

Research Report  
KTC-89-48

PAVEMENT BASE EVALUATION  
KY 55 TAYLOR COUNTY

by

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and

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16. Abstract  This report summarizes the findings of a field investigation of the aggregate underdrain system constructed on KY 55 in Taylor County. A detailed description of the construction of this project is presented in UKTRP Research Report 83-13 (Water Under Pavements).					
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## INTRODUCTION

A section of KY 55 was constructed in 1978 and designed as an experimental section to evaluate various types of aggregate drainage blankets. Four alternate designs were developed using three different types of drainage blankets. A detailed description of the construction of this project is presented in UKTRP Research Report 83-13 (Water Under Pavements).

At the request of Kentucky Transportation Cabinet personnel, Road Rater deflection measurements and a visual survey were conducted on KY 55 in Taylor Co. A follow up visual survey was conducted in March 1990. In conjunction with the initial visual survey, asphalt cores were obtained to expose the base materials. This investigation was conducted to evaluate the condition of the free draining aggregate base.

## INSPECTION AND RESULTS

Model 400 B Road Rater deflection measurements were obtained on August 14, 1989. Deflection measurements were taken at 0.2 - mile increments in the right wheel path of both the northbound and southbound lanes. The stiffness (applied load/sensor number 1 deflection) at each location is plotted versus station for a 600-pound and 1,200-pound dynamic load. Results are tabulated in Figures 1 and 2.

On August 21, 1989, a visual survey of the drainage blanket at three locations was conducted -- the locations are as follows:

Section Number	Drainage Layer
10	5 inches of No. 4's
7	4 inches of No. 5's
4	5 inches of No. 57's

Asphalt cores were obtained at each location, along with bag samples of the drainage blanket and DGA. Figures 3 through 5 show the condition of the drainage layer at each location.

At each location, the drill water drained freely through the base. The drainage

base appeared to be in good condition. At the locations tested, the base was open and no evidence of clogging or silting was observed. Most of the headwalls observed were partially clogged with vegetation, causing water to stand in the outlet pipe.

The open graded riding surface is beginning to show signs of wear. The aggregate has begun to ravel from the wheel paths and collect along the shoulder. This has not greatly diminished the ride quality of the roadway, but may begin to affect the skid resistance of the pavement. Figures 6 and 7 depict the condition of the riding surface of Sections 1 and 2. At the time of inspection, these areas contained the most severe raveling.

The areas which show the greatest distress are generally associated with the sections constructed with 5.75 inches of AC rather than 7.75 inches of AC, as was used on the remainder of the sections. Table 1 contains the structural cross section for each section along with the corresponding station numbers.

Section 9, which was constructed with 5.75 inches of AC, 5 inches of No. 57's, and 5 inches of DGA contains the most severely distressed pavement. This section contains longitudinal cracks over 40% of its length compared to 10-20% for the remainder of the sections. Rutting however was less than 0.5 inch.

Section 4 was constructed using the same structural section as Section 9. From the initial inspection, stiffness measurements indicated a weak area from Station 325+00 to Station 378+00 northbound. This area also contained rut depths of 1.25 to 2 inches. Since the initial inspection, this section has been overlaid from Station 369+50 to Station 378+50 northbound and southbound. The remainder of this section contains ruts that range from 1 to 1.5 inches in depth.

Section 2 northbound has begun to show signs of distress. Distress is indicated by the presence of alligator cracking and rut depths of 0.875 to 1.25 inches at Station 320+00. Table 2 contains the average rut depths for each section along with the structural cross section.

As shown in Figures 1 and 2, there appears to be higher stiffness between Stations 250+00 and 300+00. Section 1 was constructed with an 11.5-inch DGA base and is located in this area (Station 276+18 to 302+76). Section 6 (Station 409+07 to 435+65) was also constructed with an 11.5-inch DGA base. This section does not show as large an increase in stiffness as Section 1. However, it does indicate a higher stiffness in the southbound lane. The remainder of this section (Station 250+00 to 276+18) is located outside the experimental section.

## CONCLUSIONS

In the sections which were inspected, the drainage blanket appeared to be in good condition and is performing well. The clogged headwalls, which were observed, should be cleaned to allow water to completely drain from the base.

With the exception of the areas mentioned earlier, the only distresses observed were scattered areas of longitudinal and transverse cracking of the roadway, separation at the shoulder, and raveling of the open graded surface.

# KY 55, 600-lb. LOAD NORTH AND SOUTH (NO TEMPERATURE CORRECTION)

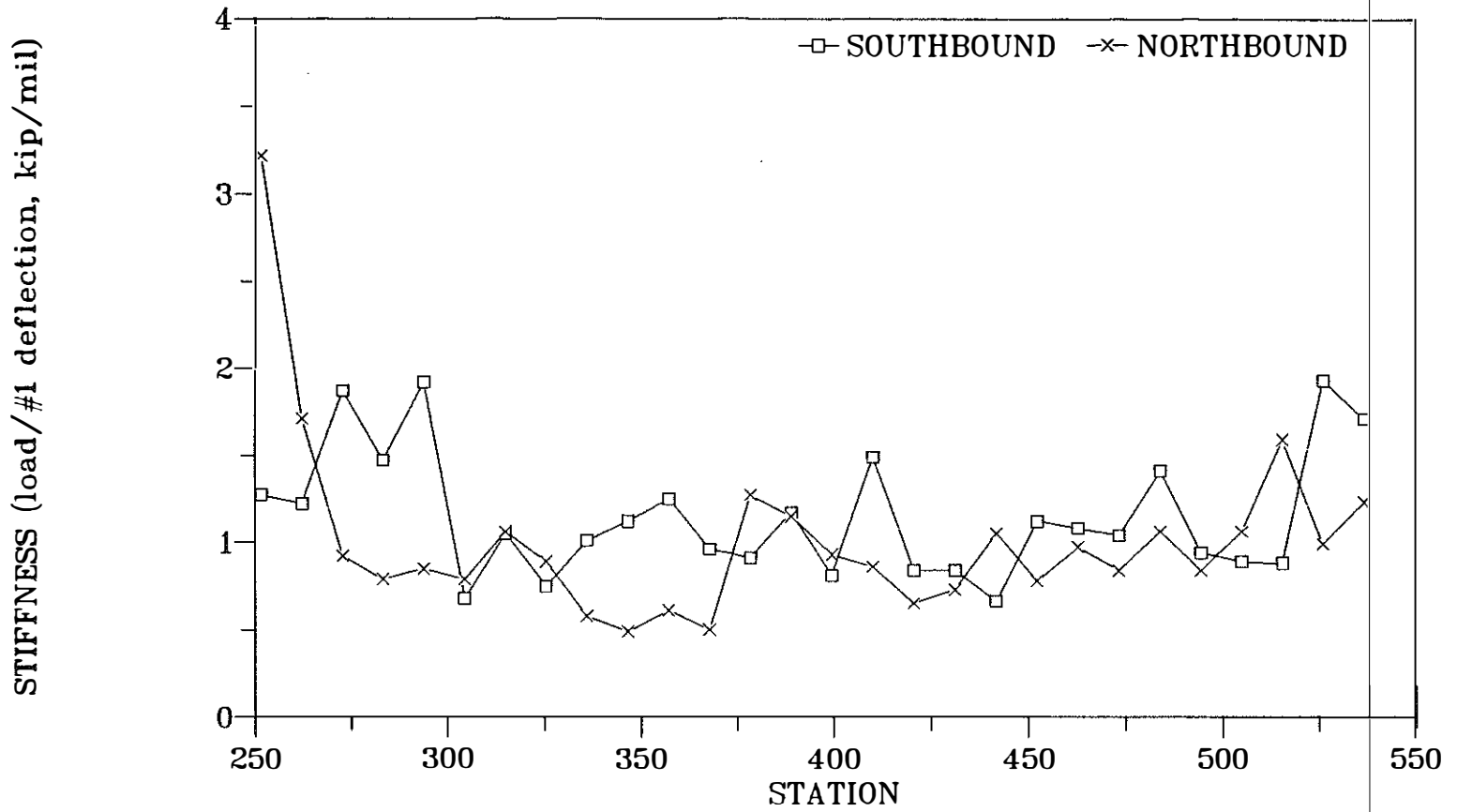


Figure 1. Stiffness vs. Station, 600-lb Load

### KY 55, 1200-lb. LOAD NORTH AND SOUTH (NO TEMPERATURE CORRECTION)

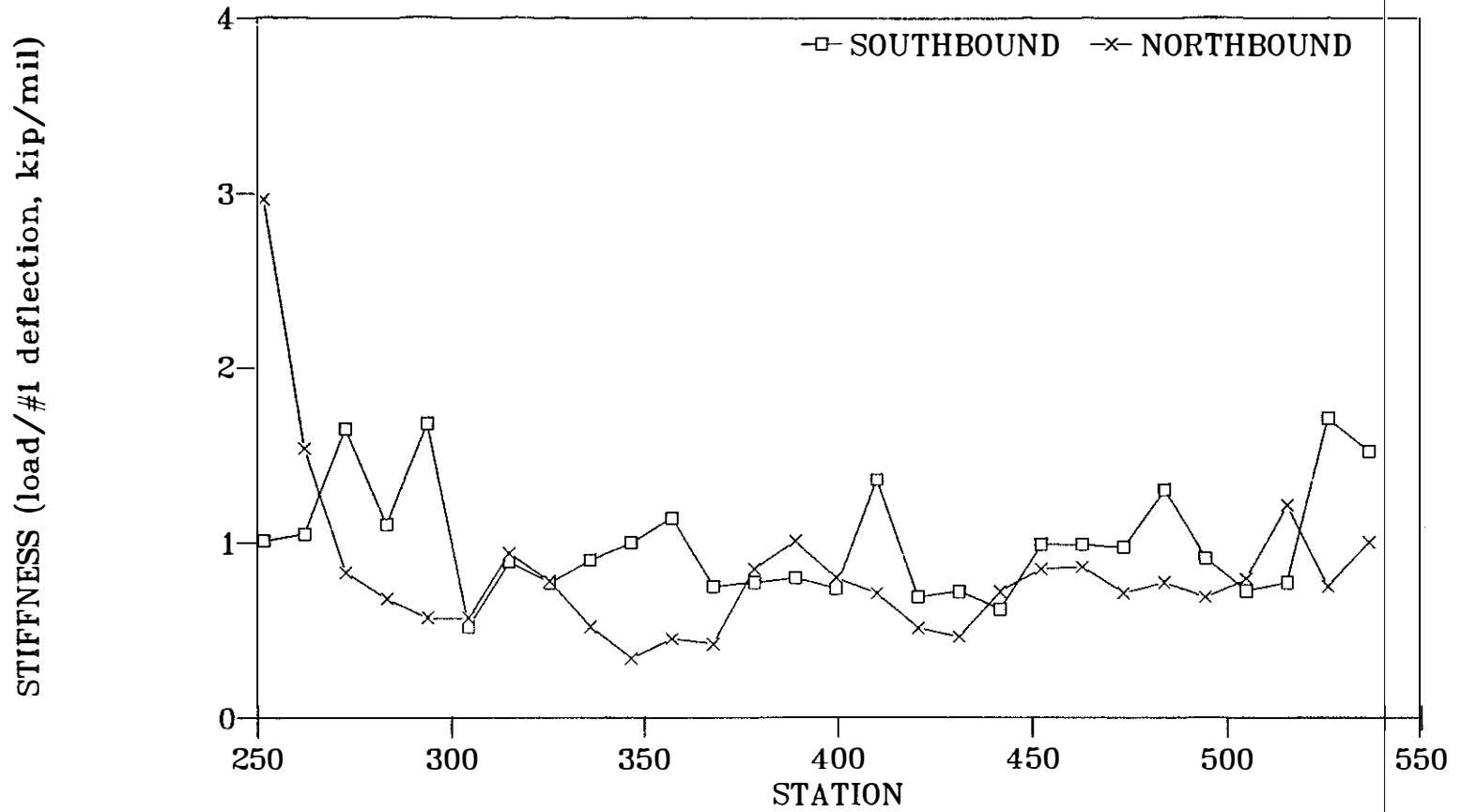


Figure 2. Stiffness vs. Station, 1200-lb Load

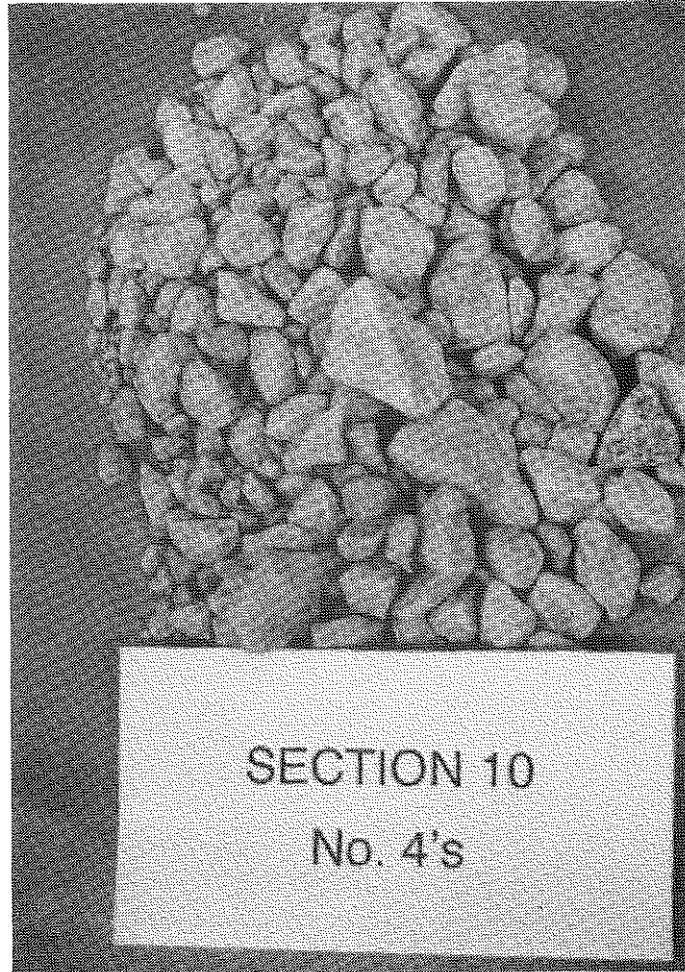


Figure 3. Section 10, No. 4's



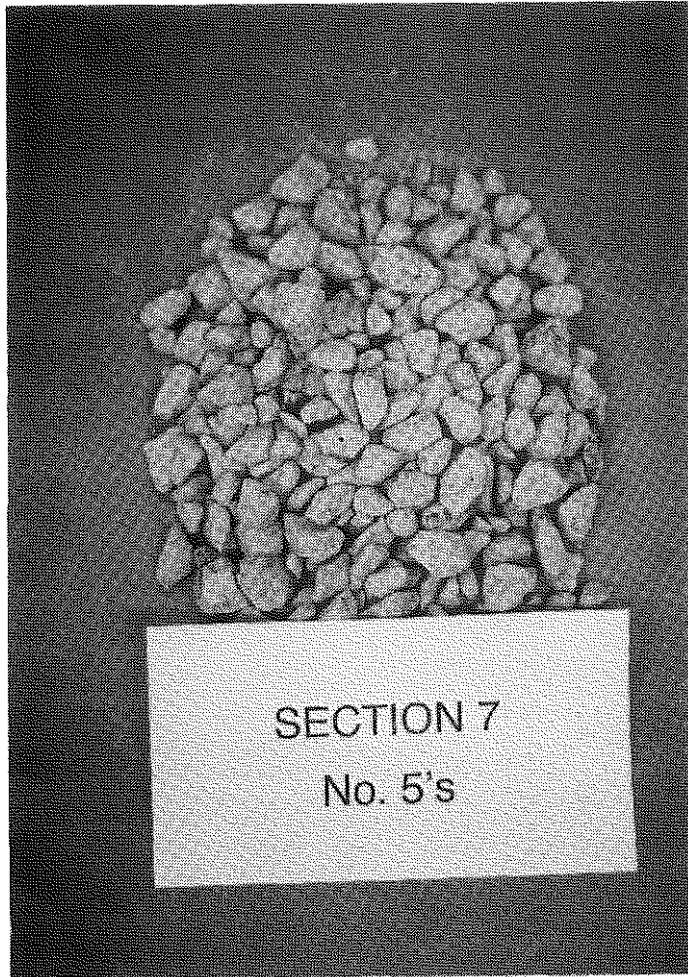


Figure 4. Section 7, No. 5's

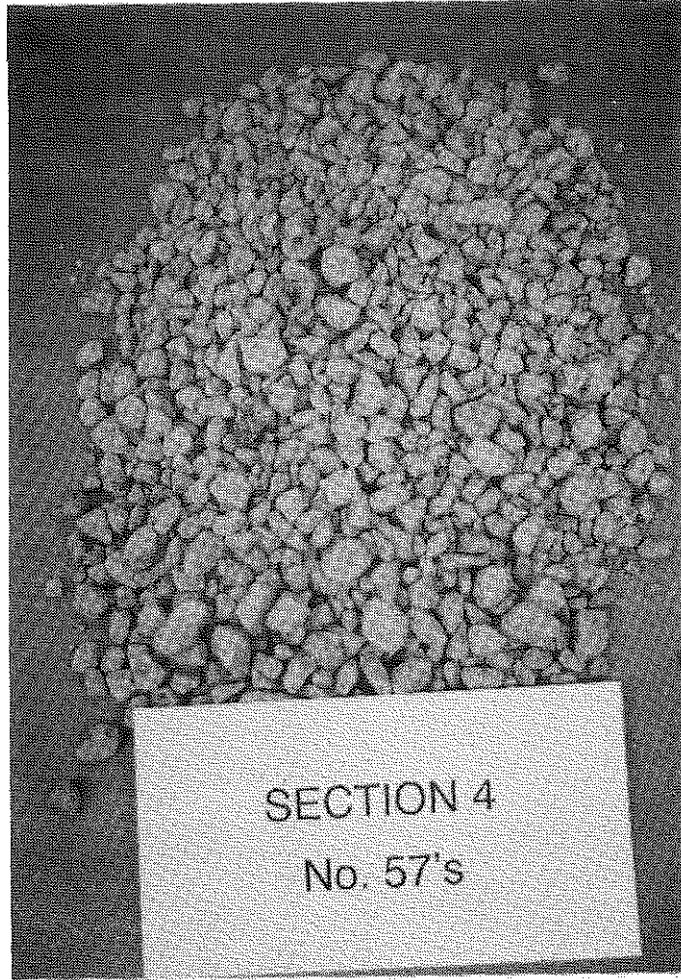


Figure 5. Section 4, No. 57's

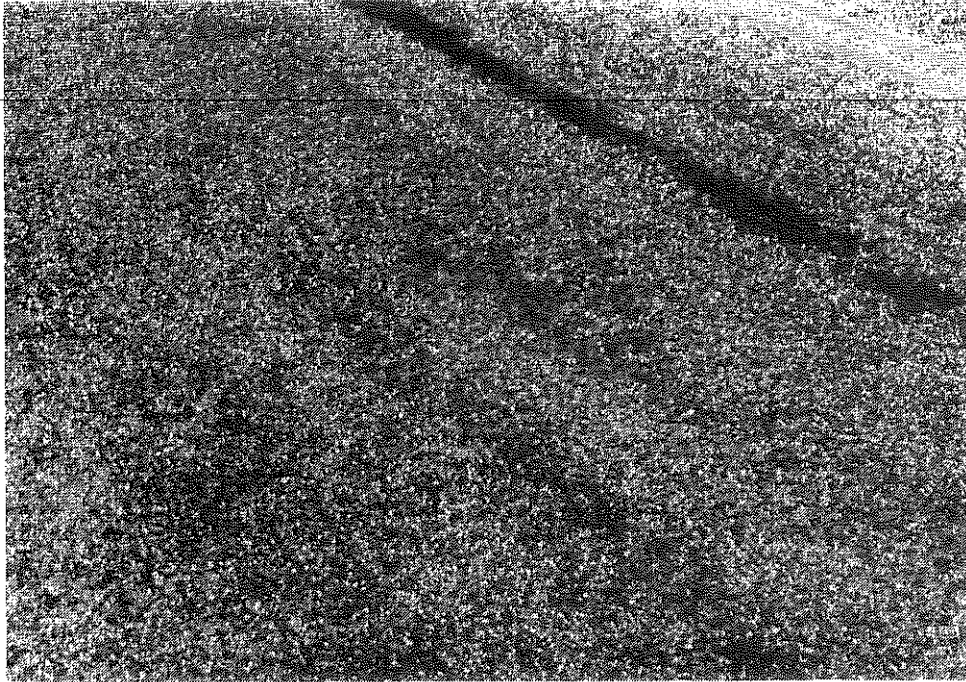


Figure 6. Surface Condition, Section 1

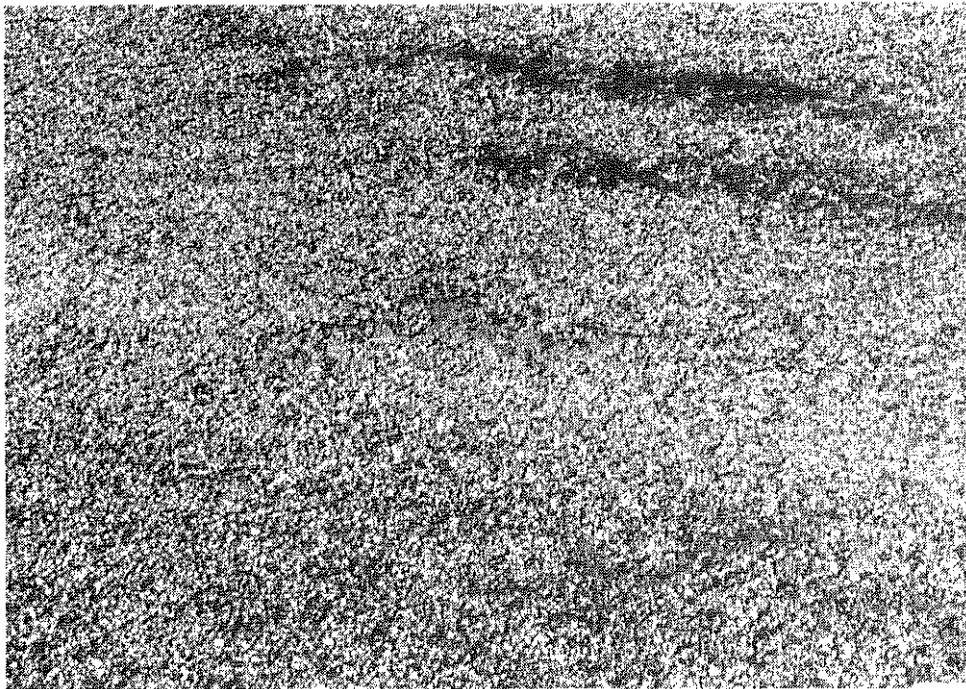


Figure 7. Surface Condition, Section 2

**Table 1. Structural Cross Sections**

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Section	AC	Thicknesses Drainage	DGA	Station Beg.	End
1	7.75	---	11.5	276+18	302+76
2	7.75	4" #5's	5	302+76	329+34
3	7.75	5" #57's	4	329+34	355+91
4	5.75	5" #57's	5	355+91	382+49
5	7.75	6" #4's	4	382+49	409+07
6	7.75	---	11.5	409+07	433+65
7	7.75	4" #5's	5	433+65	465+23
8	7.75	5" #57's	4	465+23	488+81
9	5.75	5" #57's	5	488+81	515+39
10	7.75	6" #4's	4	515+39	541+97

Table 2. Average Rut Measurements By Section

Section	AC	Thicknesses Drainage	DGA	Rutting (in.)	
				NB	SB
1	7.75	---	11.5	5/8	1/2
2	7.75	4" #5's	5	1	1/4
3	7.75	5" #57's	4	3/4	3/8
4	5.75	5" #57's	5	1 1/2	1/2
5	7.75	6" #4's	4	5/8	3/8
6	7.75	---	11.5	3/8	1/2
7	7.75	4" #5's	5	3/8	1/4
8	7.75	5" #57's	4	1/4	1/4
9	5.75	5" #57's	5	3/8	1/2
10	7.75	6" #4's	4	1/4	1/2