1971	**	Aug. 11, 1971	Nov. 16, 1971
257+50	EB	5	July 16, 1971	July 20, 1971	July 22, 1971	Aug. 11, 1971	Aug. 25, 1971	Nov. 16, 1971
262+00	EB	5	July 16, 1971	July 20, 1971	July 22, 1971	Aug. 11, 1971	Aug. 25, 1971	Nov. 22, 1971
264+00	EB	5	July 16, 1971	July 20, 1971	July 22, 1971	Aug. 11, 1971	Aug. 25, 1971	Nov. 22, 1971
265+00	EB	5	July 20, 1971	***	July 22, 1971	Aug. 11, 1971	Aug. 25, 1971	Nov. 22, 1971
268+50	EB	5	July 20, 1971	***	***	Aug. 11, 1971	Aug. 25, 1971	Nov. 22, 1971
271+00	EB	5	July 20, 1971	Aug. 2, 1971	Aug. 17, 1971	Aug. 19, 1971	Aug. 25, 1971	Nov. 22, 1971
273+50	EB	5	July 20, 1971	Aug. 12, 1971	Aug. 17, 1971	Aug. 19, 1971	Sept. 7, 1971	Nov. 22, 1971
276+00	EB	5	July 20, 1971	Aug. 12, 1971	Aug. 17, 1971	Aug. 19, 1971	Sept. 7, 1971	Nov. 22, 1971
279+50	EB	5	July 20, 1971	Aug. 12, 1971	Aug. 17, 1971	Aug. 25, 1971	Sept. 7, 1971	Nov. 22, 1971
289+50	EB	4	**	Aug. 12, 1971	Aug. 25, 1971	Sept. 7, 1971		Nov. 22, 1971
295+50	EB	4	Aug. 12, 1971	Aug. 17, 1971	Aug. 25, 1971	Sept. 7, 1971		Nov. 22, 1971
299+00	EB	4	Aug. 12, 1971	Aug. 17, 1971	Aug. 25, 1971	Sept. 7, 1971		Nov. 22, 1971
306+00	EB	4	Aug. 12, 1971	Aug. 17, 1971	Aug. 25, 1971	Sept. 7, 1971		Nov. 17, 1971
306+50	EB	4	Aug. 12, 1971	Aug. 17, 1971	Aug. 25, 1971	Sept. 7, 1971		Nov. 17, 1971
307+00	EB	4	Aug. 12, 1971	Aug. 17, 1971	Aug. 25, 1971	Sept. 7, 1971		Nov. 17, 1971
314+00	EB	4	Aug. 12, 1971	Aug. 17, 1971	Aug. 25, 1971	Sept. 7, 1971		Nov. 17, 1971
315+00	EB	4	Aug. 12, 1971	Aug. 17, 1971	Aug. 25, 1971	Sept. 7, 1971		Nov. 17, 1971
323+00	EB	5	**	Aug. 17, 1971	Aug. 18, 1971	Aug. 25, 1971	Sept. 7, 1971	Nov. 17, 1971
323+50	EB	5	**	Aug. 17, 1971	Aug. 18, 1971	Aug. 25, 1971	Sept. 7, 1971	Nov. 17, 1971
334+00	EB	5	**	Aug. 17, 1971	Aug. 18, 1971	Sept. 15, 1971	Sept. 22, 1971	Nov. 17, 1971
338+50	EB	5	**	Aug. 17, 1971	Aug. 18, 1971	Sept. 15, 1971	Sept. 22, 1971	Nov. 17, 1971
341+50	EB	5	**	Aug. 17, 1971	Aug. 18, 1971	Sept. 15, 1971	Sept. 22, 1971	Nov. 17, 1971
349+00	EB	5	**	Aug. 17, 1971	Aug. 25, 1971	Sept. 15, 1971	Sept. 22, 1971	Nov. 17, 1971
355+00	EB	5	**	**	Aug. 25, 1971	Sept. 15, 1971	Sept. 22, 1971	Nov. 17, 1971
359+00	EB	5	Aug. 18, 1971	**	Aug. 25, 1971	Sept. 15, 1971	Sept. 22, 1971	Nov. 17, 1971
360+50	EB	5	Aug. 18, 1971	**	Aug. 31, 1971	Sept. 15, 1971	Sept. 22, 1971	Nov. 17, 1971
372+00	EB	5	Aug. 25, 1971	Aug. 26, 1971	Aug. 31, 1971	**	Sept. 22, 1971	Nov. 17, 1971
376+50	EB	4	Aug. 26, 1971	Aug. 31, 1971	Sept. 28, 1971	Sept. 29, 1971		Nov. 17, 1971
379+50	EB	4	Aug. 26, 1971	Aug. 31, 1971	Sept. 28, 1971	Sept. 29, 1971		Nov. 17, 1971
388+00	EB	4	Aug. 26, 1971	Aug. 31, 1971	Sept. 28, 1971	Sept. 29, 1971		Nov. 17, 1971
391+50	EB	4	Aug. 26, 1971	Aug. 31, 1971	Sept. 28, 1971	Sept. 29, 1971		Nov. 17, 1971
396+50	EB	4	Aug. 26, 1971	Aug. 31, 1971	Sept. 28, 1971	Sept. 29, 1971		Nov. 17, 1971
403+50	EB	5	DGA	DGA	Aug. 31, 1971	Sept. 28, 1971	Oct. 14, 1971	Nov. 17, 1971
405+50	EB	5	DGA	DGA	Aug. 31, 1971	Sept. 28, 1971	Oct. 14, 1971	Nov. 17, 1971
407+50	EB	5	DGA	DGA	Aug. 31, 1971	Sept. 29, 1971	Oct. 14, 1971	Nov. 17, 1971
410+00	EB	5	DGA	DGA	Aug. 31, 1971	Sept. 29, 1971	Oct. 14, 1971	Nov. 17, 1971
414+00	EB	5	DGA	DGA	Aug. 31, 1971	Sept. 29, 1971	Oct. 14, 1971	Nov. 17, 1971
323+00	WB	5	*	Sept. 28, 1971	Oct. 4, 1971	Oct. 28, 1971	Nov. 3, 1971	Nov. 30, 1971
323+50	WB	5	*	Sept. 28, 1971	Oct. 4, 1971	Oct. 28, 1971	Nov. 3, 1971	Nov. 30, 1971
334+00	WB	5	*	Sept. 28, 1971	Oct. 4, 1971	Oct. 28, 1971	Nov. 3, 1971	Nov. 30, 1971
338+50	WB	5	*	Sept. 28, 1971	Oct. 4, 1971	Oct. 29, 1971	Nov. 3, 1971	Nov. 30, 1971
341+50	WB	5	*	Sept. 28, 1971	Oct. 4, 1971	Oct. 29, 1971	Nov. 3, 1971	Nov. 30, 1971
349+00	WB	5	*	Sept. 28, 1971	Oct. 4, 1971	Oct. 29, 1971	Nov. 4, 1971	Nov. 30, 1971
355+00	WB	5	*	Sept. 28, 1971	Oct. 4, 1971	Oct. 29, 1971	Nov. 4, 1971	Nov. 30, 1971
359+00	WB	5	*	Sept. 28, 1971	Oct. 4, 1971	Oct. 29, 1971	Nov. 4, 1971	Nov. 30, 1971
360+50	WB	5	*	Sept. 28, 1971	Oct. 4, 1971	Oct. 29, 1971	Nov. 4, 1971	Nov. 30, 1971
372+25	WB	5	*	****	Oct. 5, 1971	Oct. 29, 1971	Nov. 9, 1971	Nov. 30, 1971
376+50	WB	4	*	Oct. 5, 1971	Nov. 2, 1971	Nov. 9, 1971		Nov. 30, 1971
379+50	WB	4	*	Oct. 5, 1971	Nov. 2, 1971	Nov. 9, 1971		Nov. 30, 1971
388+00	WB	4	*	Oct. 7, 1971	Nov. 2, 1971	Nov. 9, 1971		Nov. 30, 1971
391+50	WB	4	Oct. 5, 1971	Oct. 7, 1971	Nov. 2, 1971	Nov. 9, 1971		Nov. 30, 1971
396+50	WB	4	Oct. 5, 1971	Oct. 7, 1971	Nov. 2, 1971	Nov. 9, 1971		Nov. 30, 1971
403+50	WB	5	DGA	DGA	Oct. 19, 1971	Oct. 26, 1971	Nov. 2, 1971	Nov. 30, 1971
405+50	WB	5	DGA	DGA	Oct. 19, 1971	Oct. 26, 1971	Nov. 2, 1971	Nov. 30, 1971
407+50	WB	5	DGA	DGA	Oct. 20, 1971	Oct. 26, 1971	Nov. 2, 1971	Nov. 30, 1971
410+00	WB	5	DGA	DGA	Oct. 20, 1971	Oct. 26, 1971	Nov. 2, 1971	Nov. 30, 1971
414+00	WB	5	DGA	DGA	Oct. 20, 1971	Oct. 26, 1971	Nov. 2, 1971	Nov. 30, 1971

* - Road Rater inoperable
** - Asphalt laid too fast
*** - Missed
**** - Construction interference

APPENDIX G

ASPHALTIC CONCRETE MIX DESIGN DATA

TYPE OF MIX	EFFECTIVE DATES FROM	TO	DESIGN ASPHALT CONTENT (PERCENT)	ASPHALT CONTENT EXTREMES (PERCENT)		AVERAGE (PERCENT)	STANDARD DEVIATION	NUMBER OF TESTS	SIEVE SIZE	COMPOSITION LIMITS (PERCENT)	COMBINED BIN GRADATION NUMBER OF TESTS	EXTREMES (PERCENT)	AVERAGE (PERCENT)	STANDARD DEVIATION	EXTRACTION GRADATION NUMBER OF TESTS	EXTREMES (PERCENT)	AVERAGE (PERCENT)	STANDARD DEVIATION
Agg. Lime Class I Base	June 1, 1971	June 23, 1971	6.6	5.9	7.3	6.66	0.405	22	1 1/2"	100	29	100	100	0.00	4	100	100	0.00
			6.1	4.9	7.0	5.99	0.499	17	1"	85-100		100	100	0.00		100	100	0.00
									1/2"	50-80		61-74	67.9	2.87		65-74	70.0	3.92
									#4	30-50		33-46*	39.0	2.30		34-42	38.2	3.50
									#8	25-45		28-39	33.9	1.91		31-37	34.2	2.75
									#16	15-35		24-34	29.8	2.56		28-34	31.2	2.75
									#50	5-20		7-12	10.2	1.44		11-14	12.2	1.26
									#100	3-10		2-8	4.3	1.22		5-6	5.2	0.503
4% Fly Ash Class I Base	June 24, 1971	Aug. 28, 1971	6.5	6.0	6.8	6.48	0.236	31	1 1/2"	100	74	100	100	0.00	5	100	100	0.00
			6.0	5.7	6.8	5.99	0.243	49	1"	85-100		100	100	0.00		100	100	0.00
									1/2"	50-80		64-74	69.3	2.18		67-76	71.4	3.58
									#4	30-50		35-47	40.4	1.37		37-42	39.6	2.07
									#8	25-45		31-37	34.5	1.30		31-36	33.4	2.30
									#16	15-35		25-34	30.2	1.73		27-32	29.6	2.07
									#50	5-20		8-16	10.8	1.28		8-10	9.0	1.00
									#100	3-10		4-8	5.9	0.591		4-5	4.6	0.548
3% Fly Ash Class I Base	Aug. 29, 1971	Dec. 12, 1971	5.7	5.4	6.5	5.68	0.200	53	1 1/2"	100	102	100	100	0.00	8	100	100	0.00
			6.2	5.9	6.5	6.16	0.219	5	1"	85-100		100	100	0.00		100	100	0.00
			6.5	5.9	6.8	6.45	0.204	40	1/2"	50-80		64-75	69.5	2.09		66-79	70.4	4.34
									#4	30-50		39-50	41.2	1.34		39-46**	43.4	2.93
									#8	25-45		33-39	34.7	0.965		32-36	34.2	1.49
									#16	15-35		28-33	30.6	1.30		27-32	29.5	1.80
									#50	5-20		8-15	10.2	1.56		6-10	8.6	1.30
									#100	3-10		4-9	5.4	0.956		3-5	4.1	0.641
Surface Sta 80+00 to Sta 128+00 Note: Not a part of the Research Project.	June 24, 1971	June 25, 1971	7.0	6.9	7.3	7.07	0.163	8	1/2"	100	4	100	100	0.00	4	100	100	0.00
									3/8"	80-100		91-98	95.8	3.30		94-99	97.0	2.16
									#4	55-75		62-66	64.8	1.89		62-73	68.0	4.97
									#8	35-60		48-50	48.8	0.959		48-61	54.8	6.24
									#16	25-50		43-44	43.2	0.503		41-54	47.5	6.45
									#50	9-21		13-18	15.2	2.06		12-14	13.0	0.816
									#100	5-14		6-10	8.0	1.63		2-6	4.2	1.71
									#200	3-7		5-8	6.2	1.26		1-4	2.8	1.50
Surface	Oct. 8, 1971	Dec. 12, 1971	6.6	6.3	6.9	6.61	0.158	49	1/2"	100	48	100	100	0.00	38	100	100	0.00
									3/8"	80-100		90-98	95.6	1.79		93-99	95.6	1.32
									#4	55-75		60-67	62.5	1.79		57-66	62.2	1.96
									#8	35-60		48-54	51.7	1.27		45-54	50.2	1.70
									#16	25-50		40-48	45.0	1.99		39-48	43.3	2.03
									#50	9-21		11-17	14.9	1.21		9-17	13.9	1.74
									#100	5-14		5-9	7.6	0.787		4-10	7.1	1.40
									#200	3-7		3-7	5.5	0.715		3-6	4.7	1.12
Leveling	Oct. 7, 1971	Nov. 13, 1971	6.6	6.4	6.9	6.68	0.198	8	3/8"	***	5	100	100	0.00	8	100	100	0.00
									#4			91-97	95.2	2.49		93-98	95.6	1.41
									#8			64-67	65.0	1.22		63-66	63.8	1.17
									#16			50-54	52.6	1.67		50-57	53.5	2.20
									#50			17-21	19.0	1.87		14-21	17.1	2.90
									#100			7-9	8.4	0.894		4-12	7.4	2.56
									#200			4	4.0	0.00		2-5	3.4	0.917
Median Surface	Nov. 25, 1971	Nov. 17, 1971	7.5	7.5	7.7	7.60	1.00	3	1/2"	100	4	100	100	0.00	3	100	100	0.00
									#4	60-80		69-74	71.2	2.06		70-75	71.7	2.89
									#8	45-65		56-60	58.5	1.73		58-60	58.7	1.16
									#50	13-25		19-21	20.2	0.959		20-22	20.7	1.16
									#200	6-12		9-10	9.8	0.503		7-9	7.7	1.16

*: A value of 57 was excluded from the average since it was out of line with the other values.
**: A value of 58 was excluded from the average since it was out of line with the other values.
***: Two-Bin Mix - Surface mix without the top screen. No limits were specified.

APPENDIX H

ASPHALT CONTENTS OF ASPHALTIC CONCRETE PAVEMENTS

ASPHALTIC CONCRETE FROM	TO	DATE SECTION PAVED	DIRECTION OF TRAVEL	ASPHALTIC CONCRETE LAYER	DESIGN PERCENT ASPHALT	PERCENT ASPHALT FROM EXTRACTION			AVERAGE PERCENT ASPHALT FROM EXTRACTION	PERCENT ASPHALT FROM NUCLEAR TESTS	NUMBER OF TESTS	SECTION TEST STATIONS				
80+00	128+00	6/11/71	EB	1st	6.6	6.5	6.5	6.9	6.63	5.67	20	81+00	85+00	90+00	95+00	100+00
												105+00	110+00	115+50	120+00	125+00
128+00	135+50	6/2/71	EB	1st	6.6	6.4			6.40	6.08	4	130+00	135+00			
135+50	154+50	6/3/71	EB	1st	6.8	7.2	7.1	6.4	6.90	6.66	10	140+00	145+00	150+00	155+00	160+00
154+50	190+50	6/14/71	EB	1st	6.8	7.0	6.9	7.2	7.03	6.85	10	170+00	175+00	180+00	185+00	190+00
190+50	209+25	6/5/71	EB	1st	6.8	7.0	7.3		7.16	7.28	6	195+00	200+00	205+00		
209+25	221+90	6/17/71	EB	1st	6.6	6.5	6.1		6.30	6.29	7	210+00	213+00	215+00	215+50	217+00
221+90	244+60	6/18/71	EB	1st	6.8	6.8	7.2	6.6	6.45		0					
						6.4										
244+60	267+00	7/15/71	EB	1st	6.5	6.2			6.20	7.08	3	257+50	262+00	264+00		
267+00	276+35	7/17/71	EB	1st	6.5	6.3			6.30	6.69	4	268+50	271+00	273+50	276+00	
276+35	303+00	8/10/71	EB	1st	6.5	6.9			6.90	6.25	4	279+50	288+50	295+50	299+00	
303+00	314+65	8/11/71	EB	1st	6.5	6.7			6.70	6.34	4	305+00	305+50	307+00	314+00	
314+65	319+00	8/12/71	EB	1st	6.5	6.2			6.20	6.55	1	316+00				
319+00	331+00	8/13/71	EB	1st	6.5	6.5	8.0	6.7	6.40		0					
331+00	348+25	8/14/71	EB	1st	6.5	6.4			6.40	6.60	2	338+50	341+50			
348+25	353+25	8/16/71	EB	1st	6.5	6.7			6.70		0					
353+25	362+50	8/17/71	EB	1st	6.5	6.5			6.50	7.63	2	358+00	360+50			
362+50	366+70	8/18/71	EB	1st	6.5	6.2			6.20		0					
366+70	373+50	8/24/71	EB	1st	6.5	6.8			6.80	6.96	1	372+00				
373+50	398+00	8/25/71	EB	1st	6.5	6.8	6.6		6.60	6.68	3	376+50	388+00	395+50		
398+00	399+50	8/27/71	EB	1st	6.5	6.5			6.50		0					
399+50	408+00	8/27/71	EB	1st	6.7	6.5	6.5		6.50	6.45	2	403+50	406+50			
408+00	421+51	9/28/71	EB	1st	6.7	6.9			6.90	5.28	3	407+50	410+00	414+00		
Average of All Stations for 1st Lift					6.6				6.71	6.29	57					
					6.8				6.48	6.62	24					
					6.7				6.63	6.35	8					
80+00	121+25	6/16/71	EB	2nd	6.1	6.2	6.1		6.15	5.71	18	81+00	85+50	90+00	95+00	100+00
												105+00	110+00	115+50	120+00	
121+25	128+50	6/17/71	EB	2nd	6.1	6.3			6.30	5.42	2	125+00				
128+50	181+00	6/7/71	EB	2nd	6.1	6.2	6.3		6.25	6.81	14	130+00	135+00	140+00	145+00	150+00
												155+00	160+00			
181+00	187+00	6/6/71	EB	2nd	6.1	5.7	5.8	6.1	5.87	5.77	6	155+00	170+00	180+00	185+00	
187+00	208+00	6/8/71	EB	2nd	6.1	4.9	5.6	6.0	5.50	6.27	8	190+00	195+00	200+00	205+00	
208+00	216+75	6/18/71	EB	2nd	6.1	6.0			6.00	6.42	4	213+00	215+00	215+50		
216+75	242+75	6/15/71	EB	2nd	6.1	6.2	6.0		6.10	6.42	6	217+00	222+00	232+00	237+50	241+50
												242+50				
242+75	264+50	7/16/71	EB	2nd	6.0	6.1	5.9		6.00	5.79	5	257+50	262+00	264+00		
264+50	272+00	7/21/71	EB	2nd	6.0	5.7	5.3		5.50	5.42	2	268+50	271+50			
272+00	289+75	8/11/71	EB	2nd	6.0	6.1			6.10	6.78	4	273+50	278+00	278+50	288+50	
289+75	310+50	8/13/71	EB	2nd	6.0	6.3			6.30	6.24	6	286+50	288+50	295+00	305+50	307+00
310+50	344+00	8/16/71	EB	2nd	6.0	6.1	6.7		5.95	6.38	7	314+00	318+00	323+00	329+00	334+00
												338+50	341+50			
344+00	350+00	8/17/71	EB	2nd	6.0	6.1			6.10	6.51	1	348+00				
350+00	361+00	8/18/71	EB	2nd	6.0	5.9			5.90	6.80	3	355+00	359+00	360+50		
361+00	368+93	8/23/71	EB	2nd	6.0	6.0	6.1		6.05		0					
368+93	373+50	8/25/71	EB	2nd	6.0	6.0			6.00		0					
373+50	398+80	9/27/71	EB	2nd	6.0	6.7	6.0	5.8	6.17	6.43	6	378+50	376+50	388+00	391+50	395+50
398+80	421+25	9/28/71	EB	2nd	6.7	6.8	6.8		6.80	4.86	5	403+50	408+50	407+88	418+00	419+00
Average of All Stations for 2nd Lift					6.1				5.96	5.86	88					
					6.0				6.06	6.09	30					
					6.7				6.80	4.86	8					
128+75	138+50	6/9/71	EB	3rd	6.1	6.8	6.8	6.0	6.55	6.14	4	130+00	135+00			
138+50	158+33	6/10/71	EB	3rd	6.1	6.9	7.0		6.00	6.62	6	140+00	145+00	150+00	155+00	
158+33	158+75	6/28/71	EB	3rd	6.0	6.8	6.7		6.75		0					
158+75	159+40	6/10/71	EB	3rd	6.8	6.7			6.70		0					
159+40	177+00	7/1/71	EB	3rd	6.0	6.1			6.10	7.88	4	170+00	175+00			
177+00	209+00	7/8/71	EB	3rd	6.0	6.8	6.9		6.00	6.67	12	180+00	185+00	190+00	195+00	200+00
												205+00				
209+00	240+00	8/23/71	EB	3rd	6.1/6.0	6.4	6.0		6.20	5.26	8	213+00	215+00	215+50	217+00	222+00
												232+00	237+50			
240+00	253+34	7/17/71	EB	3rd	6.0	5.7			5.70	5.53	2	241+50	242+50			
253+34	284+66	7/21/71	EB	3rd	6.0	6.7	6.3		6.00	6.00	3	257+50	262+00	264+00		
284+66	279+70	7/22/71	EB	3rd	6.0	6.1	6.0		6.05		0					
279+70	285+00	8/12/71	EB	3rd	6.5	6.5			6.50	6.38	3	271+00	275+00	278+50		
285+00	314+50	8/19/71	EB	3rd	6.0	6.0	5.9		5.95	6.04	7	289+50	295+50	299+00	308+00	308+50
												307+00	314+00			
314+50	318+00	8/20/71	EB	3rd	6.5	6.4	6.8		6.60	6.81	1	316+00				
318+00	321+50	8/23/71	EB	3rd	6.0	5.9	6.1		5.95		0					
321+50	343+10	8/17/71	EB	3rd	6.0	6.1			6.10	6.30	6	323+00	325+50	334+00	338+50	341+50
343+10	360+25	8/23/71	EB	3rd	6.0	5.8	6.1		5.95	6.12	3	346+00	355+00	359+00		
360+25	373+50	8/27/71	EB	3rd	6.0	6.7	6.0	5.8	6.17	5.64	2	360+50	372+00			
373+50	399+50	9/27/71	EB	3rd	6.7	6.5	6.5		6.50	4.89	6	376+50	379+50	388+00	391+50	396+50
Average of All Stations for 3rd Lift					6.1				5.82	5.94	20					
					6.0				5.98	6.15	48					
					6.7				5.50	4.89	5					
128+00	155+33	8/28/71	EB	4th	6.0	5.8	5.7		5.75	5.99	12	130+00	135+00	140+00	145+00	150+00
												155+00				
210+00	221+50	7/8/71	EB	4th	6.0	5.8	6.2		6.00	6.56	7	210+00	213+00	215+00	215+50	217+00
221+50	239+40	7/8/71	EB	4th	6.0	6.7			5.70	5.38	3	222+00	232+00	237+50		
239+40	250+50	8/8/71	EB	4th	6.0	6.0	5.9		6.05		0					
250+50	259+50	8/7/71	EB	4th	6.0	6.3	5.7		5.00	5.06	3	252+00	264+00	268+50		
259+50	280+75	8/18/71	EB	4th	6.0	6.8			5.90	5.44	4	271+00	273+50	278+00	278+50	
280+75	285+50	8/19/71	EB	4th	6.0	6.0	5.8		5.95		0					
285+50	302+25	8/28/71	EB	4th	5.7	5.7	5.4		5.55	6.01	3	285+50	285+50	289+00		
302+25	321+50	8/30/71	EB	4th	5.7	5.8	6.5	5.7	6.00	5.33	5	306+00	306+50	307+00	314+00	315+00
321+50	329+50	8/23/71	EB	4th	6.0	5.8	6.1		5.95	6.18	2	323+00	323+50			
329+50	357+50	9/19/71	EB	4th	5.7	5.7			5.70	6.55	8	334+00	338+50	341+50	349+00	355+00
357+50	373+50	9/15/71	EB	4th	5.7	5.7			5.70	6.01	2	359+00	360+00			
373+50	394+25	9/28/71	EB	4th	5.7	5.9			5.90	4.70	4	376+50	379+50	388+00	391+50	
394+25	399+50	9/29/71	EB	4th	5.7	5.8	5.8		5.80	4.70	1	396+50				
Average of All Stations for 4th Lift					6.0				5.93	6.14	31					
									5.80	5.58	20					

ASPHALTIC CONCRETE FROM	ASPHALTIC CONCRETE TO	DATE SECTION PAVED	DIRECTION OF TRAVEL	ASPHALTIC CONCRETE LAYER	DESIGN PERCENT ASPHALT	PERCENT ASPHALT FROM EXTRACTION			AVERAGE PERCENT ASPHALT FROM EXTRACTION	PERCENT ASPHALT FROM NUCLEAR TESTS	NUMBER OF TESTS	SECTION TEST STATIONS				
210+00	231+50	7/14/71	E_	5th	6.0	5.8	6.1		5.95	5.03	8	210+00	213+00	215+00	215+50	217+00
												223+00				
231+50	237+25	7/15/71	EB	5th	6.0	5.8			5.80	5.18	1	232+00				
237+25	247+80	8/9/71	EB	5th	6.0	5.9			5.90	5.88	2	241+50	242+50			
247+80	252+50	8/10/71	EB	5th	6.0	5.8			5.80		0					
252+50	271+50	8/24/71	EB	5th	6.0	6.0			6.00	6.44	5	257+50	262+00	264+00	268+50	271+00
271+50	285+00	8/28/71	EB	5th	5.7	5.7	5.4		5.55	6.22	2	273+50	279+50			
321+50	328+00	8/30/71	EB	5th	5.7	5.8	6.5	5.7	6.00	6.09	2	323+00	323+50			
328+00	331+50	9/16/71	EB	5th	5.7	5.5			5.50		0					
331+50	361+25	9/17/71	EB	5th	5.7	5.9	6.0		5.95	4.75	7	334+00	338+50	341+50	349+50	335+00
												359+00	360+50			
361+50	372+25	9/18/71	EB	5th	5.7	5.6	5.5		5.55	4.61	1	372+00				
Average of All Stations for 5th Lift					6.0				5.90	5.59	16					
					5.7				5.76	5.21	12					
80+00	95+00	6/24/71	EB	SURFACE	7.0	7.0	6.9	6.9	6.93	6.78	8	81+00	85+00	90+00	95+00	
95+00	125+90	6/25/71	EB	SURFACE	7.0	7.2	7.3	7.1	7.20	6.24	12	100+00	105+00	110+00	115+00	120+00
												125+00				
125+90	177+00	10/20/71	EB	SURFACE	6.6	6.9	6.6		6.75	6.74	9	130+00	135+00	140+00	145+00	150+00
												155+00	160+00	167+00	170+00	
177+00	283+00	10/21/71	EB	SURFACE	6.6	6.6	6.9	6.6	6.70	*6.99	23	180+00		279+50		
283+00	311+50	10/25/71	EB	SURFACE	6.6	6.6			6.60	*6.72	6	288+50		307+00		
311+50	409+50	11/13/71	EB	SURFACE	6.6	6.7	6.9		6.80	6.86	20	314+00		407+50	ALL	
409+50	425+68	11/14/71	EB	SURFACE	6.6	6.6			6.60	6.16	2	410+00	414+00			
Average of All Stations for Surface Lift					7.0				7.07	6.46	20					
					6.6				6.71	6.78	31					
321+50	337+50	9/23/71	WB	1st	6.5	6.4	6.2		6.30	5.08	3	323+50	323+50	334+00		
337+50	368+80	9/24/71	WB	1st	6.5	6.5	6.3		6.40		0					
368+80	381+50	10/1/71	WB	1st	6.5	6.5			6.50	6.12	2	376+50	379+50			
381+50	398+50	10/4/71	WB	1st	6.5	6.2			6.20	6.86	3	388+00	391+50	396+50		
398+50	415+25	10/25/71	WB	1st	6.2	6.1			6.10	*6.26	5	403+50	405+50	407+50	410+00	414+00
415+25	421+25	10/26/71	WB	1st	6.2	5.9			5.90		0					
421+25	425+68	10/30/71	WB	1st	6.2	6.2			6.20		0					
Average of All Stations for 1st Lift					6.5				6.35	6.01	8					
					6.2				6.07		0					
321+50	354+00	9/25/71	WB	2nd	5.7	5.4	5.4		5.40	5.05	6	323+00	323+50	334+50	338+50	341+50
												349+50				
354+00	368+50	9/27/71	WB	2nd	5.7	5.5	5.5		5.50	4.69	3	355+00	359+00	360+50		
368+50	373+50	10/2/71	WB	2nd	5.7	5.7			5.70		0					
373+50	381+25	10/4/71	WB	2nd	5.7	5.6			5.60	5.60	2	376+50	379+50			
381+25	398+50	10/5/71	WB	2nd	5.7	5.6			5.60	5.43	3	388+50	391+50	396+50		
398+50	421+50	10/26/71	WB	2nd	5.7	5.6			5.60	*4.86	5	403+50	405+50	407+50	410+00	414+00
Average of All Stations for 2nd Lift					5.7				5.54	5.13	14					
321+50	327+50	9/29/71	WB	3rd	5.7	5.8	5.8		5.80	5.25	2	323+00	323+50			
327+50	368+25	9/30/71	WB	3rd	5.7	5.8	5.9		5.85	4.61	7	334+00	338+50	341+50	349+00	355+00
												359+00	360+50			
368+25	373+25	10/4/71	WB	3rd	5.7	5.6			5.60	5.26	1	372+50				
373+25	381+00	10/28/71	WB	3rd	5.7	5.6			5.60	5.33	2	376+50	379+50			
381+00	399+50	10/29/71	WB	3rd	6.5	6.4	6.7		6.55	5.59	3	388+00	391+50	396+50		
Average of All Stations for 3rd Lift					5.7				5.75	4.89	12					
321+50	365+00	10/27/71	WB	4th	5.7	5.7	5.9		5.80	*5.10	9	323+00		360+50		
365+00	373+25	10/28/71	WB	4th	5.7	5.6			5.60	6.06	1	372+25				
373+25	383+50	11/4/71	WB	4th	5.7	5.6			5.60	6.40	2	376+50	379+50			
383+50	399+50	11/5/71	WB	4th	5.7	5.9			5.90	5.87	3	388+00	391+50	396+50		
Average of All Stations for 4th Lift					5.7				5.74	6.08	6					
321+50	347+50	11/2/71	WB	5th	5.7	5.8			5.80	5.74	5	323+00	323+50	334+00	338+50	341+50
347+50	370+00	11/3/71	WB	5th	5.7	5.6	5.5		5.55	6.06	4	349+00	355+00	359+00	360+50	
370+00	373+25	11/4/71	WB	5th	5.7	5.6			5.60	5.66	1	372+25				
Average of All Stations for 5th Lift					5.7				5.62	5.86	10					
321+00	370+00	11/11/71	WB	SURFACE	6.6	6.6	6.8		6.70	6.64	9	323+00	323+50	334+00	338+50	341+50
												349+50	355+00	359+00	360+50	
370+00	425+68	11/12/71	WB	SURFACE	6.6	6.9			6.90	6.63	11	372+25	376+50	379+50	388+00	391+50
												396+50	403+50	405+50	407+50	410+00
												414+00				
Average of All Stations for Surface Lift					6.6				6.77	6.63	20					

* Insufficient tests were obtained with this nuclear meter to prepare a calibration curve. These values were omitted from the final averages.