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Guide for Mechanistic-Empirical Design
OF NEW AND REHABILITATED PAVEMENT STRUCTURES

FINAL DOCUMENT

APPENDIX EE-1:
INPUT DATA FOR THE CALIBRATION AND VALIDATION OF THE DESIGN GUIDE FOR NEW CONSTRUCTED FLEXIBLE PAVEMENT SECTIONS

NCHRP

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Disclaimer

This is the final draft as submitted by the research agency. The opinions and conclusions expressed or implied in this report are those of the research agency. They are not necessarily those of the Transportation Research Board, the National Research Council, the Federal Highway Administration, AASHTO, or the individual States participating in the National Cooperative Highway Research program.

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Research into the subject area covered in this Appendix was conducted at ASU and Fugro-BRE, Inc. The authors of this Appendix are Dr. M.W. Witczak and Dr. C.E. Zapata. Mr. Harold Von Quintus provided assistance in assembling some of the inputs.

Foreword

The information provided in this appendix overviews and lists all the data required for calibration of performance models for newly constructed flexible pavements including pavement data, climatic information, material characterization data, and distress data. The traffic data is provided in an electronic format (attached with the Design Guide CDs). Also, in this appendix, the assumptions made for the missing variable and the basis on which these assumptions were made are explained.

This appendix is the first in a series of two volumes on calibration sections for new constructed flexible pavements. The other volume is:

Appendix EE-2: Input Data for the Calibration and Validation of the 2002 Design Guide for Rehabilitated Pavement Sections with HMA Overlays

General Table of Contents

Appendix EE-1

Input Data for the Calibration and Validation of the 2002 Design Guide for the New constructed Flexible Pavement Sections

INTRODUCTION

This appendix includes the pavement data, climatic information, material characterization data and distress values for flexible pavement sections used for the calibration of the design of new flexible pavements. The data was extracted from the LTPP database.

The information provided in this section covered all the input required to run the design guide software and simulate the same condition the pavement sections were exposed to.
The original traffic was used for the simulation runs. However, the traffic data is provided in an electronic format (attached with the Design Guide CDs). Also, in this appendix the assumptions made for the missing variable and the base on which these assumptions were made are explained.

BACKGROUND

The input data and sources of information needed for the calibration and validation of the distress prediction models for new construction are tabulated and attached to this report as Annex-A. 94 test sections from the Long Term Pavement Performance (LTPP) database were used for this purpose. The distribution of the sections is shown in Figure 1.

The following is a summary of the tables and their components provided in the Annex-A of this report. The tables contain a complete list of input data and distress data extracted from the LTPP database or, in some cases, from different sources when the information was not available.

- **Table 1 – Analysis Conditions**
  - State Code
  - SHRP Identification Number
  - State
  - Project Type
  - Pavement Type
  - Base/Subgrade Construction Completion Date
  - Asphalt Construction Completion Date
  - Traffic Opening Date
  - Design Period

- **Table 2 – Pavement Lane Properties**
  - Lane Width
  - Pavement Slope
  - Initial IRI
  - Thermal Conductivity
  - Heat Capacity
  - Surface Short Wave Absorptivity

- **Table 3 – Environmental/Climatic**
  - Latitude
  - Longitude
  - Elevation

- Groundwater Table Depth

- **Table 4 – Pavement Structure**
  - Number of Layers
  - Layer Number
  - Layer Type
  - Representative Thickness

- **Table 5 – Aggregate Gradation for Asphalt Mix**
  - Layer Number
  - Layer Type
  - Percentage Retained ¾" Sieve
  - Percentage Retained 3/8" Sieve
  - Percentage Retained #4 Sieve
  - Percentage Passing #200 Sieve

- **Table 6 – Effective Binder Content by Volume at Time of Construction**
  - Layer Number
  - Layer Time
  - Binder Content by Weight, *Pb*
  - Specific Gravity of the Binder, *Gb*
  - Bulk Specific Gravity of the Mix, *Gmb*
  - Maximum Theoretical Specific Gravity of the Mix, *Gmm*
  - Bulk Specific Gravity of the Aggregate, *Gsb*
  - Effective Specific Gravity of the Aggregate, *Gse*
  - Effective Binder Content by Volume at Time of Construction, *Vbe*

- **Table 7 – Original Air Voids (at Time of Construction) and Total Unit Weight**
  - Layer Number
  - Layer Type
  - Air Voids at Age = t
  - Age = t
  - Mean Annual Air Temperature, *Maat*
  - Original Viscosity at 77 ^{o}F
  - Original Air Voids
  - Total Unit Weight

- **Table 8 – Asphalt Binder Data**
  - Layer Number
  - Layer Type
  - Viscosity Grade
  - Penetration Grade
  - Penetration at 77F
  - Viscosity at 140F
  - Viscosity at 275F

- **Table 9 - Unbound Materials Data**
  - Layer Number
  - Layer Type
  - Dry Thermal Conductivity
  - Dry Heat Capacity
  - Liquid Limit
  - Plastic Limit
  - Plasticity Index
  - Percent Passing #200 Sieve
  - Percent Passing #4 Sieve
  - Diameter D_{60}
  - Optimum Moisture Content from LTTP Database
  - Estimated Optimum Moisture Content for Level 3 Analysis
  - Maximum Dry Unit Weight from LTPP Database
  - Estimated Maximum Dry Unit Weight for Level 3 Analysis
  - Specific Gravity of Solids
  - Saturated Hydraulic Conductivity
  - AASHTO Soil Classification
  - Unified Soil Classification System (USCS) Classification
  - Estimated Resilient Modulus based on AASHTO Soil Classification

The following tables contain the measured distress information needed to calibrate the results obtained from the analysis:

- **Table 10 – Distress Data – Rutting**
  - Survey Date
  - Maximum displacement between reference wire line and pavement surface in left lane half, LLH-Depth Mean, in inches
  - Maximum displacement between reference wire line and pavement surface in right lane half, RLH-Depth Mean, in inches
  - Maximum value of LLH-Depth Mean or RLH-Depth Mean, in inches
  - Average displacement between reference wire line and pavement surface between left lane half and right lane half data, in inches

- **Table 11 – Distress Data – Alligator Cracking**
  - Survey Date
  - Area of low severity alligator cracking, in ft^2
  - Area of medium severity alligator cracking, in ft^2
  - Area of high severity alligator cracking, in ft^2
  - Total Sum alligator cracking, in ft^2

- **Table 12 – Distress Data - Longitudinal Cracking in the Wheel Path**
  - Length of low severity longitudinal cracking in the wheel path, in ft
  - Length of medium severity longitudinal cracking in the wheel path, in ft
  - Length of high severity longitudinal cracking in the wheel path, in ft
  - Total Sum alligator cracking, in ft

- **Table 13 – Distress Data - Thermal Cracking**
  - Length of low severity transverse cracking in the wheel path, in ft
  - Length of medium severity transverse cracking in the wheel path, in ft
  - Length of high severity transverse cracking in the wheel path, in ft
  - Weighted average, in ft

- **Table 14 – Summary of Distress Data Available**
  - Distress data available for each of the 94 sections

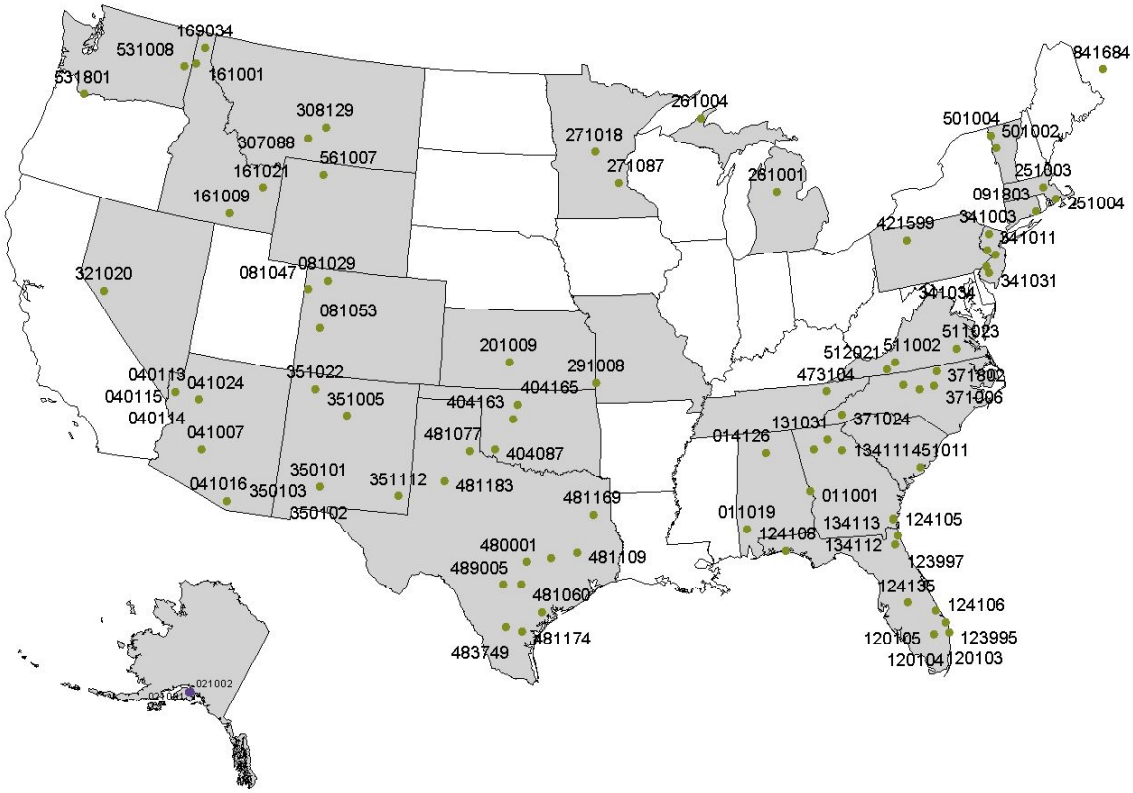


Figure 1. LTPP Sections Used for Calibration and Validation of the 2002 Design Guide

Comments on Collected Data to Input into the Design Guide Software

Most of the information shown on the tables was extracted from the LTPP database and provided by Fugro-BRE. However, some of the elements needed as input data and presented in the aforementioned tables could not be found on the LTPP Database and hence, not provided by Fugro-BRE. In these cases, the data was obtained from different sources of information or reasonably assumed.

This section is intended to describe either the sources or the assumptions needed to complete the data set for those parameters for which it was not possible to get the complete information from the LTPP database.

Table 1 – Analysis Conditions

Base/Subbase Construction Completion Date
This information was not found in the LTPP database in most of the cases. It was assumed to be 2 months prior to the Asphalt Construction Completion date.

Design Period
The design period was chosen based on the time the measured distress data was available in the database.

Table 2 – Pavement Lane Properties

Pavement Slope
A value of 1.5% was assumed for all of the sections.

Initial International Roughness Index (IRI)
A value of 150 m/km was assumed for all of the sections.

Thermal Conductivity
Reasonable values of thermal conductivity range from 0.44 to 0.81 BTU/hr-ft-^{o}F. A default value of 0.67 BTU/hr-ft-^{o}F was assumed for all of the sections.

Heat Capacity
Reasonable values of heat capacity range from 0.22 to 0.40 BTU/lb-^{o}F. A default value of 0.22 BTU/hr-ft-^{o}F was assumed for all of the sections.

Surface Short Wave Absorptivity
Reasonable values of surface short wave absorptivity for weathered asphalt (gray) range from 0.80 to 0.90. A default value of 0.85 was assumed for all of the sections.

Table 3 - Environmental/Climatic Input

Latitude and Longitude
This data was provided in degrees by Fugro-BRE. When inputting into the 2002 Design Guide, the format needed is *degrees.minutes*. Therefore, conversion to degrees and minutes was needed.

Groundwater Table Depth
If the boring log did not show information on groundwater table depth, this value was set up at the bottom of the borehole, which was considered the most conservative assumption. Information not found on the LTPP database was extracted from the report presented by Harold Von Quintus on March 2001 - Tables B-1, B-2, and B-3 (Annex- B). The data shown in this report was gathered from Soil Conservation Service reports and maps. Additional data was gathered from the US Geological Survey records, state DOTs, and LTPP boring logs and comments (Annex- C). Table 3 shows the source of information of the data gathered for the calibration and validation of the new pavement sections.

Table 4 - Pavement Structure

Number of Layers
The number of layers data was obtained from the database. In several cases, the surface asphalt layer thickness was reported to be less than 1 inch. Furthermore, no information was generally found for these layers. Due to software limitations, the Design Guide cannot handle asphalt layers of less than 1 inch in thickness. For the aforementioned reasons, sections for which the surface layer was reported to be less than 1 inch, this layer was combined with the layer immediately beneath it.

Generally the subgrade was reported to be an uncompacted layer. Therefore, the top 12 inches of the subgrade was assumed to be compacted material. This compacted "sublayer" is not included in the Number of Layers column shown in Table 4.

The *Number of Layers* column includes the bedrock or rigid layer, if such information was available.

Depth to Bedrock or Depth to a Rigid Layer
In most of the cases, records of depth to bedrock were not found in the LTPP database. In order to complete this information, the following sources were used:

- Report presented by Harold Von Quintus on March 2001 (Tables B-1, B-2, and B-3) with data from the Soil Conservation Service reports and maps (Annex- B).
- Data available from the US Geological Survey and state DOTs. (Annex- C)
- State DOTs records (Annex- C)
- LTPP boring log information and comments (Annex- C)

Table 4 shows the source of information from which the bedrock depth was attained, in the ***Comments*** column.

Table 5 - Aggregate Gradation for Asphalt Mix

Data was gathered from the LTPP database (Table AG04) and provided by Fugro-BRE.

Table 6 - Effective Binder Content by Volume at Time of Construction

The LTPP database does not have available this information. To obtain values of effective binder content by volume at time of construction, the following information was gathered:

- Binder Content by weight (*Pb*) from LTPP Table TST_AC04
- Specific Gravity of the Binder (*Gb*) from LTPP Table AE03
- Bulk Specific Gravity of the Mix (*Gmb*) at time of construction from LTPP Table AC_02
- Maximum Theoretical Specific Gravity of the Mix (*Gmm*) from LTPP Table TST_AC03
- Combined Bulk Specific Gravity of the Aggregate (*Gsb*) from LTPP Table INV_PMA

With this information, the Effective Specific Gravity of the Aggregate (*Gse*) was calculated as follows:

$$Gse = \frac{100 - Pb}{\frac{100}{Gmm} - \frac{Pb}{Gb}} \quad \text{.....(1)}$$

and the Effective Binder Content by Volume (*Vbe*):

$$Vbe = Gmb\left[\frac{Pb}{Gb} - (100 - Pb)\frac{(Gse - Gsb)}{Gse \cdot Gsb}\right] \quad \text{.....(2)}$$

Bulk Specific Gravity of the Mix (*Gmb*) at Time of Construction
For several sections, the *Gmb* value at the time of construction was not available in the LTPP database. Therefore, this value was calculated from the Maximum Theoretical Specific Gravity of the Mix (*Gmm*) and the Original Air Voids (VA_{orig}) as follows:

$$Gmb = Gmm\left(1 - \frac{VAorig}{100}\right) \quad \text{.....(3)}$$

The sections with *Gmb* values calculated from equation (3) can be recognized by the superscript [2] in Table 6.

Maximum Theoretical Specific Gravity of the Mix (*Gmm*)
Gmm values used in the calculation of the *Vbe*, were gathered from the TESTING Table of the LTPP database. There were few sections for which these values were not found on this table. In those cases, the *Gmm* values from the INVENTORY table were used.

The *Gmm* values from the INVENTORY table can be recognized by the superscript [3] in Table 6.

Effective Binder Content by Volume (*Vbe*) at Time of Construction

In cases where not enough data was available to calculate *Vbe*, a rough correlation with *Pb* was used, based on the data shown in Figure 2. The following correlation was found:

$$Vbe = 2 \cdot Pb \quad \text{.....(4)}$$

Vbe values calculated by equation (4) are recognized by the superscript [4] in Table 6.

Table 7 - Original Air Voids (at Time of Construction) and Total Unit Weight

The air voids at time of construction was extracted from the LTPP database by Fugro-BRE and was transferred to the ASU research team. During the review of the data, it was observed that the information on the original air voids extracted from the INVENTORY tables for the GPS sections might be in error. It was then decided to carry out the computation of these values based on available information.

The data collected to calculate the original air voids was the following:

- Air Voids at Age = t
- Age = t
- Mean Annual Air Temperature, *Maat*
- Original Viscosity at 77 ^{o}F

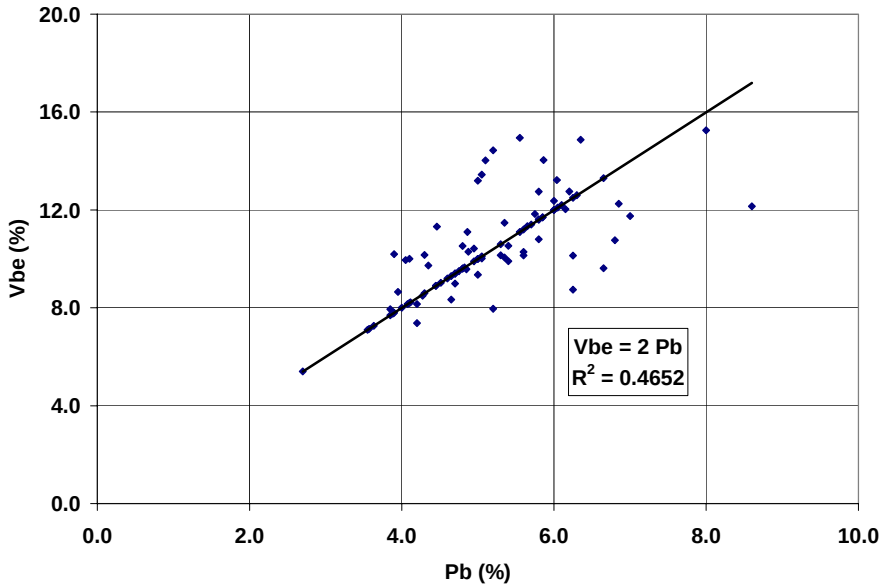


Figure 2. Correlation between Effective Binder Content by Volume (*Vbe*) and Binder Content by Weight (*Pb*)

The Inter Team Technical Report explaining how the air voids at time of construction for the GPS sections were computed is shown in Annex- D. Original air voids data for the SPS sections was considered to be reasonable and therefore, it was extracted directly from the LTPP database. The SPS sections are marked with the superscript [1] in Table 7.

Original Viscosity at 77 ^{o}F

Information on the original viscosity at 77 ^{o}F was not available for the GPS sections in the LTPP database. However, penetration at 77 ^{o}F was available. In those cases (recognized by the superscript [2] in Table 7) the penetration (*Pen*) values were converted to viscosity (η) values by the model developed by Mirza and Witczak, 1995 (see reference in Annex- D) at the University of Maryland. The regression model is given below:

$$\log \eta = 10.5012 - 2.2601 \cdot \log(Pen) + 0.00389 \cdot \log(Pen)^2 \quad \text{.....(5)}$$

In cases were the penetration was not provided, the viscosity value was inferred from the A and VTS values based on the binder grade provided for the layer. The following equation was used for this purpose:

$$\log \log \eta = A + VTS \log T_R \quad \text{.....(6)}$$

where:

η = Viscosity, cPoises
T_R = Temperature in Rankine
A, VTS = Regression parameters as function of binder grade

Section for which the viscosity was calculated by equation (6) are recognized by the superscript [3] in Table 7.

Table 8 - Asphalt Binder Data

At present, only Level 3 analysis has been validated, which only requires as input either the viscosity grade or the penetration grade. The rest of information has been filed for future reference. In cases where the binder grade was missing, the viscosity at 140 ^{o}F was used to infer the value (information marked with superscript [1] in Table 8).

Table 9a - Unbound Materials Data

The following data is summarized in Table 9a:

- Layer Number
- Layer Type
- Dry Thermal Conductivity, in BTU/hr-ft-^{o}F
- Dry Heat Capacity, in BTU/lb-^{o}F
- Liquid Limit
- Plastic Limit
- Plasticity Index

- Percent Passing #200 Sieve
- Percent Passing #4 Sieve
- Diameter D_{60}, in mm

Dry Thermal Conductivity
Values for Dry Thermal Conductivity were not available in the LTPP database. Default values were available from Part 2-CHAPTER 3 – Environmental Effects, based on the AASHTO soil classification:

Table 1. Dry Thermal Conductivity Default Values

Soil Type	Range (BTU/ft-hr-^{o}F)	Recommended (BTU/ft-hr-^{o}F)
A-1-a	0.22 – 0.44	0.30
A-1-b	0.22 – 0.44	0.27
A-2-4	0.22 – 0.24	0.23
A-2-5	0.22 – 0.24	0.23
A-2-6	0.20 – 0.23	0.22
A-2-7	0.16 – 0.23	0.20
A-3	0.25 – 0.40	0.30
A-4	0.17 – 0.23	0.22
A-5	0.17 – 0.23	0.19
A-6	0.16 – 0.22	0.18
A-7-5	0.09 – 0.17	0.13
A-7-6	0.09 – 0.17	0.12

Dry Heat Capacity
Values for Heat Capacity were not available in the LTPP database. Reasonable values range from 0.17 to 0.20 BTU/lb-^{o}F.

Liquid Limit and Plastic Limit
The Liquid and Plastic Limits (Atterberg Limits) are not needed as input parameters in the Design Guide software. However, they must be obtained in order to classify the granular unbound materials. For lime treated subbases, the LTPP database did not report Atterberg Limits. In this case, values were inferred base on the lime content of the material, that is, the effect of lime content on the Atterberg limits (Yoder and Witczak, 1975, *Principles of Pavement Design*). Figure 3 shows the effect of lime content on the material properties such as the Liquid and the Plastic Limits, and hence on the Plasticity Index. The layers for which this assumption was needed are recognized by the superscript ^{2} in Table 9a.

Percent Passing #200 and Percent Passing #4
For some treated subbases, this information was missing. In those cases, the gradation (% Passing #200 and % Passing #4) for the treated subbases (TS) was assumed to be equal to the

gradation reported for the layer immediately beneath them. The layers for which this assumption was made are recognized with the superscript [3] in Table 9a.

Diameter D_{60}

Information on diameter D_{60} is not available in the LTPP Database. Values were obtained manually from the Grain Size Distribution information provided by Fugre-BRE.

The Design Guide software has a lower boundary for Diameter D_{60} values of 0.07 mm. In cases where the D_{60} of the material was lower than 0.07 mm, it was approximated to the minimum required. The layers for which this assumption was made are pointed out in the last column of Table 9a.

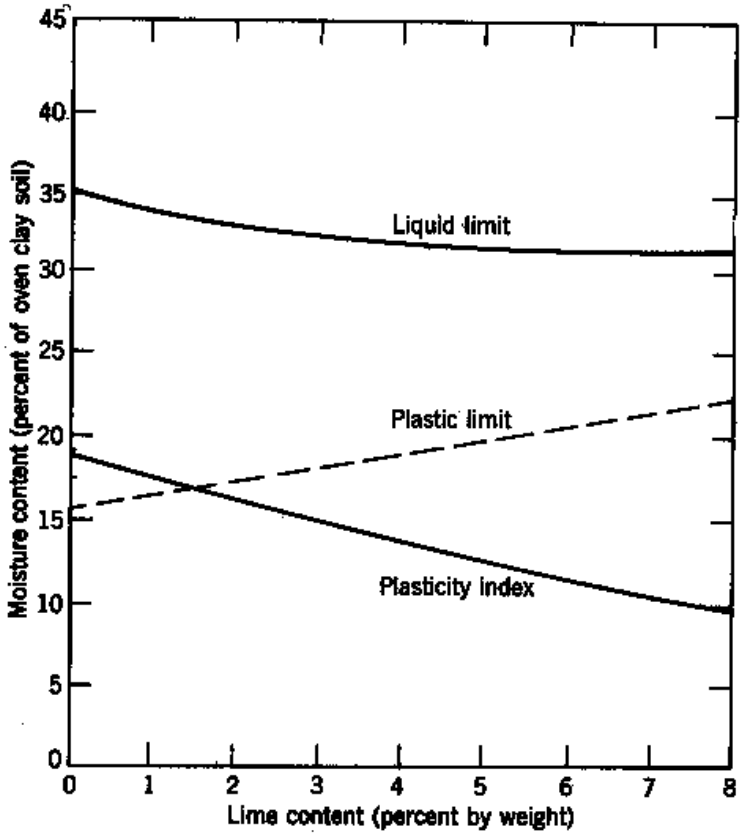


Figure 3. Effect of Lime Content on Atterberg Limits (Yoder and Witczak, 1975)

Table 9b - Unbound Materials Data

The following data is summarized in Table 9b:

- Optimum Moisture Content, in %, from LTTP Database
- Estimated Optimum Moisture Content, in %, for Level 3 Analysis

- Maximum Dry Unit Weight, in pcf, from LTPP Database
- Estimated Maximum Dry Unit Weight, in pcf, for Level 3 Analysis
- Specific Gravity of Solids
- Saturated Hydraulic Conductivity, in ft/hr
- AASHTO Soil Classification
- Unified Soil Classification System (USCS) Classification
- Estimated Resilient Modulus based on AASHTO Soil Classification

Optimum Moisture Content from LTPP Database
The measured optimum moisture content values gathered from the LTPP database were not used for the Calibration and Validation of the Design Guide because only Level 3 analysis was performed. However, this information is valuable for Levels 1 and 2 analyses.

Estimated Optimum Moisture Content for Level 3 Analysis
For Level 3 analysis, the optimum moisture content was internally estimated by the Enhanced Integrated Climatic Model (EICM) based on gradation and plasticity information for the soil. Please refer to Table 3.13 on Part 2- CHAPTER 3- ENVIRONMENTAL EFFECTS of the Design Guide for detailed explanation and equations.

Maximum Dry Unit Weight from LTPP Database
The measured maximum dry unit weight values gathered from the LTPP database were not used for the Calibration and Validation of the Design Guide because only Level 3 analysis was performed. However, this information is valuable for Levels 1 and 2 analyses.

Estimated Maximum Dry Unit Weight for Level 3 Analysis
For Level 3 analysis, the maximum dry unit weight was internally estimated by the Enhanced Integrated Climatic Model (EICM) module based on gradation, plasticity, and the estimated optimum moisture content for Level 3. Please refer to Table 3.13 on Part 2- CHAPTER 3- ENVIRONMENTAL EFFECTS of the Design Guide for detailed explanation and equations.

Specific Gravity of Solids
Information on the specific gravity of solids for unbound materials is not available in the LTPP database. For Level 3 analysis, this value was internally estimated by the EICM based on gradation and plasticity properties of each unbound layer. Please refer to Table 3.12 on Part 2- CHAPTER 3- ENVIRONMENTAL EFFECTS of the Design Guide for detailed explanation and equations.

Saturated Hydraulic Conductivity
Information on saturated hydraulic conductivity for unbound materials is not available in the LTPP database. For Level 3 analysis, this value was internally estimated by the EICM based on gradation and plasticity properties of each unbound layer. Please refer to Table 3.16 on Part 2- CHAPTER 3- ENVIRONMENTAL EFFECTS of the Design Guide for detailed explanation and equations.

Saturated hydraulic conductivity for the bedrock was assumed to be 5 ft/hr.

Table 9c - Unbound Materials Data

The following data is summarized in Table 9c:

- AASHTO Soil Classification
- Unified Soil Classification System (USCS) Classification
- Estimated Resilient Modulus at Optimum Conditions based on AASHTO Soil Classification

Estimated Resilient Modulus at Optimum Conditions based on AASHTO Soil Classification
The input resilient modulus at optimum conditions was obtained by relationships developed between soil index properties and the California Bearing Ratio (CBR). Once relationships were developed to predict CBR values, the following correlation was used to relate properties directly to estimates of modulus, M_R:

$$M_R = 2555 \cdot CBR^{0.64} \quad \text{.....(7)}$$

Detailed analysis and correlations are presented in Annex- E of this report.

Measured Distress Data to Compare with Estimated Results from the Design Guide Software

The following tables contain the measured distress information needed to calibrate the results obtained from the analysis:

Table 10 – Distress Data – Rutting

The following data is summarized in Table 10:

- Survey Date
- Maximum displacement between reference wire line and pavement surface in left lane half, LLH-Depth Mean, in inches
- Maximum displacement between reference wire line and pavement surface in right lane half, RLH-Depth Mean, in inches
- Maximum value of LLH-Depth Mean or RLH-Depth Mean, in inches
- Average displacement between left lane half and right lane half data, in inches

The average displacement between the left and the right lanes was used to calibrate the 2002 Design Guide rutting model. In those cases where no information was provided for both lanes, the maximum displacement between the left and right lanes was considered for the calibration.

Table 11 – Distress Data – Alligator Cracking

The following data is summarized in Table 11:

- Survey Date
- Area of low severity alligator cracking, in ft^2
- Area of medium severity alligator cracking, in ft^2
- Area of high severity alligator cracking, in ft^2
- Total Sum alligator cracking, in ft^2

Table 12 – Distress Data - Longitudinal Cracking in the Wheel Path

The following data is summarized in Table 12:

- Length of low severity longitudinal cracking in the wheel path, in ft
- Length of medium severity longitudinal cracking in the wheel path, in ft
- Length of high severity longitudinal cracking in the wheel path, in ft
- Total Sum alligator cracking, in ft

Table 13 – Distress Data - Thermal Cracking

The following data is summarized in Table 13:

- Length of low severity transverse cracking in the wheel path, in ft
- Length of medium severity transverse cracking in the wheel path, in ft
- Length of high severity transverse cracking in the wheel path, in ft
- Weighted average, in ft

Weighed Average
Similarly to the distress weighted average calculated above, a weighted average of the transverse cracking was based on the severity level of the distress defined in the LTPP database:

$$Weighted\ Average = \frac{Low\_severity + 3Medium\_severity + 5High\_severity}{9} \quad .(10)$$

Table 14 – Summary of Distress Data Available

Table 14 presents a summary of the distress data available for the 94 sections used in the calibration of the new pavement design models.

Additional Information Provided by FUGRO-BRE

Additional information was provided by FUGRO-BRE that has not yet been used in the calibration and validation of the Design Guide. This information can be found in the report titled *Calibration an*d *Validation of the Fatigue Cracking and Rutting Prediction Models for the 2002 Design Guide,* submitted on March 20, 2001. It includes:

- Summary and listing of the LTPP test sections where the load-related cracks, in the wheel paths, may have initiated at the surface and are propagating downward through the HMA layers.

- Summary of the permeability for the subgrade soils supporting each LTPP test section included in the calibration and validation factorials for new construction.

- Summary of resilient modulus test results for all unbound layers and materials included in the pavement structures for the calibration and validation factorials for new construction.

- Summary of laboratory resilient modulus and back-calculated layer elastic modulus for each structural layer included in the back-calculation process for the calibration and validation factorials for new construction.

The additional information presented above can be used for calibration and validation of hierarchical levels 1 and 2. At present, only Level 3 analysis is being calibrated.

ANNEX- A

Input Data for the Calibration and Validation of the 2002 Design Guide for New Constructed Pavement Sections

Table 1 Analysis Conditions

Section	State Code	SHRP ID	State	Project Type	Pavement Type[1]	Base/Subgrade Construction Completion Date	Asphalt Construction Completion Date	Traffic Opening Date	Design Period (years)
011001	01	1001	Alabama	GPS	CONV	8/1/1980	10/1/1980	10/1/1980	19
011019	01	1019	Alabama	GPS	DS/FD	8/1/1986	10/1/1986	10/1/1986	13
014126	01	4126	Alabama	GPS	DS/FD	2/1/1988	4/1/1988	4/1/1988	11
021001	02	1001	Alaska	GPS	CONV	5/1/1983	7/1/1983	7/1/1983	16
021002	02	1002	Alaska	GPS	CONV	8/1/1984	10/1/1984	10/1/1984	15
040113	04	0113	Arizona	SPS	CONV	6/1/1993	8/1/1993	8/1/1993	6
040114	04	0114	Arizona	SPS	DS/FD	6/1/1993	8/1/1993	8/1/1993	6
040115	04	0115	Arizona	SPS	DS/FD	6/1/1993	8/1/1993	8/1/1993	6
040116	04	0116	Arizona	SPS	DS/FD(TB)	6/1/1993	8/1/1993	8/1/1993	6
040117	04	0117	Arizona	SPS	DS/FD(TB)	6/1/1993	8/1/1993	8/1/1993	6
040118	04	0118	Arizona	SPS	DS/FD(TB)	6/1/1993	8/1/1993	8/1/1993	6
041007	04	1007	Arizona	GPS	DS/FD	2/1/1978	4/1/1978	9/1/1978	21
041016	04	1016	Arizona	GPS	DS/FD	4/1/1979	6/1/1979	10/1/1979	20
041024	04	1024	Arizona	GPS	CONV	5/1/1977	7/1/1977	7/1/1977	22
081029	08	1029	Colorado	GPS	CONV	4/1/1972	6/1/1972	6/1/1972	27
081047	08	1047	Colorado	GPS	CONV	6/1/1982	8/1/1982	10/1/1983	16
081053	08	1053	Colorado	GPS	CONV	12/1/1983	2/1/1984	11/1/1984	15
091803	09	1803	Connecticut	GPS	CONV	5/1/1985	7/1/1985	7/1/1985	14
120103	12	0103	Florida	SPS	DS/FD(TB)	9/1/1995	11/01/1995	11/01/1995	4
120104	12	0104	Florida	SPS	DS/FD(TB)	9/1/1995	11/01/1995	11/01/1995	4
120105	12	0105	Florida	SPS	DS/FD(TB)	9/1/1995	11/01/1995	11/01/1995	4
120106	12	0106	Florida	SPS	DS/FD(TB)	9/1/1995	11/01/1995	11/01/1995	4
123995	12	3995	Florida	GPS	CONV	10/1/1975	12/1/1975	12/1/1975	24
123997	12	3997	Florida	GPS	CONV	4/1/1974	6/1/1974	6/1/1974	25
124105	12	4105	Florida	GPS	CONV	10/1/1984	12/1/1984	12/1/1984	15
124106	12	4106	Florida	GPS	CONV	6/1/1987	8/1/1987	8/1/1987	12
124107	12	4107	Florida	GPS	CONV	8/1/1983	10/1/1983	10/1/1983	16
124108	12	4108	Florida	GPS	DS/FD(TB)	4/1/1986	6/1/1986	6/1/1986	13
124135	12	4135	Florida	GPS	CONV	12/1/1970	2/1/1971	2/1/1971	28
131031	13	1031	Georgia	GPS	CONV	4/1/1981	6/1/1981	6/1/1981	18
134111	13	4111	Georgia	GPS	DS/FD	9/1/1980	11/1/1980	11/1/1980	19
134112	13	4112	Georgia	GPS	DS/FD(TB)	4/1/1977	6/1/1977	6/1/1977	22
134113	13	4113	Georgia	GPS	DS/FD(TB)	4/1/1977	6/1/1977	6/1/1977	22
134119	13	4119	Georgia	GPS	DS/FD	4/1/1978	6/1/1978	6/1/1978	21
161001	16	1001	Idaho	GPS	CONV	6/1/1973	8/1/1973	8/1/1973	26
161009	16	1009	Idaho	GPS	CONV	8/1/1974	10/1/1974	10/1/1974	25
161021	16	1021	Idaho	GPS	CONV	8/1/1985	10/1/1985	10/1/1985	14
169034	16	9034	Idaho	GPS	CONV	8/1/1988	10/1/1988	10/1/1988	11
201009	20	1009	Kansas	GPS	DS/FD	11/1/1984	1/1/1985	1/1/1985	14
251003	25	1003	Massachusetts	GPS	DS/FD	7/1/1974	9/1/1974	9/1/1974	25
251004	25	1004	Massachusetts	GPS	DS/FD	9/1/1974	11/1/1974	11/1/1974	25
261001	26	1001	Michigan	GPS	CONV	7/1/1971	9/1/1971	9/1/1971	28
261004	26	1004	Michigan	GPS	CONV	5/1/1985	7/1/1985	7/1/1985	14
271018	27	1018	Minnesota	GPS	CONV	10/1/1978	1/1/1979	1/1/1979	20
271087	27	1087	Minnesota	GPS	DS/FD	11/1/1978	1/1/1979	1/1/1979	20
291008	29	1008	Missouri	GPS	DS/FD	2/1/1986	4/1/1986	5/1/1986	13
307088	30	7088	Montana	GPS	CONV	4/1/1981	6/1/1981	6/1/1981	18
308129	30	8129	Montana	GPS	CONV	4/1/1988	6/1/1988	6/1/1988	11
321020	32	1020	Nevada	GPS	DS/FD	4/1/1984	6/1/1984	6/1/1984	15
341003	34	1003	New Jersey	GPS	DS/FD	5/1/1974	7/1/1974	7/1/1974	25
341011	34	1011	New Jersey	GPS	DS/FD	11/1/1971	1/1/1972	1/1/1972	27
341031	34	1031	New Jersey	GPS	DS/FD	7/1/1973	9/1/1973	9/1/1973	26
341033	34	1033	New Jersey	GPS	DS/FD(TB)	5/1/1974	7/1/1974	10/1/1974	25
341034	34	1034	New Jersey	GPS	DS/FD	9/1/1985	11/1/1985	11/1/1985	14
350101	35	0101	New Mexico	SPS	DS/FD	9/1/1995	11/1/1995	11/1/1995	4
350102	35	0102	New Mexico	SPS	CONV	9/1/1995	11/1/1995	11/1/1995	4
350103	35	0103	New Mexico	SPS	DS/FD(TB)	9/1/1995	11/1/1995	11/1/1995	4
350104	35	0104	New Mexico	SPS	DS/FD(TB)	9/1/1995	11/1/1995	11/1/1995	4
350105	35	0105	New Mexico	SPS	DS/FD(TB)	9/1/1995	11/1/1995	11/1/1995	4
350106	35	0106	New Mexico	SPS	DS/FD(TB)	9/1/1995	11/1/1995	11/1/1995	4
351005	35	1005	New Mexico	GPS	DS/FD	8/1/1983	10/1/1983	10/1/1983	16
351022	35	1022	New Mexico	GPS	DS/FD	8/1/1986	10/1/1986	10/1/1986	13
351112	35	1112	New Mexico	GPS	CONV	4/1/1984	6/1/1984	6/1/1984	15

Table 1 (Cont'd) Analysis Conditions

Section	State Code	SHRP ID	State	Project Type	Pavement Type[1]	Base/Subgrade Construction Completion Date	Asphalt Construction Completion Date	Traffic Opening Date	Design Period (years)
371006	37	1006	North Carolina	GPS	CONV	5/1/1982	7/1/1982	7/1/1982	17
371024	37	1024	North Carolina	GPS	CONV	9/1/1980	11/1/1980	11/1/1980	19
371802	37	1802	North Carolina	GPS	CONV	8/1/1985	10/1/1985	10/1/1985	11
371817	37	1817	North Carolina	GPS	CONV	10/1/1983	12/1/1983	12/1/1983	16
371992	37	1992	North Carolina	GPS	CONV	12/1/1989	2/1/1990	2/1/1990	9
404087	40	4087	Oklahoma	GPS	DS/FD(TB,TS)	2/1/1986	4/1/1986	7/1/1986	13
404163	40	4163	Oklahoma	GPS	DS/FD	2/1/1987	4/1/1987	4/1/1987	12
404165	40	4165	Oklahoma	GPS	DS/FD	4/1/1984	6/1/1984	6/1/1984	15
421599	42	1599	Pennsylvania	GPS	CONV	6/1/1987	8/1/1987	8/1/1987	12
451011	45	1011	South Carolina	GPS	CONV	4/1/1985	6/1/1985	7/1/1986	13
473104	47	3104	Tennessee	GPS	CONV	4/1/1986	6/1/1986	6/1/1986	13
480001	48	0001	Texas	GPS	CONV	1/1/1989	3/1/1989	4/1/1989	10
481060	48	1060	Texas	GPS	DS/FD(TS)	1/1/1986	3/1/1986	3/1/1986	13
481077	48	1077	Texas	GPS	CONV	11/1/1981	1/1/1982	1/1/1982	17
481109	48	1109	Texas	GPS	DS/FD(TS)	12/1/1983	2/1/1984	6/1/1984	15
481130	48	1130	Texas	GPS	DS/FD(TS)	8/1/1971	10/1/1971	8/1/1972	27
481169	48	1169	Texas	GPS	CONV	6/1/1972	8/1/1972	8/1/1972	27
481174	48	1174	Texas	GPS	CONV	10/1/1973	12/1/1973	5/1/1975	24
481178	48	1178	Texas	GPS	DS/FD(TS)	5/1/1988	7/1/1988	7/1/1988	11
481183	48	1183	Texas	GPS	CONV	12/1/1974	2/1/1975	2/1/1975	24
483749	48	3749	Texas	GPS	DS/FD(TS)	1/1/1981	3/1/1981	3/1/1981	18
489005	48	9005	Texas	GPS	CONV	5/1/1986	7/1/1986	9/1/1986	13
501002	50	1002	Vermont	GPS	CONV	6/1/1984	8/1/1984	11/1/1984	15
501004	50	1004	Vermont	GPS	CONV	7/1/1984	9/1/1984	11/1/1984	15
511002	51	1002	Virginia	GPS	CONV	8/1/1979	10/1/1979	10/1/1979	20
511023	51	1023	Virginia	GPS	DS/FD(TS)	10/1/1980	12/1/1980	12/1/1980	19
512021	51	2021	Virginia	GPS	DS/FD	3/1/1985	5/1/1985	5/1/1985	14
531008	53	1008	Washington	GPS	CONV	9/1/1978	11/1/1978	11/1/1978	21
531801	53	1801	Washington	GPS	DS/FD	7/1/1973	9/1/1973	10/1/1973	26
561007	56	1007	Wyoming	GPS	CONV	5/1/1980	7/1/1980	7/1/1980	19
841684	84	1684	New Brunswick	GPS	CONV	7/1/1978	9/1/1978	9/1/1978	21

[1] CONV = Conventional; DS/FD = Deep Strength/Full Depth; TB = Treated Base; TS = Treated Subbase

Table 2 Pavement Lane Properties

Section	Lane Width (ft)	Pavement Slope (%)	Initial IRI (m/km)[1]	Thermal Conductivity (BTU/hr-ft-^{o}F)	Heat Capacity (BTU/lb-^{o}F)	Surface Short Wave Absorptivity
011001	12	1.5	150	0.67	0.22	0.85
011019	12	1.5	150	0.67	0.22	0.85
014126	12	1.5	150	0.67	0.22	0.85
021001	12	1.5	150	0.67	0.22	0.85
021002	12	1.5	150	0.67	0.22	0.85
040113	12	1.5	150	0.67	0.22	0.85
040114	12	1.5	150	0.67	0.22	0.85
040115	12	1.5	150	0.67	0.22	0.85
040116	12	1.5	150	0.67	0.22	0.85
040117	12	1.5	150	0.67	0.22	0.85
040118	12	1.5	150	0.67	0.22	0.85
041007	12	1.5	150	0.67	0.22	0.85
041016	12	1.5	150	0.67	0.22	0.85
041024	12	1.5	150	0.67	0.22	0.85
081029	12	1.5	150	0.67	0.22	0.85
081047	12	1.5	150	0.67	0.22	0.85
081053	12	1.5	150	0.67	0.22	0.85
091803	12	1.5	150	0.67	0.22	0.85
120103	12	1.5	150	0.67	0.22	0.85
120104	12	1.5	150	0.67	0.22	0.85
120105	12	1.5	150	0.67	0.22	0.85
120106	12	1.5	150	0.67	0.22	0.85
123995	12	1.5	150	0.67	0.22	0.85
123997	12	1.5	150	0.67	0.22	0.85
124105	12	1.5	150	0.67	0.22	0.85
124106	12	1.5	150	0.67	0.22	0.85
124107	12	1.5	150	0.67	0.22	0.85
124108	12	1.5	150	0.67	0.22	0.85
124135	12	1.5	150	0.67	0.22	0.85
131031	12	1.5	150	0.67	0.22	0.85
134111	12	1.5	150	0.67	0.22	0.85
134112	12	1.5	150	0.67	0.22	0.85
134113	12	1.5	150	0.67	0.22	0.85
134119	12	1.5	150	0.67	0.22	0.85
161001	13	1.5	150	0.67	0.22	0.85
161009	13	1.5	150	0.67	0.22	0.85
161021	15	1.5	150	0.67	0.22	0.85
169034	13	1.5	150	0.67	0.22	0.85
201009	12	1.5	150	0.67	0.22	0.85
251003	12	1.5	150	0.67	0.22	0.85
251004	12	1.5	150	0.67	0.22	0.85
261001	12	1.5	150	0.67	0.22	0.85
261004	12	1.5	150	0.67	0.22	0.85
271018	12	1.5	150	0.67	0.22	0.85
271087	12	1.5	150	0.67	0.22	0.85
291008	12	1.5	150	0.67	0.22	0.85
307088	12	1.5	150	0.67	0.22	0.85
308129	12	1.5	150	0.67	0.22	0.85
321020	12	1.5	150	0.67	0.22	0.85
341003	12	1.5	150	0.67	0.22	0.85
341011	12	1.5	150	0.67	0.22	0.85
341031	12	1.5	150	0.67	0.22	0.85
341033	12	1.5	150	0.67	0.22	0.85
341034	12	1.5	150	0.67	0.22	0.85
350101	12	1.5	150	0.67	0.22	0.85
350102	12	1.5	150	0.67	0.22	0.85
350103	12	1.5	150	0.67	0.22	0.85
350104	12	1.5	150	0.67	0.22	0.85
350105	12	1.5	150	0.67	0.22	0.85
350106	12	1.5	150	0.67	0.22	0.85
351005	12	1.5	150	0.67	0.22	0.85
351022	12	1.5	150	0.67	0.22	0.85
351112	12	1.5	150	0.67	0.22	0.85

Table 2 (Cont'd) Pavement Lane Properties

Section	Lane Width (ft)	Pavement Slope (%)	Initial IRI (m/km)[1]	Thermal Conductivity (BTU/hr-ft-°F)	Heat Capacity (BTU/lb-°F)	Surface Short Wave Absorptivity
371006	12	1.5	150	0.67	0.22	0.85
371024	12	1.5	150	0.67	0.22	0.85
371802	12	1.5	150	0.67	0.22	0.85
371817	12	1.5	150	0.67	0.22	0.85
371992	12	1.5	150	0.67	0.22	0.85
404087	12	1.5	150	0.67	0.22	0.85
404163	12	1.5	150	0.67	0.22	0.85
404165	12	1.5	150	0.67	0.22	0.85
421599	12	1.5	150	0.67	0.22	0.85
451011	12	1.5	150	0.67	0.22	0.85
473104	12	1.5	150	0.67	0.22	0.85
480001	12	1.5	150	0.67	0.22	0.85
481060	12	1.5	150	0.67	0.22	0.85
481077	12	1.5	150	0.67	0.22	0.85
481109	12	1.5	150	0.67	0.22	0.85
481130	12	1.5	150	0.67	0.22	0.85
481169	12	1.5	150	0.67	0.22	0.85
481174	12	1.5	150	0.67	0.22	0.85
481178	12	1.5	150	0.67	0.22	0.85
481183	12	1.5	150	0.67	0.22	0.85
483749	12	1.5	150	0.67	0.22	0.85
489005	12	1.5	150	0.67	0.22	0.85
501002	12	1.5	150	0.67	0.22	0.85
501004	12	1.5	150	0.67	0.22	0.85
511002	12	1.5	150	0.67	0.22	0.85
511023	12	1.5	150	0.67	0.22	0.85
512021	12	1.5	150	0.67	0.22	0.85
531008	12	1.5	150	0.67	0.22	0.85
531801	12	1.5	150	0.67	0.22	0.85
561007	14	1.5	150	0.67	0.22	0.85
841684	12	1.5	150	0.67	0.22	0.85

[1] IRI: International Roughness Index

Table 3 Environmental / Climatic Properties

Section	Latitude North (degrees)	Longitude West (degrees)	Elevation (ft)	Groundwater Table Depth[1] (ft)	Source of Information
011001	32.533	85.080	495	31.0	U.S Geological Survey
011019	31.353	88.032	61	12.0	Harold Von Quintus Report
014126	34.179	86.875	760	30.0	U.S Geological Survey
021001	60.650	149.492	1310	>20	Harold Von Quintus Report
021002	60.759	149.239	839	10.0	U.S Geological Survey
040113	35.392	114.255	3580	>20	Harold Von Quintus Report
040114	35.392	114.255	3580	>20	Harold Von Quintus Report
040115	35.392	114.255	3580	>20	Harold Von Quintus Report
040116	35.392	114.255	3580	>20	Harold Von Quintus Report
040117	35.392	114.255	3580	>20	Harold Von Quintus Report
040118	35.392	114.255	3580	>20	Harold Von Quintus Report
041007	33.437	112.581	1044	175.0	U.S Geological Survey
041016	31.639	111.058	3218	88.0	U.S Geological Survey
041024	35.279	113.131	5456	>20	Harold Von Quintus Report
081029	40.526	107.919	5920	25.0	U.S Geological Survey
081047	40.099	108.832	5260	> 7.5	LTPP boring log
081053	38.698	108.026	5140	8.1	LTPP Database
091803	41.395	72.027	165	5.9	LTPP Database
120103	26.543	80.692	14	3.0	Harold Von Quintus Report
120104	26.543	80.692	14	3.0	Harold Von Quintus Report
120105	26.543	80.692	14	3.0	Harold Von Quintus Report
120106	26.543	80.692	14	3.0	Harold Von Quintus Report
123995	26.501	80.078	19	9.0	LTPP boring log - Moist soil encountered
123997	30.087	81.706	21	10.0	Harold Von Quintus Report
124105	30.400	81.550	20	10.0	LTPP boring log - Moist soil encountered
124106	26.900	80.137	22	3.0	Harold Von Quintus Report
124107	27.393	80.459	26	16.8	LTPP boring log - Wet sand encountered
124108	30.388	86.431	19	34.0	U.S Geological Survey
124135	27.861	81.589	130	15.0	DOT
131031	34.404	84.005	120	10.4	LTPP Database
134111	33.932	83.423	735	34.0	U.S Geological Survey
134112	31.029	81.606	13	15.0	U.S Geological Survey
134113	31.082	81.614	13	15.0	U.S Geological Survey
134119	34.089	84.706	815	>20	Harold Von Quintus Report
161001	47.774	116.790	2150	307.0	U.S Geological Survey
161009	42.472	113.381	3025	>20	Harold Von Quintus Report
161021	43.647	111.928	4849	4.0	Harold Von Quintus Report
169034	48.421	116.500	2119	4.8	Harold Von Quintus Report - Perched water Feb-May
201009	37.998	98.747	1922	15.0	U.S Geological Survey
251003	42.201	71.335	128	11.0	U.S Geological Survey
251004	41.654	70.902	49	1.0	U.S Geological Survey
261001	44.031	84.916	1154	19.0	U.S Geological Survey
261004	47.101	88.605	984	5.0	U.S Geological Survey
271018	46.033	94.450	1118	7.8	Coordinates provided by Fugro - Harold Von Quintus Report
271087	44.807	93.228	800	85.0	U.S Geological Survey
291008	37.236	94.579	860	34.0	DOT Data
307088	45.812	110.004	4072	70.0	U.S Geological Survey
308129	46.314	109.144	4440	9.4	LTPP Database
321020	38.529	118.618	4272	211.0	U.S Geological Survey
341003	41.010	74.616	1156	70.0	U.S Geological Survey
341011	40.180	74.556	107	4.5	U.S Geological Survey
341031	39.544	75.062	85	5.0	U.S Geological Survey
341033	40.414	74.894	207	41.0	U.S Geological Survey
341034	39.824	75.106	54	90.0	U.S Geological Survey
350101	32.678	107.071	4117	>20	Harold Von Quintus Report
350102	32.678	107.071	4117	>20	Harold Von Quintus Report
350103	32.678	107.071	4117	>20	Harold Von Quintus Report
350104	32.678	107.071	4117	>20	Harold Von Quintus Report
350105	32.678	107.071	4117	>20	Harold Von Quintus Report
350106	32.678	107.071	4117	>20	Harold Von Quintus Report
351005	35.509	106.238	5523	131.0	U.S Geological Survey
351022	36.374	107.834	6727	>14	LTPP boring log
351112	32.632	103.520	3760	>20	Harold Von Quintus Report

Table 3 (Cont'd) Environmental / Climatic Properties

Section	Latitude North (degrees)	Longitude West (degrees)	Elevation (ft)	Groundwater Table Depth[1] (ft)	Source of Information
371006	35.783	78.750	435	>20	Harold Von Quintus Report
371024	35.296	83.180	2125	>20	Harold Von Quintus Report
371802	36.316	78.516	500	>20	Harold Von Quintus Report
371817	36.055	80.151	850	35.0	U.S Geological Survey
371992	35.746	79.441	585	>20	Harold Von Quintus Report
404087	34.638	99.288	1350	7.5	U.S Geological Survey
404163	35.842	98.475	1524	17.0	Harold Von Quintus Report
404165	36.391	98.291	1319	8.7	LTPP Database
421599	41.433	78.713	1500	20.0	Harold Von Quintus Report
451011	32.822	80.030	12	19.0	U.S Geological Survey
473104	36.240	83.752	1230	>20	Harold Von Quintus Report
480001	30.392	97.725	771	17.0	Harold Von Quintus Report
481060	28.510	97.058	78	>11	Harold Von Quintus Report
481077	34.539	100.435	1835	10.9	LTPP Database
481109	30.750	95.524	340	>20	Harold Von Quintus Report
481130	29.560	97.944	519	54.0	U.S Geological Survey
481169	32.196	94.803	430	8.0	Harold Von Quintus Report
481174	27.789	97.873	109	>8.3	Harold Von Quintus Report
481178	30.561	96.670	425	20.0	U.S Geological Survey
481183	33.329	101.522	2994	> 15.5	LTPP boring log
483749	27.930	98.556	570	20.0	U.S Geological Survey
489005	29.517	98.721	910	>20	Harold Von Quintus Report
501002	44.120	73.180	283	4.2	LTPP Database
501004	44.646	73.298	141	>20	Harold Von Quintus Report
511002	36.958	80.368	2204	6.0	U.S Geological Survey
511023	37.015	77.391	98	47.5	U.S Geological Survey
512021	36.734	80.802	2635	>20	Harold Von Quintus Report
531008	47.558	117.394	2356	55.0	U.S Geological Survey
531801	45.571	122.313	440	17.0	U.S Geological Survey
561007	44.503	108.919	5204	4.1	LTPP Database
841684	45.849	66.543	79	> 6.5	LTPP boring log

[1] From pavement surface

Table 4 Pavement Structure

Section	No. of Layers	Layer Number	Layer Type[1]	Representative Thickness (in)	Comments
011001	5	1	AC	1.6	AC surface layer combined with AC layer beneath
		2	AC	1.6	
		3	GB	6.2	
		4	GS	19.1	
		5	SS		BR > 5 ft (USGS-Regional)
011019	6	1	AC	1.1	LTPP data shows 0.9"
		2	AC	2.6	
		3	AC	3	
		4	GB	5.5	
		5	SS	252	
		6	BR		BR = 21 ft (Harold Von Quintus Report)
014126	5	1	AC	1.4	
		2	AC	11.7	
		3	GB	18.4	
		4	SS	132	
		5	BR		BR=13.6 ft (LTTP Data)
021001	3	1	AC	3	
		2	GB	6.3	
		3	SS		BR = Infinite (Harold Von Quintus Report)
021002	4	1	AC	3.3	
		2	GB	6	
		3	GS	7.5	
		4	SS		BR > 20 ft
040113	3	1	AC	4.5	
		2	GB	7.5	
		3	SS		
040114	3	1	AC	6.8	
		2	GB	12	
		3	SS		
040115	3	1	AC	6.6	
		2	AC	8.5	
		3	SS		BR = 50 ft (Harold Von Quintus Report)
040116	3	1	AC	4.1	
		2	ATB	12.1	
		3	SS		BR = 50 ft (Harold Von Quintus Report)
040117	4	1	AC	7.6	
		2	ATB	4.2	
		3	GB	4.2	
		4	SS		BR = 50 ft (Harold Von Quintus Report)
040118	4	1	AC	4	
		2	ATB	7.7	
		3	GB	4.1	
		4	SS		BR = 50 ft (Harold Von Quintus Report)
041007	3	1	AC	6.5	AC surface layer combined with AC layer beneath
		2	GB	10.8	
		3	SS		BR = 200 ft (DOT and USGS data)
041016	3	1	AC	10	AC surface layer combined with AC layer beneath
		2	GB	6.7	
		3	SS		BR = 20 ft (LTPP-General)
041024	3	1	AC	10.8	
		2	GB	6.3	
		3	SS		BR = Infinite (Harold Von Quintus Report)
081029	4	1	AC	4.2	AC surface layer combined with AC layer beneath
		2	GB	5.6	
		3	GS	11	
		4	SS		BR > 7.2 ft
081047	5	1	AC	3.6	
		2	GB	6.3	
		3	GS	12.9	
		4	GS	1.5	
		5	SS		BR = 35 ft (LTTP database)

Table 4 (Cont'd) Pavement Structure

Section	No. of Layers	Layer Number	Layer Type[1]	Representative Thickness (in)	Comments
081053	4	1	AC	4.6	
		2	GB	5.4	
		3	GS	23.5	
		4	SS		BR = Infinite (Harold Von Quintus Report)
091803	4	1	AC	2.9	
		2	AC	4.3	
		3	GB	12	
		4	SS		BR = Infinite (Harold Von Quintus Report)
120103	5	1	AC	2	
		2	AC	2.1	
		3	ATB	8	
		4	SS	236	
		5	BR		
120104	5	1	AC	1.9	
		2	AC	4.9	
		3	ATB	12	
		4	SS	236	
		5	BR		
120105	6	1	AC	1.9	
		2	AC	2	
		3	ATB	4	
		4	GB	4	
		5	SS	236	
		6	BR		
120106	6	1	AC	2.2	
		2	AC	5	
		3	ATB	8.3	
		4	GB	4	
		5	SS	236	
		6	BR		
123995	4	1	AC	5	AC surface layer combined with AC layer beneath
		2	GB	12.8	
		3	GS	12	
		4	SS		BR > 9 ft
123997	4	1	AC	3.1	
		2	GB	11.6	
		3	GS	15	
		4	SS		BR = 50 ft (Harold Von Quintus Report)
124105	4	1	AC	2.3	AC surface layer combined with AC layer beneath
		2	GB	10.1	
		3	GS	13.3	
		4	SS		BR > 14 ft
124106	5	1	AC	8.2	
		2	GB	10	
		3	GS	14.5	
		4	SS	236	
		5	BR		BR = 19.7 ft from top of subgrade (Harold Von Quintus Report)
124107	3	1	AC	2.7	AC surface layer combined with AC layer beneath
		2	GB	12	
		3	SS		BR > 17 ft
124108	4	1	AC	3.9	AC surface layer combined with AC layer beneath
		2	ATB	6	
		3	GS	12.9	
		4	SS		BR > 7 ft (LTPP boring log)
124135	4	1	AC	1.4	
		2	GB	3.3	
		3	GS	12	
		4	SS		BR > 17 ft (LTPP boring log)
131031	4	1	AC	3	
		2	AC	8.1	
		3	GB	8.8	
		4	SS		BR = 50 ft (Harold Von Quintus Report)

Table 4 (Cont'd) Pavement Structure

Section	No. of Layers	Layer Number	Layer Type[1]	Representative Thickness (in)	Comments
134111	3	1	AC	8.7	AC surface layer combined with AC layer beneath
		2	GB	8.4	
		3	SS		BR = 30 ft (DOT Information)

134112	3	1	AC	3.2	AC surface layer combined with AC layer beneath
		2	ATB	12.7	
		3	SS		BR = 150 ft (DOT Information)
134113	3	1	AC	3.7	AC surface layer combined with AC layer beneath
		2	ATB	11.5	
		3	SS		BR = 150 ft (DOT Information)
134119	4	1	AC	2.6	
		2	AC	13.8	
		3	GB	16.4	
		4	SS		BR = Infinite (Harold Von Quintus Report)
161001	4	1	AC	3.7	AC surface layer combined with AC layer beneath
		2	GB	9.2	
		3	SS	48	
		4	BR		BR = 5 ft (LTTP database)
161009	4	1	AC	4.8	
		2	AC	5.6	
		3	GB	9.2	
		4	SS		BR = Infinite (Harold Von Quintus Report)
161021	3	1	AC	5.9	
		2	GB	5.3	
		3	SS		BR = Infinite (Harold Von Quintus Report)
169034	4	1	AC	3.2	
		2	AC	6	
		3	GB	18.8	
		4	SS		BR = Infinite (Harold Von Quintus Report)
201009	3	1	AC	2.4	
		2	AC	8.7	
		3	SS		BR = 145 ft (USGS)
251003	5	1	AC	1.2	
		2	AC	5.4	
		3	GB	12.7	
		4	SS	41	
		5	BR		BR = 5 ft (LTTP boring log - refusal)
251004	5	1	AC	1.4	
		2	AC	8.2	
		3	GB	25.6	
		4	SS	36.8	
		5	BR		BR = 6 ft (LTTP boring log - refusal)
261001	3	1	AC	2.2	
		2	GB	10.9	
		3	SS		BR = 500 ft (DOT)
261004	4	1	AC	4.2	
		2	GB	5	
		3	SS	38	
		4	BR		BR = 3.9 ft (DOT boring logs)
271018	5	1	AC	1.6	
		2	AC	2.8	
		3	GB	5.2	
		4	SS	100	
		5	BR		BR = 8.3 ft from top of subgrade (Harold Von Quintus Report)
271087	2	1	AC	15.7	AC surface layer combined with AC layer beneath
		2	SS		BR > 5.5 ft (Soil Conservation Service reports)
291008	4	1	AC	1.8	
		2	AC	9.6	AC layer combined with layer beneath
		3	GB	4.4	
		4	SS		BR = 38 ft (DOT boring logs)
307088	4	1	AC	4.9	AC surface layer combined with AC layer beneath
		2	GB	1.8	
		3	GS	15.8	
		4	SS		BR > 16.5 ft (LTTP boring log)

Table 4 (Cont'd) Pavement Structure

Section	No. of Layers	Layer Number	Layer Type[1]	Representative Thickness (in)	Comments
308129	3	1	AC	3.2	
		2	GB	22.8	
		3	SS		BR = Infinite (Harold Von Quintus Report)
321020	3	1	AC	7	AC surface layer combined with AC layer beneath
		2	GB	4.7	
		3	SS		BR > 20 ft (LTTP boring log)
341003	5	1	AC	1.6	
		2	AC	5.9	

		3	GB	7.4	
		4	SS	24.9	
		5	BR		BR = 3.3 ft (LTTP database)
341011	5	1	AC	1.4	
		2	AC	7.6	
		3	GB	6.9	
		4	GS	24.2	
		5	SS		BR > 5 ft (LTTP boring log and Soil Conservation Service reports)
341031	4	1	AC	1.8	
		2	AC	5.5	
		3	GB	11	
		4	SS		BR > 7 ft (Soil Conservation Service reports)
341033	5	1	AC	1.2	
		2	ATB	6.2	
		3	GS	13.8	
		4	SS	120	
		5	BR		BR = 10 ft from top of subgrade (LTTP database)
341034	3	1	AC	2.5	
		2	AC	8.6	
		3	SS		BR > 4.5 ft (LTTP boring log)
350101	3	1	AC	7.2	
		2	GB	8.6	
		3	SS		
350102	3	1	AC	4.8	
		2	GB	12.2	
		3	SS		
350103	3	1	AC	5.3	
		2	ATB	7.2	
		3	SS		
350104	3	1	AC	8.1	
		2	ATB	11.1	
		3	SS		
350105	4	1	AC	5.9	
		2	ATB	4	
		3	GB	3.7	
		4	SS		
350106	4	1	AC	7.6	
		2	ATB	8	
		3	GB	2.9	
		4	SS		
351005	3	1	AC	8.9	AC surface layer combined with AC layer beneath
		2	GB	8.3	
		3	SS		BR = 1500 ft (USGS)
351022	3	1	AC	6.3	AC surface layer combined with AC layer beneath
		2	GB	10.8	
		3	SS		BR = 1377 ft (USGS)
351112	3	1	AC	6.3	
		2	GB	6	
		3	SS		BR = Infinite (Harold Von Quintus Report)
371006	4	1	AC	2	
		2	AC	6.5	
		3	GB	9.4	
		4	SS		BR = 50 ft (Harold Von Quintus Report)

Table 4 (Cont'd) Pavement Structure

Section	No. of Layers	Layer Number	Layer Type[1]	Representative Thickness (in)	Comments
371024	3	1	AC	4.8	
		2	GB	12	
		3	SS		BR = Infinite (Harold Von Quintus Report)
371802	4	1	AC	2.2	
		2	AC	2.3	
		3	GB	8.2	
		4	SS		BR = Infinite (Harold Von Quintus Report)
371817	4	1	AC	2.2	
		2	AC	2.1	
		3	GB	12	
		4	SS		BR > 6.5 ft (LTTP boring log)
371992	4	1	AC	2.4	
		2	GB	12	
		3	GS	24	
		4	SS		BR = Infinite (Harold Von Quintus Report)

404087	4	1	AC	2.2	
		2	ATB	7.9	
		3	TS	6	
		4	SS		BR > 14 ft (LTTP boring log)
404163	3	1	AC	2.6	
		2	AC	8.9	
		3	SS		BR = Infinite (Harold Von Quintus Report)
404165	3	1	AC	2.7	
		2	AC	5.4	
		3	SS		BR = Infinite (Harold Von Quintus Report)
421599	5	1	AC	3	
		2	AC	9.3	
		3	GB	12	
		4	SS	300	
		5	BR		BR = 25 ft from top of subgrade (Harold Von Quintus Report)
451011	3	1	AC	3.2	AC surface layer combined with AC layer beneath
		2	GB	10.1	
		3	SS		BR > 14 ft (LTTP boring log)
473104	4	1	AC	1.3	
		2	GB	8.7	
		3	SS	300	
		4	BR		BR = 25 ft from top of subgrade (Harold Von Quintus Report)
480001	5	1	AC	1.2	LTPP data shows 1.0"
		2	AC	1.4	
		3	GB	14.7	
		4	SS	300	
		5	BR		BR = 25 ft from top of subgrade (Harold Von Quintus Report)
481060	5	1	AC	1.7	
		2	AC	5.8	
		3	GB	12.3	
		4	TS	6	
		5	SS		BR = 50 ft (Harold Von Quintus Report)
481077	4	1	AC	1.4	
		2	AC	3.7	
		3	GB	10.4	
		4	SS		BR = Infinite (Harold Von Quintus Report)
481109	3	1	AC	1.1	LTPP: AC thickness=0.9 in. Software limitation for thickness < 1 in.
		2	AC	5.4	
		3	SS		BR = Infinite (Harold Von Quintus Report)
481130	4	1	AC	2.7	AC surface layer combined with AC layer beneath
		2	GB	17.9	
		3	TS	8	
		4	SS		BR > 10 ft (LTTP boring log)
481169	4	1	AC	1.1	
		2	GB	11.3	
		3	SS	240	
		4	BR		BR = 20 ft from top of subgrade (Harold Von Quintus Report)

Table 4 (Cont'd) Pavement Structure

Section	No. of Layers	Layer Number	Layer Type[1]	Representative Thickness (in)	Comments
481174	4	1	AC	1.4	
		2	AC	3.3	
		3	GB	13.2	
		4	SS		BR = Infinite (Harold Von Quintus Report)
481178	5	1	AC	2.1	
		2	AC	6.4	
		3	GB	10.8	
		4	TS	4.5	
		5	SS		BR = 50 ft (Harold Von Quintus Report)
481183	3	1	AC	5.7	AC surface layers combined with AC layer beneath
		2	GB	8.4	
		3	SS		BR > 15.5 ft (LTTP boring log)
483749	4	1	AC	1.8	
		2	GB	8.1	
		3	TS	8.8	
		4	SS		
489005	4	1	AC	1.15	
		2	GB	9.4	
		3	SS	300	
		4	BR		BR = 25 ft from top of subgrade (Harold Von Quintus Report)

501002	4	1	AC	3	
		2	AC	5.5	
		3	GB	25.8	
		4	SS		BR = Infinite (Harold Von Quintus Report)
501004	5	1	AC	3	
		2	AC	5	
		3	GB	24.3	
		4	GS	22.8	
		5	SS		BR = 50 ft (Harold Von Quintus Report)
511002	5	1	AC	1.4	
		2	AC	4.3	
		3	GB	7.7	
		4	SS	72	
		5	BR		BR = 6 ft (Harold Von Quintus Report)
511023	5	1	AC	2.5	
		2	AC	7.6	
		3	GB	5.6	
		4	TS	8.4	
		5	SS		BR > 50 ft (Harold Von Quintus Report)
512021	5	1	AC	1.3	
		2	AC	6.2	
		3	GB	3.6	
		4	SS	200	
		5	BR		BR = 16.7 ft from top of subgrade (Harold Von Quintus Report)
531008	4	1	AC	3.4	
		2	GB	3.1	
		3	GS	9.8	
		4	SS		BR > 6.5 ft (LTTP boring log)
531801	5	1	AC	4.5	
		2	AC	4.7	
		3	GB	3.7	
		4	SS	48	
		5	BR		BR = 5.1 ft (LTTP boring log - refusal)
561007	3	1	AC	2.8	
		2	GB	6.2	
		3	SS		BR = Infinite (Harold Von Quintus Report)
841684	5	1	AC	1.3	
		2	AC	3.7	
		3	GB	3.3	
		4	GS	21.4	
		5	SS		BR > 6.5 ft (LTTP boring log)

[1] AC=Asphalt Concrete; GB=Granular Base; ATB=Asphalt Treated Base; GS=Granular Subbase; TS= Treated Subbase; SS=Subgrade; BR=Bedrock

Table 5 Aggregate Gradation for Asphalt Mixtures

Section	Layer Number	Layer Type[1]	% Retained 3/4" Sieve	% Retained 3/8" Sieve	%Retained #4 Sieve	% Passing #200 Sieve
011001	1	AC	8	33	52	0.1
	2	AC	5.0	35.0	54.0	7.8
011019	1	AC	0.0	12.0	36.0	4.0
	2	AC	7.0	30.0	57.5	4.0
	3	AC	11.5	35.0	52.5	2.7
014126	1	AC	0.0	21.0	43.0	5.8
	2	AC	14.0	43.5	53.0	5.2
021001	1	AC	0.5	28.0	51.0	9.3
021002	1	AC	4.0	28.5	49.5	8.2
040113	1	AC	1.8	21.5	39.8	6.3
040114	1	AC	1.8	21.5	39.8	6.3
040115	1	AC	1.0	18.0	36.0	3.9
	2	AC	9.0	27.0	43.0	4.0
040116	1	AC	1.8	21.5	39.8	6.3
	2	ATB	12.0	28.0	44.0	4.0
040117	1	AC	1.8	21.5	39.8	6.3
	2	ATB	14.3	30.8	46.3	3.8
040118	1	AC	1.8	21.5	39.8	6.3
	2	ATB	14.3	30.8	46.3	3.8
041007	1	AC	9.0	38.5	45.5	4.2
041016	1	AC	3.5	33.0	44.0	5.9
041024	1	AC	5.0	33.0	54.0	7.1
081029	1	AC	0.0	20.5	42.5	5.0

081047	1	AC	0.0	27.0	47.5	6.6
081053	1	AC	0.0	18.0	43.5	6.6
091803	1	AC	0.0	33.0	48.0	4.8
	2	AC	21.5	45.5	56.5	5.4
120103	1	AC	0.0	9.7	32.7	3.2
	2	AC	1.0	23.0	38.7	3.3
	3	ATB	2.0	27.0	41.7	2.5
120104	1	AC	0.0	9.7	32.7	3.2
	2	AC	1.0	23.0	40.0	3.2
	3	ATB	2.0	27.0	41.7	2.5
120105	1	AC	0.0	9.7	32.7	3.2
	2	AC	1.0	23.0	38.7	3.3
	3	ATB	2.0	27.0	41.7	2.5
120106	1	AC	0.0	9.7	32.7	3.2
	2	AC	1.0	23.0	38.7	3.3
	3	ATB	2.0	27.0	41.7	2.5
123995	1	AC	0.0	7.5	39.0	4.8
123997	1	AC	0.0	7.5	35.0	4.1
124105	1	AC	0.0	12.5	39.5	3.0
124106	1	AC	0.0	16.5	40.5	3.8
124107	1	AC	0.0	8.0	34.0	4.8
124108	1	AC	0.0	10.5	35.0	5.0
	2	ATB	4.5	23.5	36.0	5.3
124135	1	AC	0.0	0.0	31.0	4.6
131031	1	AC	3.5	22.5	40.5	7.1
	2	AC	12.5	31.0	52.5	7.0
134111	1	AC	16.5	43.0	55.0	7.5
134112	1	AC	0.9	41.5	55.8	3.5
	2	ATB	16.0	49.4	56.3	3.3
134113	1	AC	1.5	37.5	54.0	3.7
	2	ATB	26.5	53.5	60.5	3.9
134119	1	AC	4.0	25.5	29.5	9.5
	2	AC	28.0	37.0	48.5	8.5
161001	1	AC	0.0	0.0	25.0	9.2
161009	1	AC	0.0	10.5	40.0	6.3
	2	AC	0.0	9.5	38.5	6.4
161021	1	AC	0.0	8.0	28.0	6.6
169034	1	AC	0.5	17.0	34.5	8.0
	2	AC	0.5	19.0	36.0	8.3

Table 5 (Cont'd) Aggregate Gradation for Asphalt Mixtures

Section	Layer Number	Layer Type[1]	% Retained 3/4" Sieve	% Retained 3/8" Sieve	%Retained #4 Sieve	% Passing #200 Sieve
201009	1	AC	0.0	16.5	34.5	8.0
	2	AC	0.0	15.5	34.0	7.5
251003	1	AC	0.0	16.0	44.5	5.7
	2	AC	4.0	43.5	59.5	3.1
251004	1	AC	0.0	11.0	43.5	5.4
	2	AC	29.5	50.0	66.5	5.2
261001	1	AC	0.0	22.0	43.5	6.9
261004	1	AC	0.5	13.0	30.0	7.0
271018	1	AC	0.0	15.5	30.5	3.3
	2	AC	0.0	13.5	27.5	2.7
271087	1	AC	7.5	26.0	39.5	6.7
291008	1	AC	0.0	10.0	46.0	6.2
	2	AC	4.0	31.5	54.0	9.6
307088	1	AC	0.0	20.0	37.0	8.0
308129	1	AC	0.0	19.5	40.0	7.4
321020	1	AC	3.0	19.0	37.0	7.3
341003	1	AC	0.0	5.5	33.0	6.8
	2	AC	11.5	42.5	55.5	4.1
341011	1	AC	0.0	1.0	17.5	9.5
	2	AC	7.0	34.5	50.0	9.1
341031	1	AC	0.0	3.5	37.0	4.2
	2	AC	11.0	43.5	56.5	5.2
341033	1	AC	1.0	9.5	34.5	8.5
	2	ATB	7.0	32.0	53.0	6.0
341034	1	AC	0.0	9.5	38.5	5.3
	2	AC	4.0	30.5	52.5	5.8
350101	1	AC	2.0	23.0	43.0	5.5

350102	1	AC	4.0	25.3	44.3	5.4
350103	1	AC	4.0	25.3	44.3	5.4
	2	ATB	5.3	35.5	61.3	3.3
350104	1	AC	4.0	25.3	44.3	5.4
	2	ATB	5.3	35.5	61.3	3.3
350105	1	AC	5.0	29.0	47.0	5.2
	2	ATB	8.0	57.5	92.0	1.5
350106	1	AC	4.0	25.3	44.3	5.4
	2	ATB	5.3	35.5	61.3	3.3
351005	1	AC	0.0	20.0	39.0	6.1
351022	1	AC	0.0	16.5	36.5	8.0
351112	1	AC	0.0	20.0	36.5	7.8
371006	1	AC	0.0	1.5	26.0	6.0
	2	AC	18.0	50.0	60.5	4.0
371024	1	AC	5.0	38.5	53.0	5.2
371802	1	AC	0.0	3.0	20.0	7.5
	2	AC	5.0	34.0	49.0	5.0
371817	1	AC	0.0	6.0	34.5	6.9
	2	AC	1.0	29.0	54.0	4.5
371992	1	AC	0.0	4.0	31.0	7.1
404087	1	AC	0.0	15.0	34.0	7.3
	2	ATB	12.0	29.5	38.5	7.8
404163	1	AC	0.0	11.3	46.9	6.5
	2	AC	14.4	43.7	51.7	6.3
404165	1	AC	0.0	5.9	27.5	7.2
	2	AC	9.5	57.0	52.0	5.4
421599	1	AC	0.0	1.5	37.5	6.6
	2	AC	22.0	51.0	77.0	4.5
451011	1	AC	1.0	36.5	57.0	6.7
473104	1	AC	0.0	22.0	35.0	9.2
480001	1	AC	0.0	9.0	39.0	2.0
	2	AC	0.0	9.0	39.0	2.0
481060	1	AC	0.0	5.0	35.0	5.8
	2	AC	21.5	36.0	47.0	6.9
481077	1	AC	0.0	3.0	46.0	4.0
	2	AC	22.0	32.0	43.0	7.0

Table 5 (Cont'd) Aggregate Gradation for Asphalt Mixtures

Section	Layer Number	Layer Type[1]	% Retained 3/4" Sieve	% Retained 3/8" Sieve	%Retained #4 Sieve	% Passing #200 Sieve
481109	1	AC	7.5	24.0	40.0	4.4
	2	AC	0.0	7.0	31.0	2.0
481130	1	AC	0.0	3.5	43.0	5.0
481169	1	AC	0.0	0.0	38.0	4.0
481174	1	AC	0.0	21.9	38.6	3.0
	2	AC	17.5	31.5	45.5	7.5
481178	1	AC	0.0	2.0	31.5	9.8
	2	AC	2.0	25.5	42.0	10.1
481183	1	AC	19.0	41.5	58.5	6.9
483749	1	AC	0.0	2.5	32.0	5.1
489005	1	AC	0.0	7.0	34.0	4.0
501002	1	AC	0.5	21.0	41.5	3.7
	2	AC	25.5	47.5	63.5	2.9
501004	1	AC	0.0	10.5	36.5	5.1
	2	AC	35.0	64.0	69.5	2.8
511002	1	AC	0.0	10.0	37.5	8.5
	2	AC	24.0	44.5	54.0	6.2
511023	1	AC	0.5	17.0	42.5	5.7
	2	AC	19.0	50.5	63.0	4.0
512021	1	AC	0.0	6.5	24.5	7.5
	2	AC	0.0	27.5	46.0	2.5
531008	1	AC	0.0	14.0	39.0	6.9
531801	1	AC	0.5	18.0	39.5	7.3
	2	AC	1.5	20.5	39.5	5.3
561007	1	AC	0.5	15.5	40.0	6.7
841684	1	AC	0.0	5.0	30.0	4.4
	2	AC	12.5	39.0	54.0	5.0

[1] AC=Asphalt Concrete; ATB=Asphalt Treated Base

Table 6 Effective Binder Content

Section	Layer Number	Layer Type[1]	Pb (%)	Gb	Gmb	Gmm	Gsb	Gse	Vbe (%)
011001	1	AC	6.20	1.028	2.365	2.450	2.682	2.697	13.82
	2	AC	4.50	1.028	2.360	2.523	2.670	2.709	9.13
011019[2]	1	AC	5.80	1.028	-	-	2.590	-	11.60[4]
	2	AC	4.00	1.028	2.281	2.493	-	2.650	8.00[4]
	3	AC	3.85	1.028	2.191	2.454	2.590	2.598	7.94
014126	1	AC	5.30	1.033	2.196	2.327	2.634	2.502	15.42
	2	AC	3.40	1.033	2.345	2.523	2.666	2.658	7.98
021001[2]	1	AC	6.15	1.014	2.238	2.436	2.630	2.682	12.03
021002	1	AC	6.35	1.014	2.396	2.461	2.722	2.724	14.94
040113	1	AC	4.25	1.040	2.288	2.520	2.653	2.690	8.21
040114	1	AC	4.25	1.040	2.218	2.520	2.653	2.690	7.96
040115[2]	1	AC	4.30	1.038	2.200	2.500	-	2.669	8.60[4]
	2	AC	4.80	1.039	2.308	2.508	-	2.701	9.60[4]
040116	1	AC	4.25	1.040	2.251	2.520	2.653	2.690	8.08
	2	ATB	4.70	1.039	2.304	2.513	2.649	2.702	8.79
040117	1	AC	4.25	1.040	2.260	2.520	2.653	2.690	8.11
	2	ATB	4.53	1.041	2.308	2.512	2.651	2.693	8.74
040118	1	AC	4.25	1.040	2.226	2.520	2.653	2.690	7.99
	2	ATB	4.53	1.041	2.346	2.512	2.651	2.693	8.89
041007	1	AC	5.60	1.015	2.402	2.403	2.609	2.615	13.05
041016	1	AC	5.85	1.012	2.333	2.368	2.559	2.582	12.71
041024[2]	1	AC	4.20	1.012	2.304	2.589	2.704	2.778	7.38
081029	1	AC	5.15	1.021	2.374	2.449	2.668	2.650	12.54
081047	1	AC	5.25	1.036	2.330	2.377	2.625	2.560	13.94
081053[2]	1	AC	6.00	1.040	2.267	2.412	-	2.634	12.00[4]
091803[2]	1	AC	4.95	1.010	2.297	2.552	-	2.772	9.90[4]
	2	AC	3.55	1.010	2.300	2.527	-	2.675	7.10[4]
120103	1	AC	6.17	1.040	2.197	2.353	2.523	2.565	11.66
	2	AC	5.27	1.042	2.299	2.373	2.520	2.555	10.44
	3	ATB	6.07	1.045	2.242	2.359	2.524	2.567	11.62
120104	1	AC	6.17	1.042	2.258	2.353	2.523	2.565	11.98
	2	AC	5.20	1.042	2.261	2.372	2.518	2.551	10.19
	3	ATB	6.07	1.045	2.226	2.359	2.524	2.567	11.54
120105	1	AC	6.17	1.040	2.206	2.353	2.523	2.565	11.71
	2	AC	5.27	1.042	2.238	2.373	2.520	2.555	10.16
	3	ATB	6.07	1.045	2.239	2.359	2.524	2.567	11.60
120106	1	AC	6.17	1.040	2.171	2.353	2.523	2.565	11.52
	2	AC	5.27	1.042	2.249	2.373	2.520	2.555	10.21
	3	ATB	6.07	1.045	2.244	2.359	2.524	2.567	11.63
123995	1	AC	5.60	1.030	2.214	2.371	2.489	2.569	9.43
123997[2]	1	AC	6.80	1.030	2.071	2.305	2.440	2.533	10.76
124105	1	AC	5.55	1.030	2.203	2.341	2.430	2.530	8.50
124106[2]	1	AC	6.25	1.030	2.068	2.321	2.412	2.532	8.74
124107	1	AC	6.60	1.030	2.226	2.305	2.426	2.525	10.89
124108	1	AC	5.80	1.030	2.385	2.444	2.650	2.670	12.81
	2	ATB	4.95	1.030	2.268	2.491	2.660	2.689	10.02
124135	1	AC	6.80	1.020	2.285	2.329	2.456	2.570	11.40
131031[2]	1	AC	5.40	1.034	2.187	2.455	2.634	2.664	10.54
	2	AC	4.65	1.034	2.327	2.528	2.650	2.719	8.34
134111	1	AC	4.85	1.034	2.380	2.519	2.680	2.718	9.98
134112	1	AC	5.68	1.034	2.359	2.409	2.654	2.618	14.09
	2	ATB	4.80	1.034	2.305	2.449	2.654	2.630	11.45
134113	1	AC	5.35	1.034	2.368	2.431	2.654	2.632	12.97
	2	ATB	4.15	1.034	2.335	2.465	2.654	2.623	10.38
134119[2]	1	AC	5.60	1.037	2.266	2.538	-	2.776	11.20[4]
	2	AC	4.75	1.037	2.307	2.551	-	2.751	9.50[4]
161001	1	AC	6.25	1.024	2.356	2.434	2.540	2.679	9.86
161009[2]	1	AC	5.20	1.025	2.197	2.338	2.618	2.514	14.44
	2	AC	5.05	1.031	2.156	2.332	2.591	2.500	13.44
161021[2]	1	AC	5.55	1.045	2.144	2.317	2.610	2.495	14.95
169034[2]	1	AC	5.80	1.045	2.259	2.447	2.610	2.667	10.80
	2	AC	6.05	1.045	2.283	2.446	-	2.677	12.10[4]

Table 6 (Cont'd) Effective Binder Content

Section	Layer Number	Layer Type[1]	Pb (%)	Gb	Gmb	Gmm	Gsb	Gse	Vbe (%)
201009	1	AC	4.50	1.018	2.328	2.430	2.600	2.599	10.31
	2	AC	4.55	1.018	2.298	2.428	2.600	2.600	10.28
251003	1	AC	6.00	1.026	2.384	2.442	2.650	2.678	13.06
	2	AC	4.10	1.026	2.345	2.534	2.650	2.704	7.68
251004	1	AC	6.00	1.026	2.544	2.585	2.850	2.862	14.52
	2	AC	4.40	1.026	2.513	2.645	2.850	2.852	10.71
261001	1	AC	5.10	1.024	2.391	2.447	2.690	2.644	13.38
261004	1	AC	5.05	1.014	2.362	2.489	2.695	2.698	11.68
271018[2]	1	AC	5.55	1.022	2.251	2.455	-	2.675	11.10[4]
	2	AC	4.70	1.023	2.202	2.503	-	2.695	9.40[4]
271087	1	AC	4.65	1.020	2.369	2.531	2.770	2.727	12.07
291008	1	AC	4.15	1.017	2.449	2.484	2.635	2.649	9.51
	2	AC	4.20	1.017	2.385	2.477	2.635	2.643	9.59
307088	1	AC	5.70	1.021	2.407	2.412	2.709	2.628	16.01
308129[2]	1	AC	5.80	1.029	2.253	2.408	2.590	2.625	11.62
321020	1	AC	4.65	1.010	2.380	2.467	2.640	2.653	10.53
341003	1	AC	5.80	1.025	2.381	2.485	2.680	2.723	12.14
	2	AC	4.40	1.025	2.425	2.542	2.691	2.728	9.25
341011	1	AC	5.70	1.029	2.516	2.600	2.922	2.864	15.59
	2	AC	4.00	1.025	2.600	2.673	2.913	2.865	11.58
341031	1	AC	5.00	1.025	2.452	2.570	2.785	2.791	11.79
	2	AC	4.15	1.025	2.507	2.566	2.852	2.745	13.45
341033	1	AC	5.93	1.025	2.583	2.626	2.972	2.912	16.63
	2	ATB	4.50	1.025	2.579	2.713	2.953	2.941	11.67
341034	1	AC	5.40	1.020	2.393	2.483	2.677	2.704	11.81
	2	AC	4.80	1.020	2.426	2.528	2.672	2.731	9.54
350101	1	AC	4.80	1.001	2.205	2.390	2.530	2.570	9.29
350102	1	AC	4.80	1.002	2.237	2.395	2.530	2.576	9.22
350103	1	AC	4.80	1.000	2.219	2.395	2.530	2.577	9.14
	2	ATB	3.53	1.004	2.231	2.422	2.530	2.555	7.04
350104	1	AC	4.80	1.002	2.250	2.395	2.530	2.576	9.27
	2	ATB	3.53	1.004	2.249	2.422	2.530	2.555	7.10
350105	1	AC	4.80	1.004	2.194	2.394	2.530	2.574	9.09
	2	ATB	2.30	1.004	2.231	2.422	2.530	2.506	5.95
350106	1	AC	4.80	1.000	2.249	2.395	2.530	2.577	9.26
	2	ATB	3.53	1.004	2.245	2.422	2.530	2.555	7.08
351005	1	AC	5.30	1.015	2.357	2.415	2.640	2.616	13.07
351022	1	AC	5.55	1.015	2.349	2.444	2.653	2.664	12.49
351112[2]	1	AC	5.05	1.015	2.310	2.577	-	2.807	10.10[4]
371006[2]	1	AC	5.75	1.010	2.147	2.440	2.657	2.671	11.83
	2	AC	4.05	1.010	2.238	2.462	2.652	2.620	9.95
371024[2]	1	AC	5.10	1.010	2.288	2.515	2.821	2.733	14.02
371802[2]	1	AC	6.35	1.010	2.080	2.361	2.660	2.596	14.87
	2	AC	4.80	1.010	2.215	2.467	2.660	2.660	10.53
371817	1	AC	6.00	1.010	2.332	2.514	2.755	2.777	13.21
	2	AC	5.50	1.010	2.395	2.490	2.754	2.722	14.02
371992[2]	1	AC	6.00	1.010	2.254	2.504	2.729	2.765	12.38
404087	1	AC	4.75	0.995	2.391	2.496	2.710	2.698	11.77
	2	ATB	4.50	1.010	2.373	2.498	2.723	2.684	11.77
404163[2]	1	AC	4.83	1.015	2.330	2.489	-	2.687	9.65[4]
	2	AC	3.57	1.015	2.271	2.545	-	2.696	7.14[4]
404165[2]	1	AC	4.45	1.029	2.262	2.483	-	2.658	8.90[4]
	2	AC	3.88	1.029	2.260	2.530	-	2.689	7.77[4]
421599[2]	1	AC	7.00	1.024	2.246	2.552	2.739	2.875	11.75
	2	AC	3.95	1.024	2.294	2.588	2.754	2.761	8.65
451011	1	AC	4.40	1.032	2.391	2.488	2.717	2.660	11.99
473104[2]	1	AC	5.60	1.020	2.196	2.481	2.650	2.711	10.29
480001[2]	1	AC	5.00	1.026	2.153	2.392[3]	2.536	2.573	9.34
	2	AC	5.00	1.026	-	-	-	-	10.00[4]
481060	1	AC	4.80	1.029	2.262	2.426	2.482	2.604	6.48
	2	AC	4.00	1.029	2.354	2.454	2.532	2.604	6.67

Table 6 (Cont'd) Effective Binder Content

Section	Layer Number	Layer Type[1]	Pb (%)	Gb	Gmb	Gmm	Gsb	Gse	Vbe (%)
481077[2]	1	AC	4.80	0.985	2.249	2.443	-	2.640	9.60[4]
	2	AC	4.35	0.985	2.303	2.450	2.614	2.628	9.73
481109[2]	1	AC	4.60	1.027	2.218	2.436	-	2.608	9.20[4]
	2	AC	5.00	1.032	2.138	2.349[3]	2.610	2.518	13.20
481130	1	AC	4.40	0.990	2.287	2.457	2.651	2.636	10.63
481169[2]	1	AC	5.00	1.028	-	-	-	-	10.00[4]
481174[2]	1	AC	5.30	1.010	-	-	-	-	10.60[4]
	2	AC	6.25	1.010	1.914	2.213	-	2.403	12.50[4]
481178	1	AC	5.75	1.027	2.251	2.425	2.690	2.644	13.98
	2	AC	5.55	1.027	2.259	2.378	2.690	2.577	15.70
481183	1	AC	5.45	1.025	2.195	2.329	2.607	2.513	14.66
483749	1	AC	6.00	1.028	2.121	2.266	2.402	2.454	10.62
489005[2]	1	AC	4.70	1.024	2.162	2.402[3]	-	2.573	9.40[4]
501002[2]	1	AC	5.70	1.022	2.281	2.508	-	2.749	11.40[4]
	2	AC	5.85	1.022	2.357	2.507	-	2.756	11.70[4]
501004[2]	1	AC	6.10	1.023	2.290	2.436	-	2.676	12.20[4]
	2	AC	4.65	1.022	2.326	2.474	-	2.658	9.30[4]
511002	1	AC	5.95	1.010	2.338	2.456	2.664	2.701	12.65
	2	AC	3.80	1.010	2.484	2.597	2.806	2.769	10.49
511023	1	AC	6.05	1.018	2.399	2.421	2.649	2.657	14.01
	2	AC	4.80	1.025	2.407	2.459	2.750	2.646	14.56
512021[2]	1	AC	5.65	1.020	2.205	2.445	2.638	2.668	11.34
	2	AC	4.95	1.023	2.195	2.439[3]	2.622	2.629	10.43
531008	1	AC	5.80	1.010	2.389	2.506	2.745	2.757	13.37
531801	1	AC	5.50	1.010	2.315	2.425	2.684	2.640	13.96
	2	AC	5.40	1.010	2.378	2.425	2.684	2.636	14.25
561007[2]	1	AC	6.85	1.025	2.147	2.360	2.540	2.609	12.26
841684	1	AC	7.10	1.010	2.413	2.489	2.787	2.802	16.53
	2	AC	5.60	1.010	2.493	2.558	2.784	2.813	12.94

[1] AC=Asphalt Concrete; ATB=Asphalt Treated Base
[2] Section for which *Gmb* was calculated from Equation (3)
[3] *Gmm* values from the INVENTORY LTPP Table
[4] *Vbe* calculated from correlation with *Pb* - Equation (4)

Table 7 Original Air voids and Total Unit Weight

Section	Layer Number	Layer Type	Air Voids at Age = t (%)	Age t (months)	Maat (°F)	Original Viscosity @ 77 °F (MPoises)	Original Air Voids (%)	Total Unit Weight (pcf)
011001	1	AC	3.47	108.36	64.91	1.36	8.92	147.26
	2	AC	6.41	108.36	64.91	1.36	10.19	147.26
011019[2]	1	AC	-	-	65.50	1.89	8.00	150.00
	2	AC	3.77	96.00	65.54	1.89	8.51	150.00
	3	AC	7.10	96.00	65.50	1.89	10.74	142.00
014126	1	AC	5.63	29.76	59.77	1.36	9.16	137.03
	2	AC	7.06	29.76	59.77	1.36	11.23	146.33
021001[2]	1	AC	1.64	132.00	37.03	0.33	8.11	149.00
021002	1	AC	2.64	29.53	37.40	0.22	7.30	149.48
040113[1]	1	AC	-	-	-	-	9.77	142.77
040114[1]	1	AC	-	-	-	-	9.77	138.40
040115[2]	1	AC	9.21	12.00	60.90	11.97	12.00	142.00
	2	AC	5.93	12.00	60.90	3.30	7.97	147.00
040116[1]	1	AC	-	-	-	-	9.77	140.43
	2	ATB	-	-	-	-	8.32	143.77
040117[1]	1	AC	-	-	-	-	9.77	141.00
	2	ATB	-	-	-	-	6.97	144.02
040118[1]	1	AC	-	-	-	-	9.77	138.89
	2	ATB	-	-	-	-	6.97	146.40
041007	1	AC	0.04	131.52	72.01	1.36	6.00	149.89
041016	1	AC	1.46	0.24	64.10	0.42	6.00	145.57
041024[2]	1	AC	6.77	204.00	53.30	0.93	11.00	151.00
081029	1	AC	3.07	205.80	42.86	0.62	8.07	148.13
081047	1	AC	1.98	83.80	47.51	0.76	6.33	145.36
081053[2]	1	AC	1.72	120.00	50.97	1.51	6.00	148.00
091803[2]	1	AC	6.29	108.00	50.50	2.28	9.96	149.00
	2	AC	0.23	108.00	50.50	2.28	9.00	157.00
120103[1]	1	AC	-	-	-	-	4.02	139.46
	2	AC	-	-	-	-	5.84	139.15
	3	ATB	-	-	-	-	4.68	145.39
120104[1]	1	AC	-	-	-	-	4.02	139.46
	2	AC	-	-	-	-	4.67	139.15
	3	ATB	-	-	-	-	4.68	139.34
120105[1]	1	AC	-	-	-	-	4.02	139.46
	2	AC	-	-	-	-	5.84	139.15
	3	ATB	-	-	-	-	4.68	139.34
120106[1]	1	AC	-	-	-	-	4.02	139.46
	2	AC	-	-	-	-	5.84	139.15
	3	ATB	-	-	-	-	4.68	139.34
123995	1	AC	6.60	168.00	75.06	1.36	10.34	138.16
123997[2]	1	AC	2.48	240.00	69.31	1.29	10.12	140.00
124105	1	AC	5.90	69.12	69.10	1.36	9.60	137.44
124106[2]	1	AC	6.09	84.00	74.85	3.01	10.87	136.00
124107	1	AC	3.43	74.16	73.42	1.36	7.73	138.87
124108	1	AC	2.40	41.52	66.49	1.36	6.02	148.84
	2	ATB	8.93	41.52		1.36	12.00	141.52
124135	1	AC	1.90	226.32	72.69	2.24	6.43	142.56
131031[2]	1	AC	3.41	156.00	58.62	1.04	10.91	148.00
	2	AC	3.90	156.00	58.62	1.04	7.94	152.00
134111	1	AC	5.52	100.32	62.19	1.36	9.31	148.51
134112	1	AC	2.06	147.60	67.72	1.36	6.54	147.20
	2	ATB	5.86	147.60	67.72	1.36	9.65	143.84
134113	1	AC	2.59	147.60	67.73	1.36	7.97	147.74
	2	ATB	5.30	147.60	67.73	1.36	9.08	145.69
134119[2]	1	AC	3.76	192.00	59.77	2.21	10.68	152.00
	2	AC	5.88	192.00	59.80	2.21	9.53	150.00
161001	1	AC	3.17	192.96	47.56	1.33	10.75	147.04
161009[2]	1	AC	0.65	240.00	47.71	0.56	6.00	145.00
	2	AC	3.36	240.00	47.71	1.11	7.54	141.00
161021[2]	1	AC	1.08	108.00	44.49	0.27	7.47	143.00

Table 7 (Cont'd) Original Air voids and Total Unit Weight

Section	Layer Number	Layer Type	Air Voids at Age = t (%)	Age t (months)	Maat (°F)	Original Viscosity @ 77 °F (MPoises)	Original Air Voids (%)	Total Unit Weight (pcf)
169034[2]	1	AC	3.43	72.00	45.63	0.93	7.68	147.00
	2	AC	2.50	72.00	45.63	0.93	6.66	149.00
201009	1	AC	4.18	55.68	56.03	1.36	8.16	145.27
	2	AC	5.35	55.68	56.03	1.36	10.17	143.40
251003	1	AC	2.38	177.60	49.33	1.36	7.92	148.76
	2	AC	7.47	177.60	49.33	1.36	11.44	146.32
251004	1	AC	1.58	182.40	51.42	1.36	6.00	158.73
	2	AC	5.01	182.40	51.42	1.36	8.96	156.78
261001	1	AC	2.29	225.96	43.54	0.62	9.95	149.17
261004	1	AC	5.12	61.68	40.95	1.33	9.88	147.36
271018[2]	1	AC	2.18	180.00	43.32	0.62	8.29	150.00
	2	AC	9.95	180.00	43.30	0.53	12.00	141.00
271087	1	AC	6.38	124.20	45.40	1.33	10.39	147.83
291008	1	AC	1.41	42.00	57.64	2.24	6.00	152.82
	2	AC	3.71	42.00	57.64	2.24	6.41	148.79
307088	1	AC	0.21	95.76	47.15	0.62	6.00	150.20
308129[2]	1	AC	2.47	72.00	44.55	1.23	6.45	147.00
321020	1	AC	3.52	65.64	55.60	1.36	7.39	148.49
341003	1	AC	4.19	185.64	49.27	1.36	8.17	148.54
	2	AC	4.60	185.64	49.27	1.36	8.58	151.33
341011	1	AC	3.21	230.52	52.65	1.33	7.17	157.01
	2	AC	2.74	230.52	52.65	1.33	10.51	162.23
341031	1	AC	4.58	193.20	54.50	1.36	8.50	152.99
	2	AC	2.29	193.20	54.50	1.36	8.07	156.46
341033	1	AC	1.61	184.44	52.98	1.36	6.00	161.19
	2	ATB	4.93	184.44	52.98	1.36	8.87	160.92
341034	1	AC	3.63	44.28	54.98	1.36	6.78	149.31
	2	AC	4.04	44.28	54.98	1.36	7.43	151.35
350101[1]	1	AC	-	-	-	-	7.73	142.40
350102[1]	1	AC	-	-	-	-	7.86	142.40
350103[1]	1	AC	-	-	-	-	7.86	142.40
	2	ATB	-	-	-	-	6.98	141.21
350104[1]	1	AC	-	-	-	-	7.86	142.40
	2	ATB	-	-	-	-	6.98	141.21
350105[1]	1	AC	-	-	-	-	8.36	142.40
	2	ATB	-	-	-	-	6.98	141.21
350106[1]	1	AC	-	-	-	-	7.86	142.40
	2	ATB	-	-	-	-	6.98	141.21
351005	1	AC	2.40	69.60	52.57	1.33	6.23	147.06
351022	1	AC	3.87	33.48	49.79	1.33	6.68	146.60
351112[2]	1	AC	6.42	120.00	60.84	1.09	10.37	150.00
371006[2]	1	AC	11.23	144.00	60.30	1.26	12.00	135.00
	2	AC	5.18	144.00	60.30	1.26	9.06	146.00
371024[2]	1	AC	4.59	168.00	56.41	2.01	9.00	150.00
371802[2]	1	AC	4.62	108.00	58.20	1.06	11.92	141.00
	2	AC	6.22	108.00	58.20	1.06	10.20	144.00
371817	1	AC	7.24	60.36	58.82	1.36	10.98	145.49
	2	AC	3.82	60.36	58.82	1.36	7.76	149.42
371992[2]	1	AC	5.35	48.00	58.70	1.95	10.00	148.00
404087	1	AC	4.19	49.68	62.44	1.36	8.01	149.19
	2	ATB	4.99	49.68	62.44	1.36	9.34	148.10
404163[2]	1	AC	3.49	84.00	59.82	3.12	6.37	150.00
	2	AC	6.37	84.00	59.82	3.12	10.80	149.00
404165[2]	1	AC	5.26	120.00	58.70	2.07	8.92	147.00
	2	AC	7.03	120.00	58.70	2.07	10.69	147.00
421599[2]	1	AC	8.69	84.00	45.29	1.68	12.00	145.00
	2	AC	5.50	84.00	45.29	1.68	11.34	153.00
451011	1	AC	3.89	63.12	66.20	1.36	8.09	149.19
473104[2]	1	AC	7.91	96.00	56.18	2.80	11.48	143.00
480001[2]	1	AC	-	-	-	1.84	10.00	134.50
	2	AC	-	-	-	1.84	9.00	134.50[4]

Table 7 (Cont'd) Original Air voids and Total Unit Weight

Section	Layer Number	Layer Type	Air Voids at Age = t (%)	Age t (months)	Maat (^{o}F)	Original Viscosity @ 77 ^{o}F (MPoises)	Original Air Voids (%)	Total Unit Weight (pcf)
481060	1	AC	6.76	48.12	70.96	1.36	10.39	141.14
	2	AC	4.14	48.12	70.96	1.36	7.95	146.89
481077[2]	1	AC	2.35	144.00	61.44	0.68	7.93	149.00
	2	AC	2.23	144.00	61.44	2.61	6.00	149.00
481109[2]	1	AC	4.87	120.00	67.50	3.37	8.92	145.00
	2	AC	-	-	67.50	3.37	9.00	143.00
481130	1	AC	6.89	220.20	68.03	0.76	11.09	142.72
481169[2]	1	AC	-	-	-	2.07	8.00	147.00
481174[2]	1	AC	-	-	-	0.80	9.00	147.00[4]
	2	AC	12.12	252.00	71.63	0.80	13.50	121.00
481178	1	AC	7.15	11.28	67.95	1.36	9.98	140.48
	2	AC	4.97	11.28	67.95	1.36	7.25	140.99
481183	1	AC	5.74	172.73	60.91	0.76	10.01	136.96
483749	1	AC	6.38	108.00	71.78	0.76	10.44	132.35
489005[2]	1	AC	-	-	-	0.63	10.00	139.00
501002[2]	1	AC	3.36	120.00	43.70	1.20	9.02	151.00
	2	AC	1.14	120.00	43.70	1.20	6.00	155.00
501004[2]	1	AC	1.64	120.00	45.89	1.92	6.00	150.00
	2	AC	1.72	120.00	45.89	1.26	6.00	152.00
511002	1	AC	4.80	114.38	52.04	1.36	8.71	145.89
	2	AC	4.36	114.38	52.04	1.36	11.02	154.98
511023	1	AC	0.92	100.44	58.49	1.36	6.00	149.68
	2	AC	2.14	100.44	58.49	1.36	6.00	150.17
512021[2]	1	AC	5.89	108.00	52.96	1.29	9.81	144.00
	2	AC	-	-	-	1.29	10.00	144.00
531008	1	AC	4.65	130.08	47.36	0.76	9.13	149.07
531801	1	AC	4.52	193.32	52.34	1.33	8.48	144.48
	2	AC	1.93	193.32	52.34	1.33	6.98	148.40
561007[2]	1	AC	1.67	168.00	45.16	0.77	9.00	145.00
841684	1	AC	3.03	141.48	41.70	0.62	9.70	150.57
	2	AC	2.54	141.48	41.70	0.62	8.29	155.53

[1] SPS sections - Original air voids extracted from the LTPP database
[2] Section for which the original viscosity at 77 ^{o}F was calculated from Equation (5)
[3] Section for which the original viscosity at 77 ^{o}F was calculated from Equation (6)
[4] Assumed value

Table 8 Asphalt Binder Grade Data

Section	Layer Num	Layer Type	Vis. Grade	Pen Grade	Pen 77 °F	Visc 140 °F (Poises)	Visc 275 °F (cStokes)	Comments
011001	1	AC	AC-20	-	79.0	1993.0	369.0	
	2	AC	AC-20	-	76.0	2043.0	375.0	
011019	1	AC	AC-20[1]	-	75.0	1997.0	400.0	Binder grade not available on LTPP database
	2	AC	AC-20[1]	-	75.0	1997.0	400.0	Binder grade not available on LTPP database
	3	AC	AC-20[1]	-	75.0	1997.0	400.0	Binder grade not available on LTPP database
014126	1	AC	AC-20	-	-	-	-	
	2	AC	AC-20	-	-	-	-	
021001	1	AC	AC-5[1]	-	163.0	436.0	172.0	Binder grade not available on LTPP database
021002	1	AC	AC-2.5	-	225.0	288.0	140.0	
040113	1	AC	AC-30	-	36.0	9761.0	699.8	
040114	1	AC	AC-30	-	36.0	9761.0	699.8	
040115	1	AC	AC-30[1]	-	33.0	10886.0	772.0	Binder grade not available on LTPP database
	2	AC	AC-30[1]	-	31.0	12161.0	779.0	Binder grade not available on LTPP database
040116	1	AC	AC-30	-	36.0	9761.0	699.8	
	2	ATB	AC-30	-	33.0	11788.0	696.0	
040117	1	AC	AC-30	-	36.0	9761.0	699.8	
	2	ATB	AC-30	-	32.0	11793.5	720.5	
040118	1	AC	AC-30	-	36.0	9761.0	699.8	
	2	ATB	AC-30	-	32.0	11793.5	720.5	
041007	1	AC	AC-20	-	-	-	-	
041016	1	AC	AC-5	-	-	-	-	LTPP database: AR-20
041024	1	AC	-	Pen 85-100[1]	103.0	944.0	-	Binder grade not available on LTPP database
081029	1	AC	-	Pen 120-150	-	-	-	
081047	1	AC	AC-10	-	84.0	913.0	247.0	
081053	1	AC	-	Pen 85-100[1]	83.0	870.0	240.0	Binder grade not available on LTPP database
091803	1	AC	-	Pen 60-70[1]	69.0	2052.0	-	Binder grade not available on LTPP database
	2	AC	-	Pen 60-70[1]	69.0	2052.0	-	Binder grade not available on LTPP database
120103	1	AC	AC-30	-	54.8	7083.4	716.3	
	2	AC	AC-30	-	41.7	14724.6	1063.3	
	3	ATB	AC-30	-	40.0	15313.6	1056.6	
120104	1	AC	AC-30	-	47.7	11059.3	924.6	
	2	AC	AC-30	-	42.0	16957.0	1148.0	
	3	ATB	AC-30	-	40.0	15313.6	1056.6	
120105	1	AC	AC-30	-	54.8	7083.4	716.3	
	2	AC	AC-30	-	41.7	14724.6	1063.3	
	3	ATB	AC-30	-	40.0	15313.6	1056.6	
120106	1	AC	AC-30	-	54.8	7083.4	716.3	
	2	AC	AC-30	-	41.7	14724.6	1063.3	
	3	ATB	AC-30	-	40.0	15313.7	1056.6	
123995	1	AC	AC-20	-	-	-	-	
123997	1	AC	-	Pen 85-100	89.0	1690.0	-	
124105	1	AC	AC-20	-	-	-	-	
124106	1	AC	AC-30	-	61.0	2964.0	510.0	
124107	1	AC	AC-20	-	-	-	-	
124108	1	AC	AC-20	-	-	-	-	
	2	ATB	AC-20	-	-	-	-	
124135	1	AC	-	Pen 60-70	-	2542.0	-	
131031	1	AC	AC-20	-	98.0	2286.0	423.0	
	2	AC	AC-20	-	98.0	2286.0	423.0	
134111	1	AC	AC-20	-	-	-	-	
134112	1	AC	AC-20	-	-	-	-	
	2	ATB	AC-20	-	-	-	-	
134113	1	AC	AC-20	-	-	-	-	
	2	ATB	AC-20	-	-	-	-	
134119	1	AC	AC-20	-	70.0	1900.0	380.0	
	2	AC	AC-20	-	70.0	1900.0	380.0	
161001	1	AC	-	Pen 85-100	-	-	-	
161009	1	AC	-	Pen 85-100	129.0	-	163.6	
	2	AC	-	Pen 120-150	95.0	-	197.2	
161021	1	AC	AC-5	-	180.0	525.0	193.0	

Table 8 (Cont'd) Asphalt Binder Grade Data

Section	Layer Num	Layer Type	Vis. Grade	Pen Grade	Pen 77 °F	Visc 140 °F (Poises)	Visc 275 °F (cStokes)	Comments
169034	1	AC	AC-10	-	103.0	1015.0	260.0	
	2	AC	AC-10	-	103.0	1015.0	260.0	
201009	1	AC	AC-20	-	-	-	-	LTPP database: VAC-20
	2	AC	AC-20	-	-	-	-	LTPP database: VAC-20
251003	1	AC	AC-20	-	-	-	-	
	2	AC	AC-20	-	-	-	-	
251004	1	AC	AC-20	-	-	-	-	
	2	AC	AC-20	-	-	-	-	
261001	1	AC	-	Pen 120-150	-	-	-	
261004	1	AC	-	Pen 85-100	-	-	-	
271018	1	AC	-	Pen 120-150	123.0	520.0	194.0	
	2	AC	-	Pen 120-150	132.0	719.0	251.0	
271087	1	AC	-	Pen 85-100	-	-	-	
291008	1	AC	-	Pen 60-70	-	-	-	
	2	AC	-	Pen 60-70	-	-	-	
307088	1	AC	-	Pen 120-150	122.0	-	-	
308129	1	AC	-	Pen 85-100	91.0	-	-	
321020	1	AC	AC-20	-	-	-	-	LTPP database: AR-80
341003	1	AC	AC-20	-	-	-	-	
	2	AC	AC-20	-	-	-	-	
341011	1	AC	-	Pen 85-100	-	-	-	
	2	AC	-	Pen 85-100	-	-	-	
341031	1	AC	AC-20	-	-	-	-	
	2	AC	AC-20	-	-	-	-	
341033	1	AC	AC-20	-	-	-	-	
	2	ATB	AC-20	-	-	-	-	
341034	1	AC	AC-20	-	-	-	-	
	2	AC	AC-20	-	-	-	-	
350101	1	AC	AC-20	-	56.0	2793.0	472.0	
350102	1	AC	AC-20	-	61.9	2566.0	462.6	
350103	1	AC	AC-20	-	68.0	2125.0	433.0	
	2	ATB	AC-20	-	53.8	2879.3	480.0	
350104	1	AC	AC-20	-	61.9	2566.0	462.6	
	2	ATB	AC-20	-	53.8	2879.3	480.0	
350105	1	AC	AC-20	-	56.0	2943.0	494.0	
	2	ATB	AC-20	-	53.8	2879.3	480.0	
350106	1	AC	AC-20	-	67.0	2566.0	462.6	
	2	ATB	AC-20	-	53.8	2879.3	480.0	
351005	1	AC	-	Pen 85-100	-	-	-	
351022	1	AC	-	Pen 85-100	-	-	-	
351112	1	AC	-	Pen 85-100	96.0	-	-	
371006	1	AC	AC-20	-	90.0	2082.0	475.3	
	2	AC	AC-20	-	90.0	2082.0	475.3	
371024	1	AC	AC-20	-	73.0	1788.0	414.0	
371802	1	AC	AC-20	-	97.0	2051.0	683.4	
	2	AC	AC-20	-	97.0	2051.0	683.4	
371817	1	AC	AC-20	-	-	-	-	
	2	AC	AC-20	-	-	-	-	
371992	1	AC	AC-20	-	74.0	1943.0	-	
404087	1	AC	AC-20	-	-	-	-	
	2	ATB	AC-20	-	-	-	-	
404163	1	AC	AC-20	-	60.0	1611.0	353.0	
	2	AC	AC-20	-	60.0	1611.0	353.0	
404165	1	AC	AC-20	-	72.0	2233.0	465.0	
	2	AC	AC-20	-	72.0	2233.0	-	
421599	1	AC	AC-20	-	79.0	2037.0	452.0	
	2	AC	AC-20	-	79.0	2037.0	452.0	
451011	1	AC	AC-20	-	-	-	-	
473104	1	AC	AC-20	-	63.0	1977.0	-	
480001	1	AC	AC-20	-	76.0	2139.0	510.0	
	2	AC	AC-20	-	76.0	2139.0	510.0	
481060	1	AC	AC-20	-	-	-	-	
	2	AC	AC-20	-	-	-	-	

Table 8 (Cont'd) Asphalt Binder Grade Data

Section	Layer Num	Layer Type	Vis. Grade	Pen Grade	Pen 77 °F	Visc 140 °F (Poises)	Visc 275 °F (cStokes)	Comments
481077	1	AC	AC-20	-	118.0	1016.0	590.0	
	2	AC	AC-20	-	65.0	2265.0	-	
481109	1	AC	AC-20	-	58.0	1800.0	310.0	
	2	AC	AC-20	-	58.0	1800.0	310.0	
481130	1	AC	AC-10	-	98.0	1008.0	250.0	
481169	1	AC	AC-20	-	72.0	1870.0	465.0	
481174	1	AC	AC-10	-	110.0	995.0	255.0	
	2	AC	AC-10	-	110.0	995.0	255.0	
481178	1	AC	AC-20	-	-	-	-	
	2	AC	AC-20	-	-	-	-	
481183	1	AC	AC-10	-	-	-	-	
483749	1	AC	AC-10	-	-	-	-	
489005	1	AC	AC-10	-	122.0	1107.0	280.0	
501002	1	AC	-	Pen 85-100	92.0	1144.0	308.0	
	2	AC	-	Pen 85-100	92.0	1144.0	308.0	
501004	1	AC	-	Pen 85-100	74.5	1159.0	311.0	
	2	AC	-	Pen 85-100	90.0	1159.0	311.0	
511002	1	AC	AC-20	-	89.0	1945.0	424.0	
	2	AC	AC-20	-	89.0	1945.0	424.0	
511023	1	AC	AC-20	-	-	-	-	
	2	AC	AC-20	-	-	-	-	
512021	1	AC	AC-20	-	89.0	1945.0	424.0	
	2	AC	AC-20	-	89.0	1945.0	424.0	
531008	1	AC	AC-10	-	83.0	3662.0	504.3	LTPP database: AR-40
531801	1	AC	-	Pen 85-100	-	-	-	
	2	AC	-	Pen 85-100	-	-	-	
561007	1	AC	AC-10	-	-	-	-	
841684	1	AC	-	Pen 150-200	-	-	-	
	2	AC	-	Pen 150-200	-	-	-	

[1] Binder grade inferred from viscosity at 140 °F

Table 9a Unbound Materials Data

Section	Layer Num	Layer Type[1]	Dry Thermal Conductivity (BTU/hr-ft-°F)	Heat Capacity (BTU/lb-°F)	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)	% Passing #200 Sieve	% Passing #4 Sieve	D_{60} (mm)
011001	3	GB	0.30	0.17	0	0	0	9.7	46.5	8.37
	4	GS	0.27	0.17	0	0	0	12.9	63.0	2.70
	5	SS	0.23	0.17	25	18	7	24.1	76.0	0.90
011019	4	GB	0.27	0.17	0	0	0	14.0	58.0	5.05
	5	SS	0.23	0.17	17	15	2	28.0	98.0	0.24
	6	BR	0.60	0.20	-	-	-	0.0	0.0	1.00
014126	3	GB	0.23	0.17	0	0	0	14.3	59.0	4.84
	4	SS	0.23	0.17	10.5	9.5	1	29.9	92.0	0.21
	5	BR	0.60	0.20	-	-	-	0.0	0.0	1.00
021001	2	GB	0.30	0.17	0	0	0	9.0	51.0	6.22
	3	SS	0.30	0.17	0	0	0	11.0	50.0	7.67
021002	2	GB	0.30	0.17	0	0	0	7.0	50.0	6.63
	3	GS	0.30	0.17	0	0	0	3.9	30.0	25.44
	4	SS	0.30	0.17	0	0	0	7.6	46.0	9.96
040113	2	GB	0.30	0.17	21	21	0	10.0	57.0	5.61
	3	SS	0.27	0.17	0	0	0	9.0	77.0	2.25
040114	2	GB	0.30	0.17	21	21	0	10.0	57.0	5.61
	3	SS	0.23	0.17	24	17	7	18.0	64.0	3.94
040115	3	SS	0.27	0.17	20	18	2	25.0	88.0	0.76
040116	3	SS	0.27	0.17	22	17.5	4.5	16.0	71.0	2.00
040117	3	GB	0.30	0.17	21	21	0	10.0	57.0	5.61
	4	SS	0.27	0.17	22	17.5	4.5	17.0	79.0	1.50
040118	3	GB	0.30	0.17	21	21	0	8.0	49.0	7.14
	4	SS	0.22	0.17	28	15	13	31.0	77.0	1.03
041007	2	GB	0.27	0.17	0	0	0	7.4	72.0	2.82
	3	SS	0.27	0.17	24	20	4	23.3	84.0	1.60
041016	2	GB	0.23	0.17	15.5	9	6.5	13.9	63.0	3.83
	3	SS	0.23	0.17	26.5	17	9.5	14.5	49.5	9.19
041024	2	GB	0.22	0.17	28	12	16	11.0	34.0	14.30
	3	SS	0.22	0.17	-	-	22	30.0	72.0	1.15
081029	2	GB	0.23	0.17	0	0	0	8.0	64.0	3.22
	3	GS	0.22	0.17	0	0	0	16.2	75.5	0.83
	4	SS	0.22	0.17	12	8.5	3.5	38.4	99.0	0.11
081047	2	GB	0.30	0.17	0	0	0	11.6	52.5	6.12
	3	GS	0.30	0.17	0	0	0	8.9	42.5	11.34
	4	GS	0.18	0.17	28	15	13	51.8	70.0	0.60
	5	SS	0.18	0.17	31	14	17	91.6	97.5	0.07
081053	2	GB	0.30	0.17	0	0	0	8.0	48.0	7.52
	3	GS	0.30	0.17	0	0	0	8.0	40.0	16.60
	4	SS	0.18	0.17	40	18	22	92.0	97.0	0.07
091803	3	GB	0.30	0.17	0	0	0	8.0	56.0	5.75
	4	SS	0.23	0.17	0	0	0	12.6	90.0	0.48
120103	4	SS	0.27	0.17	0	0	0	12.0	62.0	3.77
	5	BR	0.60	0.20	-	-	-	0.0	0.0	1.00
120104	4	SS	0.27	0.17	0	0	0	12.0	63.0	3.77
	5	BR	0.60	0.20	-	-	-	0.0	0.0	1.00
120105	4	GB	0.30	0.17	0	0	0	11.0	60.0	4.97
	5	SS	0.27	0.17	0	0	0	14.0	72.0	2.58
	6	BR	0.60	0.20	-	-	-	0.0	0.0	1.00
120106	4	GB	0.30	0.17	0	0	0	11.0	60.0	4.97
	5	SS	0.27	0.17	0	0	0	16.0	76.0	1.28
	6	BR	0.60	0.20	-	-	-	0.0	0.0	1.00
123995	2	GB	0.30	0.17	0	0	0	7.6	55.5	4.86
	3	GS	0.30	0.17	0	0	0	6.4	86.5	0.40
	4	SS	0.30	0.17	0	0	0	1.8	99.5	0.27
123997	2	GB	0.27	0.17	0	0	0	21.0	70.0	1.82
	3	GS	0.23	0.17	0	0	0	12.0	87.0	0.13
	4	SS	0.30	0.17	0	0	0	9.0	99.0	0.15
124105	2	GB	0.23	0.17	0	0	0	24.1	74.5	1.00
	3	GS	0.30	0.17	0	0	0	6.8	93.5	0.17
	4	SS	0.30	0.17	0	0	0	3.0	99.0	0.16
124106	2	GB	0.27	0.17	0	0	0	6.0	68.0	2.48
	3	GS	0.30	0.17	0	0	0	1.0	93.0	0.41
	4	SS	0.30	0.17	0	0	0	0.0	98.0	0.25
	5	BR	0.60	0.20	-	-	-	0.0	0.0	1.00

Table 9a (Cont'd) Unbound Materials Data

Section	Layer Num	Layer Type[1]	Dry Thermal Conductivity (BTU/hr-ft-°F)	Heat Capacity (BTU/lb-°F)	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)	% Passing #200 Sieve	% Passing #4 Sieve	D_{60} (mm)
124107	2	GB	0.27	0.17	0	0	0	8.8	64.5	2.50
	3	SS	0.27	0.17	0	0	0	11.4	99.0	0.29
124108	3	GS	0.27	0.17	0	0	0	13.2	95.5	0.40
	4	SS	0.27	0.17	0	0	0	6.6	99.5	0.37
124135	2	GB	0.27	0.17	0	0	0	37.9	94.5	0.28
	3	GS	0.27	0.17	0	0	0	12.4	92.0	0.30
	4	SS	0.27	0.17	0	0	0	2.0	99.5	0.28
131031	3	GB	0.27	0.17	0	0	0	16.0	94.0	0.72
	4	SS	0.27	0.17	31	23	8	44.0	93.0	0.19
134111	2	GB	0.27	0.17	0	0	0	8.7	56.0	0.60
	3	SS	0.27	0.17	37.5	23.5	14	52.5	95.5	0.16
134112	3	SS	0.27	0.17	0	0	0	0.9	90.0	0.31
134113	3	SS	0.27	0.17	0	0	0	5.7	100.0	0.15
134119	3	GB	0.30	0.17	0	0	0	15.0	42.0	8.63
	4	SS	0.22	0.17	0	0	0	48.0	94.0	0.14
161001	2	GB	0.27	0.17	0	0	0	8.3	52.5	5.88
	3	SS	0.27	0.17	20	18	2	5.2	28.5	13.60
	4	BR	0.60	0.20	-	-	-	0.0	0.0	1.00
161009	3	GB	0.30	0.17	0	0	0	10.0	64.0	4.17
	4	SS	0.22	0.17	0	0	0	68.0	89.0	0.07
161021	2	GB	0.30	0.17	0	0	0	9.0	59.0	4.68
	3	SS	0.30	0.17	0	0	0	6.0	28.0	18.43
169034	3	GB	0.30	0.17	0	0	0	1.0	4.0	31.04
	4	SS	0.27	0.17	0	0	0	22.0	57.0	6.00
201009	3	SS	0.27	0.17	21	17.5	3.5	30.7	100.0	0.22
251003	3	GB	0.27	0.17	0	0	0	3.7	44.0	11.15
	4	SS	0.27	0.17	0	0	0	7.1	67.0	2.57
	5	BR	0.60	0.20	-	-	-	0.0	0.0	1.00
251004	3	GB	0.27	0.17	0	0	0	8.6	72.5	2.04
	4	SS	0.27	0.17	0	0	0	20.5	68.0	2.14
	5	BR	0.60	0.20	-	-	-	0.0	0.0	1.00
261001	2	GB	0.27	0.17	0	0	0	6.3	58.5	5.00
	3	SS	0.27	0.17	0	0	0	4.0	98.0	0.34
261004	2	GB	0.27	0.17	0	0	0	7.3	60.5	4.50
	3	SS	0.27	0.17	0	0	0	1.5	98.5	0.33
	4	BR	0.60	0.20	-	-	-	0.0	0.0	1.00
271018	3	GB	0.27	0.17	0	0	0	7.0	66.0	2.80
	4	SS	0.30	0.17	0	0	0	6.0	94.0	0.57
	5	BR	0.60	0.20	-	-	-	0.0	0.0	1.00
271087	2	SS	0.27	0.17	0	0	0	26.4	95.5	0.26
291008	3	GB	0.27	0.17	0	0	0	14.4	61.0	4.10
	4	SS	0.27	0.17	27	16	11	37.8	67.0	1.20
307088	2	GB	0.27	0.17	0	0	0	11.1	60.0	4.25
	3	GS	0.27	0.17	0	0	0	10.1	44.0	10.10
	4	SS	0.27	0.17	24	13.5	10.5	26.6	62.0	2.50
308129	2	GB	0.30	0.17	0	0	0	7.0	39.0	8.74
	3	SS	0.18	0.17	31	14.5	16.5	58.0	84.0	0.11
321020	2	GB	0.27	0.17	0	0	0	9.2	62.5	3.75
	3	SS	0.27	0.17	0	0	0	11.3	93.0	0.84
341003	3	GB	0.27	0.17	0	0	0	10.0	58.5	4.78
	4	SS	0.27	0.17	0	0	0	7.9	64.0	3.37
	5	BR	0.60	0.20	-	-	-	0.0	0.0	1.00
341011	3	GB	0.27	0.17	0	0	0	9.7	66.0	2.30
	4	GS	0.27	0.17	0	0	0	8.9	72.5	1.30
	5	SS	0.27	0.17	0	0	0	9.1	97.0	0.35
341031	3	GB	0.27	0.17	25	19	6	9.3	75.0	1.80
	4	SS	0.27	0.17	0	0	0	6.9	92.0	0.73
341033	3	GS	0.27	0.17	20	18	2	4.3	27.5	14.10
	4	SS	0.27	0.17	27	23	4	23.4	50.5	8.20
	5	BR	0.60	0.20	-	-	-	0.0	0.0	1.00
341034	3	SS	0.27	0.17	0	0	0	10.6	98.0	0.39
350101	2	GB	0.30	0.17	0	0	0	5.0	55.0	5.10
	3	SS	0.18	0.17	40	18	22	69.0	93.0	0.07
350102	2	GB	0.30	0.17	0	0	0	5.0	55.0	5.10
	3	SS	0.12	0.17	64	27.5	36.5	88.0	99.0	0.07
350103	3	SS	0.12	0.17	70	28	42	90.0	99.0	0.07

Table 9a (Cont'd) Unbound Materials Data

Section	Layer Num	Layer Type[1]	Dry Thermal Conductivity (BTU/hr-ft-°F)	Heat Capacity (BTU/lb-°F)	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)	% Passing #200 Sieve	% Passing #4 Sieve	D_{60} (mm)
350104	3	SS	0.12	0.17	0	0		42.0	90.0	100.00
350105	3	GB	0.30	0.17	0	0	0	5.0	55.0	5.10
	4	SS	0.12	0.17	58	27	31	86.0	98.0	0.07
350106	3	GB	0.30	0.17	0	0	0	5.0	55.0	5.10
	4	SS	0.12	0.17	61	24	37	67.0	94.0	0.07
351005	2	GB	0.27	0.17	0	0	0	6.1	49.5	7.38
	3	SS	0.27	0.17	22.5	19.5	3	5.3	95.5	0.30
351022	2	GB	0.27	0.17	0	0	0	9.4	59.5	4.50
	3	SS	0.23	0.17	19	17	2	8.5	97.5	0.31
351112	2	GB	0.27	0.17	23.5	18	5.5	17.0	70.0	1.96
	3	SS	0.30	0.17	0	0	0	3.0	100.0	0.17
371006	3	GB	0.30	0.17	0	0	0	12.0	50.0	8.43
	4	SS	0.22	0.17	0	0	0	51.0	92.0	0.12
371024	2	GB	0.23	0.17	0	0	0	27.0	48.0	9.88
	3	SS	0.22	0.17	38	26	12	35.0	95.0	0.27
371802	3	GB	0.30	0.17	0	0	0	10.0	52.0	7.24
	4	SS	0.12	0.17	44.5	28	16.5	57.0	92.0	0.12
371817	3	GB	0.27	0.17	0	0	0	12.6	52.0	9.30
	4	SS	0.22	0.17	0	0	0	45.6	97.0	0.21
371992	2	GB	0.30	0.17	0	0	0	13.0	54.0	6.84
	3	GS	0.30	0.17	34	30	0	6.0	60.0	4.17
	4	SS	0.22	0.17	25	21	4	40.0	86.0	0.47
404087	4	SS	0.12	0.17	44	23	21	88.6	100.0	0.07
404163	3	SS	0.22	0.17	28.5	21	7.5	85.0	100.0	0.07
404165	3	SS	0.23	0.17	0	0	0	29.0	100.0	0.18
421599	3	GB	0.30	0.17	16	15	1	12.0	38.0	8.63
	4	SS	0.22	0.17	26.5	20.5	6	48.0	67.0	1.50
	5	BR	0.60	0.20	-	-	-	0.0	0.0	1.00
451011	2	GB	0.27	0.17	0	0	0	21.3	67.0	2.50
	3	SS	0.23	0.17	0	0	0	16.3	98.0	0.14
473104	2	GB	0.27	0.17	0	0	0	16.0	48.0	8.45
	3	SS	0.22	0.17	30.5	20.5	10	58.0	86.0	0.09
	4	BR	0.60	0.20	-	-	-	0.0	0.0	1.00
480001	3	GB	0.23	0.17	17	16	1	25.0	64.0	3.71
	4	SS	0.18	0.17	31.5	17.5	14	45.0	70.0	1.35
	5	BR	0.60	0.20	-	-	-	0.0	0.0	1.00
481060	3	GB	0.30	0.17	0	0	0	5.0	46.0	10.00
	4	TS	0.27	0.17	19	18	1	24.4	48.0	9.20
	5	SS	0.23	0.17	22	15	7	34.0	98.5	0.24
481077	3	GB	0.30	0.17	0	0	0	8.0	45.0	10.05
	4	SS	0.22	0.17	0	0	0	63.0	96.0	0.07
481109	3	SS	0.22	0.17	-	-	25	71.0	99.0	0.07
481130	2	GB	0.30	0.17	9	8.5	0.5	9.8	27.5	13.72
	3	TS	0.19	0.17	41.8	40.4	1.4	81.7	100.0	0.02
	4	SS	0.12	0.17	53	22.5	30.5	81.7	100.0	0.02
481169	2	GB	0.23	0.17	0	0	0	27.0	83.0	0.39
	3	SS	0.30	0.17	0	0	0	3.0	100.0	0.20
	4	BR	0.60	0.20	-	-	-	0.0	0.0	1.00
481174	3	GB	0.30	0.17	0	0	0	14.0	59.0	4.74
	4	SS	0.12	0.17	55	21.5	33.5	64.0	100.0	0.07
481178	3	GB	0.27	0.17	0	0	0	22.3	57.5	5.02
	4	TS	0.12	0.17	44.3	24.3	20	72.6	100.0	0.04
	5	SS	0.12	0.17	46	21	25	72.6	100.0	0.04
481183	2	GB	0.18	0.17	26.5	15.5	11	37.7	83.0	0.68
	3	SS	0.18	0.17	27	14.5	12.5	63.3	97.5	0.07
483749	2	GB	0.27	0.17	0	0	0	17.8	78.0	1.10
	3	TS	0.12	0.17	40.7	20.5	20.2	49.0	99.0	0.11
	4	SS	0.12	0.17	42	18	24	49.0	99.0	0.11
489005	2	GB	0.22	0.17	25	16	9	42.0	74.0	1.75
	3	SS	0.12	0.17	57.5	26.5	31	64.0	80.0	0.07
	4	BR	0.60	0.20	-	-	-	0.0	0.0	1.00
501002	3	GB	0.30	0.17	0	0	0	3.0	18.0	23.54
	4	SS	0.30	0.17	0	0	0	7.0	48.0	7.74
501004	3	GB	0.30	0.17	0	0	0	7.0	30.0	20.39
	4	GS	0.23	0.17	0	0	0	12.0	86.0	0.50
	5	SS	0.12	0.17	57	23	34	65.0	94.0	0.07

Table 9a (Cont'd) Unbound Materials Data

Section	Layer Num	Layer Type[1]	Dry Thermal Conductivity (BTU/hr-ft-^{o}F)	Heat Capacity (BTU/lb-^{o}F)	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)	% Passing #200 Sieve	% Passing #4 Sieve	D_{60} (mm)
5E+05	3	GB	0.22	0.17	0	0	0	40.2	59.0	5.43
	4	SS	0.22	0.17	0	0	0	46.8	70.5	1.26
	5	BR	0.60	0.20	-	-	-	0.0	0.0	1.00
5E+05	3	GB	0.22	0.17	0	0	0	37.5	53.5	8.80
	4	TS	0.22	0.17	0	0	0	97.2	99.0	0.07
	5	SS	0.22	0.17	31	21	10	97.2	99.0	0.07
512021	3	GB	0.23	0.17	0	0	0	29.0	50.0	7.58
	4	SS	0.19	0.17	0	0	0	58.0	70.0	2.00
	5	BR	0.60	0.20	-	-	-	0.0	0.0	1.00
5E+05	2	GB	0.30	0.17	0	0	0	3.6	50.5	6.04
	3	GS	0.30	0.17	0	0	0	8.6	53.5	5.54
	4	SS	0.30	0.17	22	17	5	8.6	43.5	9.89
5E+05	3	GB	0.30	0.17	0	0	0	8.7	47.0	6.29
	4	SS	0.23	0.17	13.5	9	4.5	18.7	61.5	3.00
	5	BR	0.60	0.20	-	-	-	0.0	0.0	1.00
561007	2	GB	0.30	0.17	0	0	0	9.0	52.0	6.11
	3	SS	0.23	0.17	0	0	0	24.0	82.0	0.22
8E+05	3	GB	0.23	0.17	25	19	6	14.9	58.0	5.27
	4	GS	0.27	0.17	0	0	0	7.2	86.5	0.96
	5	SS	0.23	0.17	0	0	0	15.2	98.5	0.21

[1] GB = Granular base; GS = Granular subbase; SS = Subgrade; BR = Bedrock

Table 9b Unbound Materials Data

Section	Optimum Moisture Content[2] (%)	Optimum Moisture Content (%)	MAX_DRY_UNIT_WT. (UG05)	Est Max Dry Unit Weight for Level 3 Analysis	Specific Gravity of Soilds	Saturated Hydraulic Conductivity	AASHTO CLASS	USCS CLASS	Est. Resilient Modulus (psi)
011001	6	6.3	139	136.2	2	2.72E+00	A-1-a	GW-GM	40000
	6	7.1	137.5	133.3	2.65	6.64E+00	A-1-b	SM	38000
	11	12.9	121	119.6	2.7	2.28E-05	A-2-4	SC	32000
011019	-	6.6		134.9	2.65	1.69E+00	A-1-b	SM	38000
	-	11.9		121.6	2.68	2.89E-05	A-2-4	SM	32000
	-	1		127.83	2.6	5			750000
014126	8	6.7	134	134.8	2.65	1.61E+00	A-2-4	GM	32000
	11.5	11.5	122	122.1	2.68	3.05E-05	A-2-4	SM	32000
	-	1		127.83	2.6	5			750000
021001	-	6.5		135.5	2.65	2.12E+00	A-1-a	SP-SM	40000
	-	7		133.6	2.65	2.55E+00	A-1-a	SP-SM	40000
021002	7.5	6.5	142	135.6	2.65	2.25E+00	A-1-a	GW-GM	40000
	6	5.6	146	139	2.65	3.42E+00	A-1-a	GW-GM	40000
	7	6.8	141	134.3	2.65	3.02E+00	A-1-a	GP-GM	40000
040113	-	6.6		135.2	2.65	1.90E+00	A-1-b	SW-SM	40000
	-	7.9		130.2	2.65	4.71E+00	A-1-a	SP-SM	38000
040114	-	6.6		135.2	2.65	1.90E+00	A-2-4	SC	40000
	-	12.5		120.3	2.69	2.49E-05	A-1-a	SP-SM	32000
040115	-	11.8		121.7	2.68	2.92E-05	A-1-b	SM	38000
040116	-	8		129.9	2.65	3.70E+00	A-1-b	SM	38000
040117	-	6.6		135.2	2.65	1.90E+00	SM	1.5	40000
	-	8.3		129	2.65	1.95E+00	SP-SM	5.6136	38000
040118	-	6.4		135.8	2.65	2.40E+00	SC	1.03	40000
	-	14.6		116	2.71	1.39E-05	GW-GM	7.14	25500
041007	7	7.1	135.5	133.4	2.65	7.17E+00	A-1-b	SW-SM	38000
	10	12.2	125	120.9	2.69	2.67E-05	A-1-b	SW	38000
041016	8	12.2	120.9	120.9	2.69	2.69E-05	A-2-4	SC	32000
	11	12.6	122.5	108.1	2.69	2.43E-05	A-2-4	GC	17000
041024	-	13		119.4	2.7	2.24E-05	A-1-b	GP-GC	25500
	-	16.2		112.8	2.72	8.25E-06	A-2-6	SC	25500
081029	6.5	7	139	133.7	2.65	8.98E+00	A-2-4	SM	32000
	6	8	137	130.1	2.65	4.02E+00	A-4	CL	24000
	16	12.6	109.5	120.1	2.69	2.44E-05	A-4	CL	24000
081047	5.5	6.5	138.5	135.4	2.65	2.08E+00	A-1-a	GP-GM	40000
	7	6.1	136	137	2.65	3.20E+00	A-1-a	GW-GM	40000
	12	16.2	121	112.6	2.72	8.03E-06	A-6	Cl	17000
	13.5	20.6	114	104.2	2.74	1.46E-06	A-6	CL	17000
081053	-	6.4		135.9	2.65	2.51E+00	A-1-a	GP-GM	40000
	-	5.9		137.9	2.65	3.46E+00	A-1-a	GP-GM	40000
	-	22.7		100.6	2.75	6.25E-07	A-6	CL	17000
091803	-	6.6		135.2	2.65	1.96E+00	A-1-a	SP-SM	40000
	-	9.3		125.6	2.65	6.89E-01	A-2-4	SM	32000
120103	-	7.5		131.7	2.65	1.15E+00	A-1-b	SP-SM	38000
	-	1		127.83	2.6	5			750000
120104	-	7.5		131.7	2.65	1.15E+00	A-1-b	SP-SM	38000
	-	1		127.83	2.6	5			750000
120105	-	6.7		134.9	2.65	1.66E+00	A-1-b	SM	40000
	-	7.8		130.6	2.65	6.11E+00	A-1-a	SP-SM	38000
	-	1		127.83	2.6	5			750000
120106	-	6.7		134.9	2.65	1.66E+00	A-1-b	SM	40000
	-	8.4		128.6	2.65	1.32E+00	A-1-a	SP-SM	38000
	-	1		127.83	2.6	5			750000
1E+05	9	6.7	130	134.8	2.65	1.61E+00	A-1-a	SP-SM	40000
	9	8.6	112	128	2.65	3.59E-01	A-3	SP-SM	29000
	13	9.9	107	123.7	2.65	7.87E-02	A-3	SP	29000
123997	-	7.4		132.2	2.65	3.03E+00	A-1-b	SM	38000
	-	9.6		124.8	2.65	3.13E-03	A-2-4	SM	32000
	-	10.5		121.8	2.65	6.13E-03	A-3	SP-SM	29000
1E+05	10.5	7.8	125.5	130.6	2.65	6.86E+00	A-2-4	SM	32000
	11	9.3	111	125.6	2.65	1.09E-02	A-3	SP-SM	29000
	15.5	10.5	101	122	2.65	8.25E-03	A-3	SP	29000
124106	-	7.2		133	2.65	5.68E+00	A-1-b	SP-SM	38000
	-	8.6		128.1	2.65	3.93E-01	A-3	SP	29000
	-	10		123.5	2.65	5.74E-02	A-3	SP	29000
	-	1		127.83	2.6	5			750000

Table 9b (Cont'd) Unbound Materials Data

Section	Optimum Moisture Content[2] (%)	Optimum Moisture Content from DG	MAX_DRY_UNIT_WT. (UG05)	Est Max Dry Unit Weight for Level 3 Analysis	Specific Gravity of Soilds	Saturated Hydraulic Conductivity	AASHTO CLASS	USCS CLASS	Est. Resilient Modulus (psi)
124107	7	7.1	129	133.1	2.65	5.76E+00	A-1-b	SP-SM	38000
	9.5	9.8	118.5	124	2.65	1.05E-01	A-2-4	SP-SM	32000
124108	9	8.6	119	128	2.65	3.59E-01	A-2-4	SM	32000
	11	9.6	108	124.7	2.65	2.69E-01	A-3	SP-SM	29000
124135	10	8.9	120	127	2.65	9.11E-02	A-4	SM	24000
	9.5	8.8	116	127.2	2.65	1.20E-01	A-2-4	SM	32000
	14	9.9	107.5	123.9	2.65	9.91E-02	A-3	SP	29000
131031	-	8.1		129.7	2.65	2.62E+00	A-1-b	SM	38000
	-	14.3		116.7	2.71	1.55E-05	A-1-b	SM	38000
134111	8.5	8.3	134.5	129.1	2.65	1.47E+00	A-1-a	SP-SM	40000
	16	16.6	109	111.9	2.72	7.10E-06	A-6	CL	17000
134112	10	9.8	107.5	124.2	2.65	1.36E-01	A-3	SP	29000
134113	15.5	10.5	99	121.8	2.65	6.13E-03	A-3	SP-SM	29000
134119	-	6.3		136.3	2.65	2.77E+00	A-1-a	GM	40000
	-	10.6		121.6	2.65	4.44E-03	A-4	ML	24000
161001	6.5	6.5	139	135.3	2.65	2.00E+00	A-1-a	GP-GM	40000
	7	11.2	137	122.3	2.67	3.18E-05	A-1-a	GW-GM	40000
	-	1		127.83	2.6	5			750000
161009	-	6.8		134.4	2.65	1.32E+00	A-1-a	SP-SM	40000
	-	11.4		119.2	2.65	1.35E-04	A-4	ML	24000
161021	-	6.7		134.7	2.65	1.54E+00	A-1-a	SW-SM	40000
	-	6.4		135.9	2.65	3.45E+00	A-1-a	GP-GM	40000
169034	-	5.5		139.5	2.65	3.42E+00	A-1-a	GP	40000
	-	7.2		132.9	2.65	2.04E+00	A-1-b	GM	38000
201009	12	12.4	119.5	120.6	2.69	2.59E-05	A-2-4	SM	32000
251003	8	6.1	133.5	136.9	2.65	3.18E+00	A-1-a	GW	40000
	8	7.8	128	130.6	2.65	6.07E+00	A-1-b	SP-SM	38000
	-	1		127.83	2.6	5			750000
251004	6.5	7.3	132.5	132.5	2.65	3.86E+00	A-1-b	SP-SM	38000
	7	8	136	130.1	2.65	4.26E+00	A-1-b	SM	38000
	-	1		127.83	2.6	5			750000
261001	6	6.6	138.5	134.9	2.65	1.67E+00	A-1-a	SP-SM	40000
	13	9.7	111	124.5	2.65	1.95E-01	A-3	SP	29000
261004	6	6.7	144	134.6	2.65	1.46E+00	A-1-a	SP-SM	40000
	7	9.7	110	124.4	2.65	1.74E-01	A-3	SP	29000
	-	1		127.83	2.6	5			750000
271018	-	7		133.4	2.65	7.40E+00	A-1-b	SW-SM	38000
	-	9.2		126.1	2.65	1.24E+00	A-3	SP-SM	29000
	-	1		127.83	2.6	5			750000
271087	8	9.9	129.5	123.6	2.65	6.75E-02	A-2-4	SM	32000
291008	6	6.8	142.5	134.4	2.65	1.29E+00	A-1-a	SM	40000
	9	14.7	124	115.8	2.71	1.36E-05	A-6	CL	17000
307088	6	6.8	138	134.5	2.65	1.36E+00	A-1-a	SP-SM	40000
	6	6.2	140	136.7	2.65	3.04E+00	A-1-a	GW-GM	40000
	13	13.7	120	117.8	2.71	1.80E-05	A-2-6	GC	25500
308129	-	6.3		136.3	2.65	2.80E+00	A-1-a	GP-GM	40000
	-	17.8		109.5	2.73	4.57E-06	A-6	CL	17000
321020	5	6.9	138.5	134.1	2.65	1.14E+00	A-1-a	SP-SM	40000
	9.5	8.8	124.5	127.3	2.65	4.17E+00	A-1-b	SW-SM	38000
341003	6	6.7	139	134.8	2.65	1.58E+00	A-1-a	SP-SM	40000
	7	7.6	143.5	131.4	2.65	9.66E+00	A-1-b	SW-SM	38000
	-	1		127.83	2.6	5			750000
341011	6	7.2	137	132.8	2.65	4.91E+00	A-1-b	SW-SM	38000
	7.5	7.6	132.5	131.3	2.65	1.37E+00	A-1-b	SW-SM	38000
	11	9.6	116	124.6	2.65	2.18E-01	A-3	SP-SM	29000
341031	7.5	11.8	130.5	121.6	2.68	2.89E-05	A-2-4	SW-SC	32000
	8.5	8.9	124	126.9	2.65	2.73E+00	A-1-b	SP-SM	38000
341033	6	11.2	137.5	122.3	2.67	3.19E-05	A-1-a	GP	40000
	9.5	12.2	129	120.9	2.69	2.67E-05	A-1-b	GM	38000
	-	1		127.83	2.6	5			750000
341034	14	9.5	112.5	124.9	2.65	3.27E-01	A-1-b	SP-SM	38000
350101	-	6.6		134.9	2.65	1.71E+00	A-6	CL	40000
	-	20.5		104.5	2.74	1.56E-06	A-1-a	SW	17000
350102	-	6.6		134.9	2.65	1.71E+00	A-7-6	CH	40000
	-	27.4		93.3	2.76	8.73E-08	A-1-a	SW	8000
350103	-	29.4		90.4	2.77	3.73E-08	A-7-6	CH	8000

Table 9b (Cont'd) Unbound Materials Data

Section	Optimum Moisture Content[2] (%)	Optimum Moisture Content from DG	MAX_DRY_UNIT_WT. (UG05)	Est Max Dry Unit Weight for Level 3 Analysis	Specific Gravity of Soilds	Saturated Hydraulic Conductivity	AASHTO CLASS	USCS CLASS	Est. Resilient Modulus (psi)
350104	0.07	29.4		90.4	2.77	3.73E-08	A-7-6	CH	8000
350105	-	6.6		134.9	2.65	1.7.e+00	A-7-6	CH	40000
	-	25.3		96.4	2.76	2.09E-07	A-1-a	SW	8000
350106	-	6.6		134.9	2.65	1.70E+00	A-7-6	CH	40000
	-	24.5		97.6	2.75	2.85E-07	A-1-a	SW	8000
351005	7	6.4	136	135.9	2.65	2.47E+00	A-1-a	GP-GM	40000
	12	11.3	119	122.3	2.67	3.14E-05	A-2-4	SP	32000
351022	6	6.7	138	134.6	2.65	1.46E+00	A-1-b	SP-SM	38000
	11	11.4	122	122.3	2.67	3.14E-05	A-2-4	SP-SM	32000
351112	-	12.2		120.9	2.69	2.67E-05	A-1-b	SC	38000
	-	10.4		122.2	2.65	1.09E-02	A-3	SP	29000
371006	-	6.3		136.2	2.65	2.73E+00	A-1-a	GP-GM	40000
	-	10.8		121.1	2.65	2.13E-03	A-4	ML	24000
371024	-	6.2		136.6	2.65	3.00E+00	A-2-4	GM	32000
	-	14.7		115.8	2.71	1.35E-05	A-2-6	SM	25500
371802	-	6.4		135.8	2.65	2.43E+00	A-1-a	GP-GM	40000
	-	17.7		109.7	2.73	4.72E-06	A-7-6	ML	8000
371817	5.5	6.2	144	136.5	2.65	2.90E+00	A-1-b	GM	38000
	16.5	10.2	109	122.9	2.65	2.75E-02	A-4	ML	24000
371992	-	6.4		135.7	2.65	2.32E+00	A-1-a	GM	40000
	-	11.5		122.2	2.68	3.09E-05	A-1-a	SW-SM	40000
	-	12.8		119.7	2.7	2.32E-05	A-4	SM	24000
404087	17	22	108	101.8	2.75	8.36E-07	A-7-6	CL	8000
404163	-	16		113	2.72	8.64E-06	A-4	CL	24000
404165	-	10.3		122.4	2.65	1.40E-02	A-2-4	SM	32000
421599	-	11.3		122.3	2.67	3.17E-05	A-1-a	GP-GM	40000
	-	13.8		117.6	2.71	1.77E-05	A-4	CL-ML	24000
	-	1		127.83	2.6	5			750000
451011	9	7.1	127.5	133.1	2.65	5.75E+00	A-1-b	SM	38000
	11	10.6	110	121.6	2.65	4.44E-03	A-2-4	SM	32000
473104	-	6.3		136.2	2.65	2.73E+00	A-1-b	GM	38000
	-	15.7		113.7	2.72	9.70E-06	A-4	CL	24000
	-	1		127.83	2.6	5			750000
480001	-	11.5		122.1	2.68	3.08E-05	A-2-4	SM	32000
	-	16		113.1	2.72	8.77E-06	A-6	CL	17000
	-	1		127.83	2.6	5			750000
481060	8	6.2	133	136.7	2.65	3.02E+00	A-1-a	GP-GM	40000
	18	11.5	106	122.2	2.68	3.09E-05	A-1-b	GM	38000
	13	13.4	113.5	118.4	2.7	1.97E-05	A-2-4	SC	32000
481077	-	6.2		136.7	2.65	3.03E+00	A-1-a	GP-GM	40000
	-	11.4		119.2	2.65	1.35E-04	A-4	ML	24000
481109	-	21.6		102.4	2.74	9.76E-07	A-4	ML	24000
481130	6.5	11.1	139.5	122.3	2.67	3.22E-05	A-1-a	GP-GM	40000
	16.8	12.4	106	120.5	2.69	2.55E-05	A-5	ML	20000
	22	24.6	99	97.5	2.75	2.80E-07	A-7-6	CH	8000
481169	-	8.6		127.9	2.65	3.27E-01	A-2-4	SM	32000
	-	10.2		122.8	2.65	2.23E-02	A-3	SP	29000
	-	1		127.83	2.6	5			750000
481174	-	6.7		134.7	2.65	1.56E+00	A-1-a	SM	40000
	-	23.2		99.8	2.75	5.06E-07	A-7-6	CH	8000
481178	7	6.6	133.5	134.9	2.65	1.68E+00	A-1-b	GM	38000
	20.1	20.2	103	105	2.74	1.77E-06	A-7-6	CL	8000
	21.5	21.8	100	102.1	2.75	9.08E-07	A-7-6	CL	8000
481183	9	14.7	126	115.8	2.71	1.36E-05	A-6	SC	17000
	15	16.9	108.5	111.3	2.72	6.34E-06	A-6	CL	17000
483749	14.5	7.8	109.5	130.8	2.65	8.90E+00	A-1-b	SM	38000
	16.5	17.9	106.5	109.2	2.73	4.29E-06	A-7-6	SC	8000
	16.5	18.9	106.5	107.4	2.73	2.99E-06	A-7-6	SC	8000
489005	-	14.4		116.3	2.71	1.47E-05	A-4	CL	24000
	-	22.5		100.9	2.75	6.71E-07	A-7-6	CH	8000
	-	1		127.83	2.6	5			750000
501002	-	5.6		138.8	2.65	3.42E+00	A-1-a	GP	40000
	-	7		133.6	2.65	2.56E+00	A-1-a	GW-GM	40000

Table 9b (Cont'd) Unbound Materials Data

Section	Optimum Moisture Content[2] (%)	Optimum Moisture Content from DG	MAX_DRY_UNIT_WT. (UG05)	Est Max Dry Unit Weight for Level 3 Analysis	Specific Gravity of Soilds	Saturated Hydraulic Conductivity	AASHTO CLASS	USCS CLASS	Est. Resilient Modulus (psi)
501004	-	5.7		138.4	2.65	3.42E+00	A-1-a	GP-GM	40000
	-	8.4		128.6	2.65	7.94E-01	A-2-4	SP-SM	32000
	-	23.5		99.3	2.75	4.51E-01	A-7-6	CH	8000
511002	6	6.6	140	135.1	2.65	1.84E+00	A-4	GM	24000
	11.5	8.4	121.5	128.5	2.65	1.27E+00	A-4	CL	24000
	-	1		127.83	2.6	5			750000
511023	8	6.3	135	136.3	2.65	2.81E+00	A-4	GM	24000
	10	10.1	123	123	2.65	1.35E-04	A-4	ML	24000
	13	17.8	115	109.4	2.73	4.44E-06	A-4	CL	24000
512021	-	6.4		136	2.65	2.52E+00	A-2-4	GM	32000
	-	8		129.9	2.65	3.70E+00	A-5	ML	20000
	-	1		127.83	2.6	5			750000
531008	8	6.5	146	135.4	2.65	2.06E+00	A-1-a	GW	40000
	7	6.6	149.5	135.2	2.65	1.88e+-00	A-1-a	GP-GM	40000
	14	11.7	125	121.8	2.68	2.97E-05	A-1-a	GP-GM	40000
531801	8.5	6.5	136	135.5	2.65	2.14E+00	A-1-a	GP-GM	40000
	12	12.1	120	121.1	2.69	2.72E-05	A-2-4	SM	32000
	-	1		127.83	2.6	5			750000
561007	-	6.5		135.4	2.65	2.08E+-00	A-1-a	GP-GM	40000
	-	10.1		123.1	2.65	3.36E-02	A-2-4	SM	32000
841684	8	12.2	140	121	2.69	2.69E-05	A-2-4	SM	32000
	10	7.9	124	130.5	2.65	6.12E+00	A-1-b	SP-SM	38000
	12	10.2	114	122.9	2.65	2.75E-02	A-2-4	SM	32000

[1] GB = Granular base; GS = Granular subbase; SS = Subgrade; BR = Bedrock

Table 10 Permanent Deformation Data

Section	Survey Date	LLH Mean Depth (in)	RLH Mean Depth (in)	Max Mean Depth (in)	Average Rutting (in)
011001	04/05/89	0.315	0.354	-	0.335
011001	02/12/91	0.236	0.394	-	0.315
011001	04/02/92	0.157	0.433	-	0.295
011019	05/15/89	-	-	0.512	-
011019	04/16/90	-	-	0.551	-
011019	01/15/91	-	-	0.551	-
011019	03/31/92	-	-	0.551	-
011019	03/22/94	-	-	0.591	-
011019	01/08/96	-	-	0.591	-
011019	01/23/98	-	-	0.709	-
014126	06/05/89	0.197	0.157	-	0.177
014126	03/03/91	0.276	0.157	-	0.217
014126	04/08/92	0.118	0.197	-	0.157
014126	04/08/94	0.236	0.157	-	0.197
014126	12/11/95	0.236	0.197	-	0.217
014126	12/05/97	0.197	0.197	-	0.197
021001	08/21/91	0.236	0.118	-	0.177
021001	08/26/93	0.276	0.197	-	0.236
021001	06/15/95	0.315	0.236	-	0.276
021001	08/22/97	0.394	0.315	-	0.354
021001	08/26/98	0.394	0.315	-	0.354
021002	08/22/91	0.157	0.197	-	0.177
021002	07/30/92	0.197	0.276	-	0.236
021002	06/14/95	0.197	0.276	-	0.236
021002	08/21/97	0.276	0.315	-	0.295
021002	05/14/98	0.236	0.276	-	0.256
040114	03/30/95	-	-	0.394	-
040114	11/07/95	-	-	0.394	-
040114	02/04/96	-	-	0.433	-
040114	04/04/96	-	-	0.472	-
040114	07/09/96	-	-	0.433	-
040114	08/13/96	-	-	0.433	-
040114	01/07/98	-	-	0.433	-
040114	04/21/98	-	-	0.433	-
040114	06/12/98	-	-	0.472	-
040114	10/23/98	-	-	0.433	-
040114	02/12/99	-	-	0.472	-
040115	02/15/95	0.039	0.118	0.118	0.079
040115	03/30/95	0.118	0.197	0.197	0.157
040115	01/07/98	0.079	0.118	0.118	0.098
040115	02/11/99	0.079	0.118	0.118	0.098
040116	03/30/95	-	-	0.354	-
040116	01/08/98	-	-	0.354	-
040116	02/12/99	-	-	0.354	-
040117	03/30/95	-	-	0.433	-
040117	01/08/98	-	-	0.394	-
040117	02/11/99	-	-	0.472	-

Table 10 (Cont'd) Permanent Deformation Data

Section	Survey Date	LLH Mean Depth (in)	RLH Mean Depth (in)	Max Mean Depth (in)	Average Rutting (in)
040118	03/30/95	-	-	0.394	-
040118	01/08/98	-	-	0.354	-
040118	02/12/99	-	-	0.354	-
041007	11/20/89	0.709	1.063	-	0.886
041007	09/05/91	0.630	1.142	-	0.886
041007	09/20/91	0.669	0.984	-	0.827
041007	09/16/94	0.709	1.299	-	1.004
041016	11/30/89	0.354	0.394	-	0.374
041016	07/02/90	0.236	0.315	-	0.276
041016	09/25/91	0.197	0.276	-	0.236
041016	09/18/96	0.276	0.354	-	0.315
041024	11/03/89	0.236	0.236	-	0.236
041024	08/26/90	0.236	0.276	-	0.256
041024	09/04/91	0.157	0.276	-	0.217
041024	08/22/95	0.276	0.236	-	0.256
041024	11/09/95	0.276	0.276	-	0.276
041024	02/08/96	0.315	0.276	-	0.295
041024	04/04/96	0.276	0.236	-	0.256
041024	06/13/96	0.276	0.276	-	0.276
041024	07/11/96	0.315	0.236	-	0.276
041024	08/15/96	0.276	0.276	-	0.276
041024	01/15/98	0.315	0.236	-	0.276
041024	04/22/98	0.315	0.236	-	0.276
041024	06/15/98	0.276	0.276	-	0.276
041024	10/26/98	0.315	0.276	-	0.295
081029	10/20/89	0.236	0.236	-	0.236
081029	08/25/91	0.197	0.236	-	0.217
081029	10/21/91	0.197	0.157	-	0.177
081029	09/08/95	0.236	0.236	-	0.236
081047	10/20/89	0.394	0.354	-	0.374
081047	08/25/91	0.315	0.394	-	0.354
081047	10/22/91	0.354	0.315	-	0.335
081053	10/19/89	0.315	0.394	-	0.354
081053	07/07/90	0.394	0.472	-	0.433
081053	12/06/93	0.354	0.433	-	0.394
081053	03/14/94	0.354	0.433	-	0.394
081053	08/08/94	0.354	0.433	-	0.394
081053	10/21/94	0.354	0.472	-	0.413
081053	02/13/95	0.354	0.472	-	0.413
081053	05/08/95	0.354	0.472	-	0.413
081053	05/10/96	0.394	0.472	-	0.433
081053	10/21/96	0.433	0.512	-	0.472
081053	11/14/96	0.433	0.512	-	0.472
081053	03/20/97	0.433	0.512	-	0.472
081053	08/05/97	0.433	0.551	-	0.492
081053	09/26/97	0.472	0.551	-	0.512
081053	08/25/98	0.512	0.512	-	0.512

Table 10 (Cont'd) Permanent Deformation Data

Section	Survey Date	LLH Mean Depth (in)	RLH Mean Depth (in)	Max Mean Depth (in)	Average Rutting (in)
091803	09/05/90	0.157	0.197	-	0.177
091803	08/22/91	0.079	0.197	-	0.138
091803	09/30/92	0.157	0.236	-	0.197
091803	05/12/94	0.118	0.157	-	0.138
091803	09/25/94	0.118	0.157	-	0.138
091803	05/25/95	0.157	0.197	-	0.177
091803	10/30/95	0.197	0.197	-	0.197
091803	10/08/96	0.157	0.197	-	0.177
091803	05/08/97	0.157	0.197	-	0.177
091803	10/16/97	0.157	0.197	-	0.177
091803	06/17/98	0.157	0.197	-	0.177
123995	04/18/89	0.472	0.315	-	0.394
123995	02/05/91	0.472	0.315	-	0.394
123995	04/15/92	0.433	0.433	-	0.433
123995	03/09/94	0.433	0.354	-	0.394
123995	01/21/96	0.433	0.354	-	0.394
123997	12/14/89	0.630	0.630	-	0.630
123997	02/09/91	0.630	0.630	-	0.630
123997	04/13/92	0.630	0.787	-	0.709
123997	03/08/94	0.709	0.787	-	0.748
124105	04/12/89	0.354	0.394	0.394	0.374
124105	02/09/91	0.354	0.394	0.394	0.374
124105	04/13/92	0.315	0.551	0.551	0.433
124106	04/18/89	-	-	0.236	-
124106	02/05/91	-	-	0.276	-
124106	04/15/92	-	-	0.197	-
124106	03/09/94	-	-	0.236	-
124106	01/21/96	-	-	0.236	-
124106	01/17/97	-	-	0.315	-
124107	12/06/89	0.236	0.118	0.236	0.177
124107	02/05/91	0.197	0.118	0.197	0.157
124107	04/15/92	0.157	0.157	0.157	0.157
124107	03/09/94	0.197	0.079	0.197	0.138
124107	01/22/96	0.197	0.157	0.197	0.177
124108	04/27/89	0.354	0.354	0.354	0.354
124108	01/16/91	0.433	0.472	0.472	0.453
124108	04/01/92	0.315	0.472	0.472	0.394
124108	03/21/94	0.433	0.551	0.551	0.492
124108	01/16/96	0.512	0.551	0.551	0.531
124135	12/10/89	0.472	0.512	0.512	0.492
124135	01/29/91	0.512	0.669	0.669	0.591
131031	01/09/90	0.394	0.394	-	0.394
131031	03/04/91	0.512	0.354	-	0.433
131031	04/28/92	0.354	0.433	-	0.394
131031	04/04/94	0.551	0.433	-	0.492
131031	01/13/96	0.472	0.354	-	0.413

Table 10 (Cont'd) Permanent Deformation Data

Section	Survey Date	LLH Mean Depth (in)	RLH Mean Depth (in)	Max Mean Depth (in)	Average Rutting (in)

134111	03/20/89	0.236	0.315	0.315	0.276
134111	03/04/91	0.276	0.236	0.276	0.256
134111	04/27/92	0.157	0.354	0.354	0.256
134112	05/04/89	0.276	0.197	0.276	0.236
134112	02/10/91	0.276	0.197	0.276	0.236
134112	04/13/92	0.197	0.197	0.197	0.197
134112	02/24/94	0.236	0.236	0.236	0.236
134112	01/25/96	0.236	0.276	0.276	0.256
134112	04/23/98	0.354	0.315	0.354	0.335
134113	05/04/89	0.118	0.197	0.197	0.157
134113	02/10/91	0.079	0.197	0.197	0.138
134113	04/13/92	0.079	0.276	0.276	0.177
134113	02/24/94	0.118	0.236	0.236	0.177
134113	01/25/96	0.118	0.236	0.236	0.177
134113	04/23/98	0.118	0.236	0.236	0.177
134119	01/08/90	0.276	0.276	-	0.276
134119	03/04/91	0.276	0.276	-	0.276
134119	04/28/92	0.197	0.315	-	0.256
134119	04/07/94	0.236	0.236	-	0.236
161001	07/17/89	0.276	0.315	0.315	0.295
161001	08/02/90	0.157	0.236	0.236	0.197
161001	07/04/91	0.157	0.236	0.236	0.197
161001	08/25/94	0.197	0.276	0.276	0.236
161001	05/17/95	0.236	0.276	0.276	0.256
161001	07/09/97	0.236	0.354	0.354	0.295
161001	09/23/98	0.315	0.433	0.433	0.374
161009	09/20/89	0.433	0.433	-	0.433
161009	07/19/90	0.276	0.512	-	0.394
161009	07/26/91	0.394	0.394	-	0.394
161021	09/21/89	0.197	0.118	-	0.157
161021	07/21/90	0.197	0.157	-	0.177
161021	07/28/91	0.118	0.118	-	0.118
161021	09/12/95	0.197	0.118	-	0.157
161021	06/05/96	0.157	0.118	-	0.138
161021	07/29/97	0.236	0.118	-	0.177
169034	07/17/89	-	-	0.079	-
169034	08/02/90	-	-	0.157	-
169034	07/04/91	-	-	0.079	-
169034	05/17/95	-	-	0.157	-
169034	07/09/97	-	-	0.157	-
169034	09/24/98	-	-	0.236	-
201009	05/02/89	0.276	0.236	0.276	0.256
201009	12/10/90	0.315	0.236	0.315	0.276
201009	04/08/93	0.236	0.197	0.236	0.217
201009	04/23/96	0.118	0.079	0.118	0.098
201009	04/26/96	0.079	0.000	0.079	0.039

Table 10 (Cont'd) Permanent Deformation Data

Section	Survey Date	LLH Mean Depth (in)	RLH Mean Depth (in)	Max Mean Depth (in)	Average Rutting (in)
251003	08/04/89	0.157	0.157	0.157	0.157
251003	09/06/90	0.236	0.236	0.236	0.236
251003	08/23/91	0.118	0.197	0.197	0.157

251003	09/30/92	0.197	0.197	0.197	0.197
251003	10/27/95	0.157	0.197	0.197	0.177
251003	10/23/96	0.157	0.197	0.197	0.177
251003	06/16/98	0.118	0.197	0.197	0.157
251004	08/04/89	0.315	0.394	0.394	0.354
251004	09/05/90	0.276	0.315	0.315	0.295
251004	08/22/91	0.276	0.394	0.394	0.335
251004	09/30/92	0.433	0.512	0.512	0.472
251004	10/29/95	0.354	0.472	0.472	0.413
251004	06/05/97	0.315	0.394	0.394	0.354
251004	06/15/98	0.315	0.433	0.433	0.374
261001	09/07/89	0.197	0.236	0.236	0.217
261001	07/21/90	0.236	0.276	0.276	0.256
261001	07/16/91	0.157	0.236	0.236	0.197
261001	06/09/93	0.236	0.276	0.276	0.256
261001	07/05/96	0.197	0.236	0.236	0.217
261004	10/21/90	0.157	0.197	0.197	0.177
261004	05/13/93	0.118	0.079	0.118	0.098
261004	07/07/94	0.118	0.118	0.118	0.118
261004	06/15/95	0.157	0.157	0.157	0.157
271018	6/22/89	-	-	0.394	-
271018	10/30/90	-	-	0.354	-
271018	6/2/93	-	-	0.276	-
271018	3/8/94	-	-	0.276	-
271087	06/09/89	0.236	0.157	0.276	0.197
271087	11/13/90	0.236	0.197	0.315	0.217
271087	05/11/93	0.118	0.118	0.197	0.118
271087	06/25/96	0.118	0.157	0.276	0.138
271087	08/03/99	0.157	0.157	0.236	0.157
291008	03/13/89	0.236	0.236	0.394	0.236
291008	11/07/90	0.315	0.276	0.472	0.295
291008	03/05/93	0.315	0.276	0.472	0.295
291008	04/17/96	0.236	0.236	0.354	0.236
307088	09/27/89	0.472	0.394	0.472	0.433
307088	07/29/90	0.394	0.394	0.394	0.394
307088	05/20/91	0.394	0.315	0.394	0.354
308129	10/03/89	0.354	0.354	-	0.354
308129	07/29/90	0.276	0.354	-	0.315
308129	07/30/91	0.157	0.315	-	0.236
308129	12/14/93	0.276	0.315	-	0.295
308129	03/17/94	0.276	0.354	-	0.315
308129	08/22/94	0.276	0.315	-	0.295
308129	10/31/94	0.276	0.354	-	0.315
308129	02/17/95	0.354	0.472	-	0.413

Table 10 (Cont'd) Permanent Deformation Data

Section	Survey Date	LLH Mean Depth (in)	RLH Mean Depth (in)	Max Mean Depth (in)	Average Rutting (in)
308129	05/18/95	0.276	0.394	-	0.335
308129	06/10/96	0.315	0.394	-	0.354
308129	10/28/96	0.276	0.394	-	0.335
308129	01/23/97	0.354	0.433	-	0.394
308129	03/25/97	0.276	0.394	-	0.335

308129	08/11/97	0.315	0.433	-	0.374
308129	10/01/97	0.315	0.433	-	0.374
321020	08/29/89	0.354	0.276	0.433	0.315
321020	08/22/90	0.354	0.315	0.472	0.335
321020	07/23/91	0.354	0.276	0.551	0.315
321020	09/14/94	0.276	0.276	0.315	0.276
321020	04/25/95	0.315	0.394	0.472	0.354
321020	06/05/97	0.315	0.315	0.433	0.315
321020	06/09/98	0.315	0.354	0.512	0.335
321020	04/13/99	0.354	0.394	0.748	0.374
341003	09/11/90	0.709	0.906	0.906	0.807
341003	08/15/91	0.630	0.787	0.787	0.709
341003	09/28/92	0.748	0.906	0.906	0.827
341011	10/05/89	0.315	0.276	0.315	0.295
341011	09/12/90	0.394	0.354	0.394	0.374
341011	04/05/92	0.276	0.315	0.315	0.295
341011	02/24/93	0.394	0.354	0.394	0.374
341011	11/03/95	0.433	0.354	0.433	0.394
341011	07/29/97	0.354	0.315	0.354	0.335
341031	10/05/89	0.551	0.433	0.709	0.492
341031	09/12/90	0.512	0.433	0.630	0.472
341031	04/06/92	0.472	0.472	0.591	0.472
341031	02/24/93	0.472	0.433	0.630	0.453
341031	10/26/95	0.709	0.433	1.142	0.571
341031	11/04/95	0.512	0.551	0.748	0.531
341033	10/05/89	0.276	0.276	0.354	0.276
341033	09/12/90	0.354	0.354	0.551	0.354
341033	04/05/92	0.236	0.315	0.394	0.276
341033	02/24/93	0.315	0.354	0.512	0.335
341033	11/03/95	0.315	0.394	0.669	0.354
341033	07/23/97	0.276	0.315	0.433	0.295
341034	10/05/89	0.157	0.118	0.157	0.138
341034	09/12/90	0.276	0.276	0.276	0.276
341034	04/06/92	0.157	0.197	0.197	0.177
341034	02/24/93	0.276	0.197	0.276	0.236
341034	11/04/95	0.276	0.236	0.276	0.256
341034	07/30/97	0.236	0.118	0.236	0.177
350101	05/01/97	-	-	0.197	-
350101	03/19/99	-	-	0.236	-
350102	05/01/97	-	-	0.197	-
350102	03/19/99	-	-	0.236	-

Table 10 (Cont'd) Permanent Deformation Data

Section	Survey Date	LLH Mean Depth (in)	RLH Mean Depth (in)	Max Mean Depth (in)	Average Rutting (in)
350103	05/01/97	-	-	0.197	-
350103	03/19/99	-	-	0.276	-
350104	05/01/97	-	-	0.236	-
350104	03/19/99	-	-	0.276	-
350105	05/02/97	-	-	0.236	-
350105	03/22/99	-	-	0.236	-
350106	05/02/96	-	-	0.197	-
350106	03/22/99	-	-	0.236	-

351005	10/31/89	0.315	0.630	0.630	0.472
351005	08/21/91	0.276	0.669	0.669	0.472
351005	10/24/92	0.276	0.551	0.551	0.413
351005	03/18/95	0.472	0.669	0.669	0.571
351005	03/16/99	0.512	0.709	0.709	0.610
351022	10/31/89	0.197	0.157	0.197	0.177
351022	08/22/91	0.118	0.157	0.157	0.138
351022	10/24/92	0.197	0.197	0.197	0.197
351022	03/18/95	0.276	0.157	0.276	0.217
351022	03/17/99	0.197	0.118	0.197	0.157
351112	12/05/89	0.118	0.197	-	0.157
351112	01/22/91	0.157	0.197	-	0.177
351112	09/27/91	0.079	0.197	-	0.138
351112	01/27/93	0.079	0.157	-	0.118
351112	03/15/95	0.157	0.236	-	0.197
351112	09/09/97	0.118	0.157	-	0.138
351112	03/15/99	0.118	0.197	-	0.157
371006	10/13/89	0.079	0.079	-	0.079
371006	03/19/91	0.079	0.079	-	0.079
371006	10/11/92	0.197	0.157	-	0.177
371006	04/18/94	0.118	0.079	-	0.098
371006	09/20/94	0.157	0.079	-	0.118
371024	11/03/89	-	-	0.354	-
371024	03/09/91	-	-	0.433	-
371024	04/10/92	-	-	0.354	-
371802	10/13/89	-	-	0.354	-
371802	03/18/91	-	-	0.315	-
371802	10/10/92	-	-	0.354	-
371802	04/15/94	-	-	0.433	-
371802	07/18/95	-	-	0.472	-
371802	02/09/96	-	-	0.512	-
371802	04/02/96	-	-	0.512	-
371817	10/15/89	0.276	0.512	0.512	0.394
371817	03/18/91	0.276	0.236	0.276	0.256
371817	10/18/92	0.354	0.354	0.354	0.354
371992	10/15/92	-	-	0.236	-
371992	04/20/94	-	-	0.039	-
371992	02/06/96	-	-	0.157	-
371992	04/22/98	-	-	0.236	-

Table 10 (Cont'd) Permanent Deformation Data

Section	Survey Date	LLH Mean Depth (in)	RLH Mean Depth (in)	Max Mean Depth (in)	Average Rutting (in)
404087	01/17/90	0.748	0.472	0.748	0.610
404087	10/13/91	0.551	0.315	0.551	0.433
404087	02/08/93	0.512	0.236	0.512	0.374
404087	02/09/95	0.709	0.433	0.709	0.571
404163	01/23/90	0.551	0.354	-	0.453
404163	03/17/91	0.512	0.236	-	0.374
404163	10/28/91	0.354	0.236	-	0.295
404163	03/10/93	0.354	0.197	-	0.276
404163	04/22/96	0.354	0.276	-	0.315
404163	08/20/97	0.512	0.276	-	0.394

404163	01/11/99	0.591	0.315	-	0.453
421599	07/18/89	0.157	0.197	-	0.177
421599	09/27/90	0.197	0.236	-	0.217
421599	08/07/91	0.197	0.197	-	0.197
421599	03/01/93	0.315	0.315	-	0.315
421599	06/21/95	0.276	0.276	-	0.276
421599	07/19/96	0.276	0.276	-	0.276
421599	03/26/98	0.276	0.276	-	0.276
451011	04/11/89	0.315	0.354	0.512	0.335
451011	03/05/91	0.472	0.512	0.709	0.492
451011	10/24/92	0.630	0.630	0.984	0.630
451011	01/27/96	0.630	0.709	1.102	0.669
451011	02/11/99	0.669	0.748	1.260	0.709
473104	11/01/89	-	-	0.276	-
473104	05/06/91	-	-	0.315	-
473104	10/26/92	-	-	0.354	-
473104	11/30/95	-	-	0.630	-
480001	04/10/89	-	-	0.236	-
480001	10/11/90	-	-	0.276	-
480001	03/11/92	-	-	0.315	-
480001	02/17/93	-	-	0.197	-
480001	02/20/95	-	-	0.315	-
480001	03/19/98	-	-	0.157	-
481060	06/18/90	0.472	0.354	0.472	0.413
481060	02/14/91	0.394	0.276	0.394	0.335
481060	03/18/92	0.236	0.236	0.236	0.236
481060	02/23/93	0.276	0.157	0.276	0.217
481060	02/23/95	0.394	0.354	0.394	0.374
481060	01/05/99	0.472	0.315	0.472	0.394
481077	04/25/89	0.472	0.591	-	0.531
481077	10/13/91	0.512	0.709	-	0.610
481077	10/12/92	0.551	0.669	-	0.610
481077	03/10/95	0.669	0.748	-	0.709
481077	03/26/98	0.669	0.709	-	0.689
481109	01/04/90	0.315	0.315	-	0.315
481109	09/21/90	0.315	0.315	-	0.315
481109	03/10/92	0.157	0.354	-	0.256

Table 10 (Cont'd) Permanent Deformation Data

Section	Survey Date	LLH Mean Depth (in)	RLH Mean Depth (in)	Max Mean Depth (in)	Average Rutting (in)
481109	02/12/93	0.236	0.276	-	0.256
481109	02/16/95	0.394	0.394	-	0.394
481130	04/11/89	0.512	0.551	0.551	0.531
481130	10/12/90	0.669	0.709	0.709	0.689
481130	03/12/92	0.591	0.787	0.787	0.689
481169	03/04/90	0.315	0.315	-	0.315
481169	09/18/90	0.315	0.315	-	0.315
481169	03/07/91	0.315	0.315	-	0.315
481169	01/30/92	0.236	0.433	-	0.335
481169	02/27/93	0.276	0.354	-	0.315
481169	03/03/95	0.394	0.551	-	0.472
481174	10/17/90	-	-	0.394	-

481174	02/14/91	-	-	0.433	-
481174	03/16/92	-	-	0.315	-
481174	02/18/93	-	-	0.354	-
481174	02/21/95	-	-	0.669	-
481174	03/20/98	-	-	0.669	-
481178	04/10/89	0.197	0.157	0.197	0.177
481178	02/22/91	0.157	0.118	0.157	0.138
481178	03/10/92	0.118	0.157	0.157	0.138
481178	02/16/93	0.157	0.157	0.157	0.157
481178	02/17/95	0.236	0.236	0.236	0.236
481183	12/06/89	0.197	0.315	0.394	0.256
481183	09/15/90	0.315	0.276	0.472	0.295
483749	10/17/90	0.197	0.315	0.709	0.256
483749	02/14/91	0.157	0.276	0.512	0.217
483749	03/16/92	0.118	0.276	0.591	0.197
483749	02/21/93	0.157	0.276	0.591	0.217
483749	02/21/95	0.394	0.276	0.906	0.335
483749	03/28/97	0.630	0.276	-	0.453
489005	10/14/90	0.354	0.315	-	0.335
489005	03/12/92	0.079	0.197	-	0.138
489005	02/17/93	0.118	0.157	-	0.138
489005	02/20/95	0.236	0.236	-	0.236
489005	07/10/98	0.157	0.157	-	0.157
501002	08/09/89	0.354	0.236	-	0.295
501002	08/08/90	0.433	0.315	-	0.374
501002	09/04/91	0.354	0.276	-	0.315
501002	04/27/93	0.394	0.354	-	0.374
501002	05/25/94	0.394	0.354	-	0.374
501002	08/17/94	0.394	0.354	-	0.374
501002	04/27/95	0.433	0.354	-	0.394
501002	10/12/95	0.472	0.394	-	0.433
501002	10/17/96	0.315	0.394	-	0.354
501002	05/15/97	0.472	0.394	-	0.433
501002	10/23/97	0.472	0.433	-	0.453
501002	06/06/98	0.433	0.433	-	0.433

Table 10 (Cont'd) Permanent Deformation Data

Section	Survey Date	LLH Mean Depth (in)	RLH Mean Depth (in)	Max Mean Depth (in)	Average Rutting (in)
501004	08/09/89	0.197	0.118	-	0.157
501004	08/07/90	0.276	0.236	-	0.256
501004	09/20/91	0.236	0.157	-	0.197
501004	04/27/93	0.315	0.197	-	0.256
501004	10/12/95	0.276	0.197	-	0.236
501004	11/04/97	0.315	0.197	-	0.256
511002	10/15/89	0.315	0.472	0.748	0.394
511023	10/12/89	0.512	0.630	0.630	0.571
511023	03/20/91	0.512	0.591	0.591	0.551
511023	10/10/92	0.472	0.709	0.709	0.591
511023	12/07/93	0.551	0.669	0.669	0.610
511023	09/18/95	0.512	0.591	0.591	0.551
511023	02/09/96	0.591	0.748	0.748	0.669
511023	03/24/97	0.551	0.630	0.630	0.591

512021	10/15/89	0.433	0.354	-	0.394
512021	03/11/91	0.433	0.433	-	0.433
512021	10/20/92	0.472	0.591	-	0.531
531008	07/17/89	0.748	0.787	0.984	0.768
531008	07/17/89	0.748	0.787	0.984	0.768
531008	08/02/90	0.748	0.748	0.906	0.748
531008	08/02/90	0.748	0.748	0.906	0.748
531008	05/28/91	0.787	0.748	0.984	0.768
531008	05/28/91	0.787	0.748	0.984	0.768
531008	07/04/91	0.866	0.787	0.984	0.827
531008	07/04/91	0.866	0.787	0.984	0.827
531008	06/16/94	1.102	1.063	1.299	1.083
531008	06/16/94	1.102	1.063	1.299	1.083
531801	07/17/89	0.157	0.236	0.236	0.197
531801	08/09/90	0.157	0.197	0.197	0.177
531801	06/05/91	0.197	0.236	0.236	0.217
531801	06/22/94	0.157	0.157	0.157	0.157
531801	05/08/95	0.157	0.157	0.157	0.157
531801	10/31/95	0.157	0.197	0.197	0.177
531801	03/27/97	0.197	0.197	0.197	0.197
561007	09/26/89	0.472	0.433	-	0.453
561007	07/22/90	0.433	0.354	-	0.394
561007	05/13/91	0.394	0.354	-	0.374
561007	08/03/91	0.354	0.276	-	0.315
561007	12/09/93	0.276	0.276	-	0.276
561007	03/16/94	0.276	0.276	-	0.276
561007	04/19/94	0.315	0.276	-	0.295
561007	08/19/94	0.276	0.236	-	0.256
561007	02/16/95	0.276	0.276	-	0.276
561007	05/17/95	0.276	0.236	-	0.256
561007	09/08/95	0.276	0.276	-	0.276
561007	06/11/96	0.197	0.236	-	0.217

Table 10 (Cont'd) Permanent Deformation Data

Section	Survey Date	LLH Mean Depth (in)	RLH Mean Depth (in)	Max Mean Depth (in)	Average Rutting (in)
561007	10/24/96	0.276	0.276	-	0.276
561007	11/19/96	0.276	0.276	-	0.276
561007	03/10/97	0.276	0.315	-	0.295
561007	03/24/97	0.276	0.276	-	0.276
561007	08/07/97	0.276	0.276	-	0.276
561007	09/30/97	0.276	0.276	-	0.276
841684	08/29/90	0.472	0.630	0.630	0.551
841684	08/28/91	0.472	0.630	0.630	0.551
841684	05/03/93	0.551	0.748	0.748	0.650
841684	10/24/95	0.630	0.787	0.787	0.709

Table 11 Alligator Cracking Data

Section	Survey Date	Low Severity Cracking (ft^2)	Medium Severity Cracking (ft^2)	High Severity Cracking (ft^2)	Total Alligator Cracking (ft^2)
011001	09/20/91	7.5	0.0	0.0	7.5
011001	04/02/92	12.9	0.0	0.0	12.9
011001	07/24/92	12.9	0.0	0.0	12.9
011001	01/15/93	45.2	0.0	0.0	45.2
011019	05/15/89	0.0	0.0	0.0	0.0
011019	04/16/90	0.0	0.0	0.0	0.0
011019	01/15/91	0.0	0.0	0.0	0.0
011019	06/19/91	799.8	0.0	0.0	799.8
011019	03/31/92	0.0	0.0	0.0	0.0
011019	03/29/93	1111.9	0.0	0.0	1111.9
011019	07/22/95	2554.3	0.0	0.0	2554.3
011019	01/23/98	0.0	1460.7	232.5	1693.2
014126	06/05/89	0.0	0.0	0.0	0.0
014126	03/03/91	0.0	0.0	0.0	0.0
014126	03/30/93	0.0	0.0	0.0	0.0
014126	04/08/94	0.0	0.0	0.0	0.0
014126	12/11/95	6.5	21.5	0.0	28.0
014126	12/05/97	80.7	0.0	0.0	80.7
021001	05/31/90	0.0	0.0	0.0	0.0
021001	08/21/91	0.0	0.0	0.0	0.0
021001	08/26/93	0.0	0.0	0.0	0.0
021001	06/15/95	0.0	0.0	0.0	0.0
021001	08/22/97	0.0	0.0	0.0	0.0
021001	08/26/98	0.0	3.2	0.0	3.2
021001	06/24/99	151.8	12.9	0.0	164.7
021002	05/30/90	0.0	0.0	0.0	0.0
021002	08/22/91	0.0	0.0	0.0	0.0
021002	08/25/93	0.0	0.0	0.0	0.0
021002	06/14/95	0.0	0.0	0.0	0.0
021002	08/21/97	0.0	0.0	0.0	0.0
021002	05/14/98	0.0	0.0	0.0	0.0
040113	02/21/95	0.0	0.0	0.0	0.0
040113	03/30/95	0.0	0.0	0.0	0.0
040113	08/17/95	0.0	0.0	0.0	0.0
040113	11/08/95	0.0	0.0	0.0	0.0
040113	02/07/96	0.0	0.0	0.0	0.0
040113	04/03/96	0.0	0.0	0.0	0.0
040113	07/10/96	0.0	0.0	0.0	0.0
040113	08/14/96	0.0	0.0	0.0	0.0
040113	01/08/98	0.0	0.0	0.0	0.0
040113	01/13/98	0.0	0.0	0.0	0.0
040113	04/20/98	9.7	0.0	0.0	9.7
040113	06/11/98	9.7	0.0	0.0	9.7
040113	10/22/98	9.7	0.0	0.0	9.7
040113	02/16/99	36.6	0.0	0.0	36.6
040113	01/13/00	0.0	28.0	0.0	28.0

Table 11 (Cont'd) Alligator Cracking Data

Section	Survey Date	Low Severity Cracking (ft^2)	Medium Severity Cracking (ft^2)	High Severity Cracking (ft^2)	Total Alligator Cracking (ft^2)
040114	02/15/95	0.0	0.0	0.0	0.0
040114	03/30/95	0.0	0.0	0.0	0.0
040114	08/17/95	0.0	0.0	0.0	0.0
040114	11/07/95	0.0	0.0	0.0	0.0
040114	02/06/96	0.0	0.0	0.0	0.0
040114	04/02/96	0.0	0.0	0.0	0.0
040114	07/09/96	0.0	0.0	0.0	0.0
040114	08/13/96	0.0	0.0	0.0	0.0
040114	01/07/98	0.0	0.0	0.0	0.0
040114	04/21/98	46.3	0.0	0.0	46.3
040114	06/12/98	51.7	0.0	0.0	51.7
040114	10/23/98	114.1	0.0	0.0	114.1
040114	02/12/99	262.6	0.0	0.0	262.6
040114	01/13/00	17.2	52.7	3.2	73.2
040115	02/15/95	0.0	0.0	0.0	0.0
040115	03/30/95	24.8	0.0	0.0	24.8
040115	01/07/98	0.0	0.0	0.0	0.0
040115	02/11/99	0.0	0.0	0.0	0.0
040115	01/12/00	0.0	0.0	0.0	0.0
040116	02/17/95	0.0	0.0	0.0	0.0
040116	03/30/95	0.0	0.0	0.0	0.0
040116	01/08/98	0.0	0.0	0.0	0.0
040116	02/12/99	0.0	15.1	0.0	15.1
040116	01/13/00	10.8	32.3	0.0	43.1
040117	02/15/95	0.0	0.0	0.0	0.0
040117	03/30/95	0.0	0.0	0.0	0.0
040117	01/07/98	0.0	0.0	0.0	0.0
040117	02/11/99	0.0	0.0	0.0	0.0
040117	01/12/00	0.0	0.0	0.0	0.0
040118	02/17/95	0.0	0.0	0.0	0.0
040118	03/30/95	0.0	0.0	0.0	0.0
040118	01/08/98	0.0	0.0	0.0	0.0
040118	02/12/99	50.6	0.0	0.0	50.6
040118	01/13/00	67.8	53.8	0.0	121.6
041007	09/20/91	37.7	0.0	0.0	37.7
041007	02/02/93	44.1	16.1	0.0	60.3
041007	09/16/94	70.0	132.4	0.0	202.4
041024	11/03/89	0.0	0.0	0.0	0.0
041024	08/26/90	0.0	0.0	0.0	0.0
041024	10/29/92	0.0	0.0	0.0	0.0
041024	03/28/95	0.0	0.0	0.0	0.0
041024	07/17/95	0.0	0.0	0.0	0.0
041024	08/22/95	11.8	0.0	0.0	11.8
041024	11/09/95	0.0	9.7	0.0	9.7
041024	02/08/96	0.0	0.0	0.0	0.0
041024	04/04/96	16.1	0.0	0.0	16.1

Table 11 (Cont'd) Alligator Cracking Data

Section	Survey Date	Low Severity Cracking (ft^2)	Medium Severity Cracking (ft^2)	High Severity Cracking (ft^2)	Total Alligator Cracking (ft^2)
041024	06/13/96	118.4	0.0	0.0	118.4
041024	08/15/96	161.5	0.0	0.0	161.5
041024	04/22/98	0.0	398.3	528.5	926.8
041024	06/15/98	0.0	397.2	529.6	926.8
041024	10/26/98	0.0	414.4	528.5	942.9
081029	10/21/91	26.9	15.1	0.0	42.0
081029	07/15/94	0.0	0.0	0.0	0.0
081029	09/08/95	463.9	0.0	0.0	463.9
081053	10/19/89	0.0	0.0	0.0	0.0
081053	07/07/90	0.0	0.0	0.0	0.0
081053	04/13/93	3.2	0.0	0.0	3.2
081053	11/04/93	0.0	0.0	0.0	0.0
081053	12/06/93	22.6	0.0	0.0	22.6
081053	10/12/94	0.0	0.0	0.0	0.0
081053	02/13/95	39.8	0.0	0.0	39.8
081053	05/08/95	39.8	0.0	0.0	39.8
081053	05/10/96	0.0	0.0	0.0	0.0
081053	10/21/96	310.0	0.0	0.0	310.0
081053	11/14/96	253.0	0.0	0.0	253.0
081053	03/20/97	457.5	0.0	0.0	457.5
091803	07/31/89	0.0	0.0	0.0	0.0
091803	09/05/90	0.0	0.0	0.0	0.0
091803	08/22/91	0.0	0.0	0.0	0.0
091803	09/30/92	7.5	0.0	0.0	7.5
091803	05/12/94	211.0	0.0	0.0	211.0
091803	05/25/95	240.0	0.0	0.0	240.0
091803	10/08/96	84.0	81.8	0.0	165.8
091803	05/08/97	301.4	0.0	0.0	301.4
091803	09/11/97	15.1	325.1	0.0	340.1
091803	06/17/98	194.8	0.0	0.0	194.8
091803	05/02/00	298.2	0.0	0.0	298.2
120103	12/18/96	0.0	0.0	0.0	0.0
120103	02/09/00	0.0	0.0	0.0	0.0
120103	02/16/00	0.0	0.0	0.0	0.0
120104	12/18/96	0.0	0.0	0.0	0.0
120104	02/09/00	0.0	0.0	0.0	0.0
120104	02/16/00	0.0	0.0	0.0	0.0
120105	12/18/96	0.0	0.0	0.0	0.0
120105	02/09/00	0.0	0.0	0.0	0.0
120105	02/15/00	0.0	0.0	0.0	0.0
120106	12/19/96	0.0	0.0	0.0	0.0
120106	02/09/00	0.0	0.0	0.0	0.0
120106	02/17/00	0.0	0.0	0.0	0.0
123995	04/15/92	0.0	0.0	0.0	0.0
123995	03/09/94	86.1	0.0	0.0	86.1
123995	01/17/96	58.1	0.0	0.0	58.1
123995	01/21/96	121.6	0.0	0.0	121.6

Table 11 (Cont'd) Alligator Cracking Data

Section	Survey Date	Low Severity Cracking (ft^2)	Medium Severity Cracking (ft^2)	High Severity Cracking (ft^2)	Total Alligator Cracking (ft^2)
123997	08/15/90	1999.9	0.0	0.0	1999.9
123997	10/04/91	0.0	2999.9	0.0	2999.9
123997	03/08/93	0.0	4680.1	0.0	4680.1
123997	03/16/94	0.0	5047.2	0.0	5047.2
124105	04/12/89	0.0	0.0	0.0	0.0
124105	10/04/91	0.0	0.0	0.0	0.0
124105	03/08/93	0.0	0.0	0.0	0.0
124106	04/18/89	0.0	0.0	0.0	0.0
124106	02/05/91	0.0	0.0	0.0	0.0
124106	07/18/91	0.0	0.0	0.0	0.0
124106	03/09/94	0.0	0.0	0.0	0.0
124106	01/17/97	0.0	0.0	0.0	0.0
124106	07/13/99	0.0	0.0	0.0	0.0
124107	12/06/89	0.0	0.0	0.0	0.0
124107	02/05/91	0.0	0.0	0.0	0.0
124107	07/18/91	0.0	0.0	0.0	0.0
124107	03/11/93	731.9	355.2	8.6	1095.8
124107	03/09/94	655.5	243.3	0.0	898.8
124107	01/22/96	263.7	811.6	92.6	1167.9
124107	03/31/97	44.1	372.4	1223.9	1640.4
124108	04/27/89	0.0	0.0	0.0	0.0
124108	01/16/91	0.0	0.0	0.0	0.0
124108	10/03/91	0.0	0.0	0.0	0.0
124108	03/21/94	0.0	0.0	0.0	0.0
124108	08/30/94	0.0	0.0	0.0	0.0
124108	01/16/96	0.0	0.0	0.0	0.0
124135	12/10/89	1111.9	86.1	0.0	1198.0
124135	01/29/91	2045.1	355.2	0.0	2400.4
134111	03/20/89	0.0	0.0	0.0	0.0
134111	03/04/91	0.0	0.0	0.0	0.0
134111	02/24/92	316.5	0.0	0.0	316.5
134112	05/04/89	0.0	0.0	0.0	0.0
134112	02/10/91	0.0	0.0	0.0	0.0
134112	04/09/91	0.0	0.0	0.0	0.0
134112	02/24/94	0.0	0.0	0.0	0.0
134112	10/27/94	0.0	0.0	0.0	0.0
134112	01/25/96	0.0	0.0	0.0	0.0
134112	02/26/97	0.0	0.0	0.0	0.0
134112	04/23/98	0.0	0.0	0.0	0.0
134113	05/04/89	0.0	0.0	0.0	0.0
134113	02/10/91	0.0	0.0	0.0	0.0
134113	04/09/91	0.0	0.0	0.0	0.0
134113	02/24/94	0.0	0.0	0.0	0.0
134113	10/27/94	0.0	0.0	0.0	0.0
134113	01/25/96	0.0	0.0	0.0	0.0
134113	02/26/97	47.4	0.0	0.0	47.4
134113	04/23/98	44.1	0.0	0.0	44.1

Table 11 (Cont'd) Alligator Cracking Data

Section	Survey Date	Low Severity Cracking (ft^2)	Medium Severity Cracking (ft^2)	High Severity Cracking (ft^2)	Total Alligator Cracking (ft^2)
161001	07/17/89	0.0	0.0	0.0	0.0
161001	08/02/90	0.0	0.0	0.0	0.0
161001	06/30/93	35.5	0.0	0.0	35.5
161001	08/25/94	16.1	0.0	0.0	16.1
161001	05/17/95	0.0	0.0	0.0	0.0
161001	07/09/97	3.2	611.4	0.0	614.6
161001	09/23/98	0.0	433.8	99.0	532.8
161009	09/20/89	0.0	0.0	0.0	0.0
161009	07/19/90	0.0	0.0	0.0	0.0
161009	07/08/92	22.6	0.0	0.0	22.6
161009	10/16/93	0.0	0.0	0.0	0.0
161009	06/05/96	0.0	0.0	0.0	0.0
161009	07/25/97	4.3	0.0	4.3	8.6
161009	08/10/99	14.0	0.0	0.0	14.0
161021	09/21/89	0.0	0.0	0.0	0.0
161021	10/24/90	0.0	0.0	0.0	0.0
161021	08/13/91	0.0	0.0	0.0	0.0
161021	08/17/93	0.0	0.0	0.0	0.0
161021	09/12/95	0.0	0.0	0.0	0.0
161021	06/05/96	0.0	0.0	0.0	0.0
161021	07/29/97	0.0	0.0	0.0	0.0
161021	08/13/99	0.0	0.0	0.0	0.0
169034	07/17/89	0.0	0.0	0.0	0.0
169034	08/02/90	0.0	0.0	0.0	0.0
169034	06/30/93	0.0	0.0	0.0	0.0
169034	08/24/94	0.0	0.0	0.0	0.0
169034	05/17/95	0.0	0.0	0.0	0.0
169034	07/09/97	24.8	0.0	0.0	24.8
169034	09/24/98	0.0	0.0	24.8	24.8
201009	08/25/88	9.7	0.0	0.0	9.7
201009	05/02/89	0.0	0.0	0.0	0.0
201009	12/10/90	42.0	0.0	0.0	42.0
201009	10/26/91	1.1	12.9	0.0	14.0
201009	04/08/93	6.5	18.3	16.1	40.9
201009	04/14/95	2.2	53.8	0.0	56.0
201009	04/23/96	0.0	0.0	0.0	0.0
201009	04/26/96	0.0	0.0	0.0	0.0
201009	01/13/99	0.0	1642.6	0.0	1642.6
251003	08/04/89	0.0	0.0	0.0	0.0
251003	09/06/90	0.0	0.0	0.0	0.0
251003	08/23/91	28.0	0.0	0.0	28.0
251003	09/30/92	56.0	92.6	0.0	148.5
251003	10/27/95	45.2	75.3	0.0	120.6
251003	10/23/96	1314.3	0.0	0.0	1314.3
251003	06/16/98	1062.4	62.4	0.0	1124.8

Table 11 (Cont'd) Alligator Cracking Data

Section	Survey Date	Low Severity Cracking (ft^2)	Medium Severity Cracking (ft^2)	High Severity Cracking (ft^2)	Total Alligator Cracking (ft^2)
251004	08/04/89	0.0	0.0	0.0	0.0
251004	09/05/90	0.0	0.0	0.0	0.0
251004	08/22/91	0.0	0.0	0.0	0.0
251004	09/30/92	0.0	0.0	0.0	0.0
251004	10/29/95	0.0	0.0	0.0	0.0
251004	06/05/97	56.0	0.0	0.0	56.0
251004	06/15/98	0.0	0.0	0.0	0.0
251004	05/31/00	17.2	0.0	0.0	17.2
261001	07/19/88	0.0	0.0	0.0	0.0
261001	09/07/89	0.0	0.0	0.0	0.0
261001	07/21/90	0.0	0.0	0.0	0.0
261001	07/16/91	33.4	0.0	0.0	33.4
261001	09/27/91	28.0	0.0	0.0	28.0
261001	09/01/92	39.8	0.0	0.0	39.8
261001	06/07/93	0.0	80.7	0.0	80.7
261001	06/09/93	76.4	0.0	0.0	76.4
261001	05/12/95	58.1	0.0	0.0	58.1
261001	07/05/96	82.9	0.0	0.0	82.9
261001	08/05/99	47.4	0.0	0.0	47.4
261004	09/13/89	0.0	0.0	0.0	0.0
261004	07/21/90	0.0	0.0	0.0	0.0
271018	04/24/89	0.0	0.0	0.0	0.0
271018	06/22/89	0.0	0.0	0.0	0.0
271018	10/30/90	0.0	0.0	0.0	0.0
271018	06/02/93	0.0	0.0	0.0	0.0
271018	07/14/93	0.0	0.0	0.0	0.0
271018	07/26/93	0.0	0.0	0.0	0.0
271018	03/08/94	0.0	0.0	0.0	0.0
271018	08/08/94	0.0	0.0	0.0	0.0
271087	10/25/91	0.0	0.0	0.0	0.0
271087	05/11/93	0.0	0.0	0.0	0.0
271087	10/05/94	0.0	3.2	0.0	3.2
271087	06/25/96	12.9	0.0	0.0	12.9
271087	08/03/99	110.9	0.0	0.0	110.9
271087	09/04/00	32.3	0.0	0.0	32.3
291008	02/16/92	40.9	0.0	0.0	40.9
291008	03/05/93	139.9	21.5	0.0	161.5
291008	03/26/93	0.0	0.0	0.0	0.0
291008	03/29/93	0.0	0.0	0.0	0.0
291008	04/17/96	0.0	0.0	0.0	0.0
291008	02/01/00	364.9	714.7	0.0	1079.6
307088	09/27/89	0.0	0.0	0.0	0.0
307088	05/20/91	0.0	65.7	0.0	65.7
308129	10/03/89	0.0	0.0	0.0	0.0
308129	07/29/91	0.0	0.0	0.0	0.0
308129	07/06/92	0.0	0.0	0.0	0.0

Table 11 (Cont'd) Alligator Cracking Data

Section	Survey Date	Low Severity Cracking (ft^2)	Medium Severity Cracking (ft^2)	High Severity Cracking (ft^2)	Total Alligator Cracking (ft^2)
308129	08/18/93	0.0	0.0	0.0	0.0
308129	12/14/93	0.0	0.0	0.0	0.0
308129	03/17/94	0.0	0.0	0.0	0.0
308129	10/31/94	0.0	0.0	0.0	0.0
308129	02/17/95	0.0	0.0	0.0	0.0
308129	05/18/95	0.0	0.0	0.0	0.0
308129	06/10/96	0.0	0.0	0.0	0.0
308129	10/28/96	0.0	0.0	0.0	0.0
308129	01/23/97	0.0	0.0	0.0	0.0
308129	03/12/97	0.0	0.0	0.0	0.0
308129	03/25/97	0.0	0.0	0.0	0.0
308129	08/11/97	0.0	0.0	0.0	0.0
308129	10/01/97	0.0	0.0	0.0	0.0
308129	06/23/99	0.0	0.0	0.0	0.0
321020	07/23/91	0.0	0.0	0.0	0.0
321020	08/05/93	18.3	0.0	0.0	18.3
321020	09/14/94	187.3	62.4	0.0	249.7
321020	04/25/95	34.4	0.0	0.0	34.4
321020	06/05/97	671.7	1043.0	0.0	1714.7
321020	06/09/98	3269.0	35.5	0.0	3304.5
341031	04/06/92	279.9	11.8	0.0	291.7
341031	02/24/93	598.5	10.8	0.0	609.2
341031	10/26/95	0.0	652.3	304.6	956.9
341031	11/04/95	573.7	7.5	0.0	581.3
341033	04/05/92	78.6	0.0	0.0	78.6
341033	02/24/93	6.5	0.0	0.0	6.5
341033	11/03/95	15.1	0.0	0.0	15.1
341033	07/23/97	0.0	0.0	0.0	0.0
341034	10/05/89	0.0	0.0	0.0	0.0
341034	09/12/90	0.0	0.0	0.0	0.0
341034	04/06/92	0.0	0.0	0.0	0.0
341034	02/24/93	0.0	0.0	0.0	0.0
341034	11/04/95	0.0	0.0	0.0	0.0
341034	07/30/97	129.2	75.3	0.0	204.5
341638	10/05/89	0.0	0.0	0.0	0.0
341638	09/12/90	0.0	0.0	0.0	0.0
341638	04/06/92	0.0	0.0	0.0	0.0
341638	02/24/93	0.0	0.0	0.0	0.0
341638	11/04/95	0.0	0.0	0.0	0.0
341638	07/31/97	0.0	0.0	0.0	0.0
350101	05/01/97	0.0	0.0	0.0	0.0
350101	03/19/99	0.0	0.0	0.0	0.0
350101	10/08/99	0.0	0.0	0.0	0.0
350102	05/01/97	0.0	0.0	0.0	0.0
350102	03/19/99	0.0	0.0	0.0	0.0
350102	10/08/99	0.0	0.0	0.0	0.0

Table 11 (Cont'd) Alligator Cracking Data

Section	Survey Date	Low Severity Cracking (ft^2)	Medium Severity Cracking (ft^2)	High Severity Cracking (ft^2)	Total Alligator Cracking (ft^2)
350103	05/01/97	0.0	0.0	0.0	0.0
350103	03/19/99	0.0	0.0	0.0	0.0
350103	10/08/99	0.0	0.0	0.0	0.0
350104	05/01/97	0.0	0.0	0.0	0.0
350104	03/19/99	0.0	0.0	0.0	0.0
350104	10/08/99	0.0	0.0	0.0	0.0
350105	05/02/97	0.0	0.0	0.0	0.0
350105	03/22/99	0.0	0.0	0.0	0.0
350105	10/08/99	0.0	0.0	0.0	0.0
350106	05/02/97	0.0	0.0	0.0	0.0
350106	03/22/99	0.0	0.0	0.0	0.0
350106	10/08/99	0.0	0.0	0.0	0.0
351005	10/31/89	0.0	0.0	0.0	0.0
351005	03/26/91	0.0	0.0	0.0	0.0
351005	10/24/92	0.0	0.0	0.0	0.0
351005	02/15/94	0.0	0.0	0.0	0.0
351005	03/18/95	0.0	0.0	0.0	0.0
351005	04/29/97	0.0	0.0	0.0	0.0
351005	03/16/99	0.0	0.0	0.0	0.0
351005	10/09/99	0.0	0.0	0.0	0.0
351022	10/31/89	0.0	0.0	0.0	0.0
351022	03/26/91	0.0	0.0	0.0	0.0
351022	10/24/92	0.0	0.0	0.0	0.0
351022	02/15/94	0.0	0.0	0.0	0.0
351022	03/18/95	0.0	0.0	0.0	0.0
351022	04/30/97	0.0	0.0	0.0	0.0
351022	03/17/99	0.0	0.0	0.0	0.0
351112	12/05/89	0.0	0.0	0.0	0.0
351112	01/22/91	0.0	0.0	0.0	0.0
351112	03/27/91	0.0	0.0	0.0	0.0
351112	01/27/93	0.0	0.0	0.0	0.0
351112	02/16/94	0.0	0.0	0.0	0.0
351112	10/26/94	0.0	0.0	0.0	0.0
351112	03/15/95	8.6	0.0	0.0	8.6
351112	04/25/95	0.0	0.0	0.0	0.0
351112	06/27/95	0.0	0.0	0.0	0.0
351112	11/25/96	0.0	0.0	0.0	0.0
351112	04/28/97	0.0	0.0	0.0	0.0
351112	09/09/97	0.0	0.0	0.0	0.0
351112	03/15/99	0.0	0.0	0.0	0.0
351112	02/02/00	0.0	0.0	0.0	0.0
371024	11/03/89	166.8	0.0	0.0	166.8
371024	03/09/91	889.1	89.3	0.0	978.4
371024	04/10/92	1442.4	307.8	342.3	2092.5
371802	03/10/91	35.5	0.0	0.0	35.5
371802	10/10/92	50.6	35.5	0.0	86.1

Table 11 (Cont'd) Alligator Cracking Data

Section	Survey Date	Low Severity Cracking (ft^2)	Medium Severity Cracking (ft^2)	High Severity Cracking (ft^2)	Total Alligator Cracking (ft^2)
371802	04/15/94	1520.9	0.0	0.0	1520.9
371802	07/18/95	1739.4	70.0	0.0	1809.4
371802	04/02/96	2608.1	205.6	0.0	2813.7
371992	03/18/91	0.0	0.0	0.0	0.0
371992	10/15/92	2.2	0.0	0.0	2.2
371992	04/20/94	0.0	0.0	0.0	0.0
371992	02/06/96	0.0	0.0	0.0	0.0
404087	01/17/90	0.0	0.0	0.0	0.0
404087	10/13/91	0.0	0.0	0.0	0.0
404087	10/15/91	0.0	0.0	0.0	0.0
404087	11/06/92	0.0	0.0	0.0	0.0
404087	02/08/93	0.0	0.0	0.0	0.0
404087	11/03/94	0.0	0.0	0.0	0.0
404087	02/09/95	32.3	0.0	0.0	32.3
404087	08/14/95	0.0	0.0	0.0	0.0
404087	06/18/97	66.7	206.7	0.0	273.4
404163	01/23/90	0.0	0.0	0.0	0.0
404163	03/17/91	0.0	0.0	0.0	0.0
404163	10/14/91	0.0	0.0	0.0	0.0
404163	11/05/92	0.0	0.0	0.0	0.0
404163	03/10/93	0.0	0.0	0.0	0.0
404163	11/02/94	0.0	0.0	0.0	0.0
404163	04/22/96	26.9	0.0	0.0	26.9
404163	08/20/97	0.0	0.0	0.0	0.0
404163	01/11/99	12.9	0.0	0.0	12.9
404165	01/23/90	0.0	0.0	0.0	0.0
404165	03/17/91	0.0	0.0	0.0	0.0
404165	10/14/91	0.0	0.0	0.0	0.0
404165	11/05/92	0.0	0.0	0.0	0.0
404165	03/10/93	0.0	0.0	0.0	0.0
404165	10/13/94	1.1	2.2	0.0	3.2
404165	11/02/94	0.0	0.0	0.0	0.0
404165	04/18/95	3.2	0.0	0.0	3.2
404165	06/20/95	3.2	0.0	0.0	3.2
404165	04/22/96	0.0	0.0	0.0	0.0
404165	11/08/96	0.0	0.0	0.0	0.0
404165	05/23/97	32.3	0.0	0.0	32.3
404165	09/11/97	39.8	0.0	0.0	39.8
404165	09/20/99	63.5	4.3	0.0	67.8
404165	11/03/99	36.6	0.0	0.0	36.6
421599	08/29/89	0.0	0.0	0.0	0.0
421599	09/27/90	0.0	0.0	0.0	0.0
421599	03/01/93	0.0	0.0	0.0	0.0
421599	09/01/94	0.0	0.0	0.0	0.0
421599	06/21/95	0.0	0.0	0.0	0.0
421599	07/19/96	0.0	0.0	0.0	0.0
421599	03/26/98	8.6	0.0	0.0	8.6

Table 11 (Cont'd) Alligator Cracking Data

Section	Survey Date	Low Severity Cracking (ft^2)	Medium Severity Cracking (ft^2)	High Severity Cracking (ft^2)	Total Alligator Cracking (ft^2)
451011	03/18/92	0.0	0.0	0.0	0.0
451011	10/24/92	0.0	0.0	0.0	0.0
451011	06/09/93	1101.1	0.0	0.0	1101.1
451011	01/27/96	10.8	46.3	0.0	57.0
451011	06/26/97	1728.7	40.9	149.6	1919.2
451011	02/11/99	1203.4	612.5	254.0	2069.9
473104	08/23/89	0.0	74.3	0.0	74.3
473104	11/01/89	0.0	0.0	0.0	0.0
473104	05/06/91	51.7	0.0	0.0	51.7
473104	08/13/91	451.0	0.0	0.0	451.0
473104	10/26/92	139.9	19.4	0.0	159.3
473104	08/04/93	370.3	0.0	0.0	370.3
473104	11/30/95	123.8	300.3	291.7	715.8
473104	10/25/96	159.3	1217.4	406.9	1783.6
480001	04/10/89	0.0	0.0	0.0	0.0
480001	10/11/90	0.0	0.0	0.0	0.0
480001	05/17/91	0.0	0.0	0.0	0.0
480001	02/17/93	0.0	0.0	0.0	0.0
480001	04/06/93	0.0	0.0	0.0	0.0
480001	02/20/95	0.0	0.0	0.0	0.0
480001	03/24/95	0.0	0.0	0.0	0.0
480001	05/08/97	0.0	18.3	0.0	18.3
480001	03/19/98	0.0	26.9	0.0	26.9
480001	05/12/99	22.6	0.0	0.0	22.6
481060	02/14/91	0.0	0.0	0.0	0.0
481060	04/10/91	0.0	0.0	0.0	0.0
481060	03/26/92	0.0	0.0	0.0	0.0
481060	02/23/93	7.5	0.0	0.0	7.5
481060	03/31/93	0.0	0.0	0.0	0.0
481060	10/11/94	0.0	0.0	0.0	0.0
481060	02/23/95	0.0	0.0	0.0	0.0
481060	03/15/95	0.0	0.0	0.0	0.0
481060	03/20/95	0.0	0.0	0.0	0.0
481060	06/14/95	0.0	0.0	0.0	0.0
481060	04/22/97	0.0	0.0	0.0	0.0
481060	07/10/97	11.8	0.0	0.0	11.8
481060	09/30/97	0.0	0.0	0.0	0.0
481060	01/05/99	2.2	0.0	0.0	2.2
481077	04/25/89	0.0	0.0	0.0	0.0
481077	11/07/91	0.0	0.0	0.0	0.0
481077	10/12/92	0.0	0.0	0.0	0.0
481077	05/20/93	0.0	0.0	0.0	0.0
481077	10/24/94	9.7	0.0	0.0	9.7
481077	03/10/95	0.0	0.0	0.0	0.0
481077	04/20/95	0.0	0.0	0.0	0.0
481077	06/22/95	0.0	0.0	0.0	0.0

Table 11 (Cont'd) Alligator Cracking Data

Section	Survey Date	Low Severity Cracking (ft^2)	Medium Severity Cracking (ft^2)	High Severity Cracking (ft^2)	Total Alligator Cracking (ft^2)
481077	08/11/95	0.0	0.0	0.0	0.0
481077	06/25/96	0.0	0.0	0.0	0.0
481077	05/15/97	12.9	0.0	0.0	12.9
481077	07/02/97	56.0	0.0	0.0	56.0
481077	09/16/97	49.5	0.0	0.0	49.5
481077	03/26/98	40.9	0.0	0.0	40.9
481109	01/04/90	0.0	0.0	0.0	0.0
481109	09/21/90	0.0	0.0	0.0	0.0
481109	05/29/91	0.0	0.0	0.0	0.0
481109	02/12/93	73.2	0.0	0.0	73.2
481109	07/14/93	0.0	0.0	0.0	0.0
481109	02/16/95	186.2	0.0	0.0	186.2
481109	05/12/95	74.3	0.0	0.0	74.3
481109	08/05/96	149.6	0.0	0.0	149.6
481130	04/11/89	0.0	0.0	0.0	0.0
481130	10/12/90	0.0	0.0	0.0	0.0
481130	03/25/91	489.8	44.1	0.0	533.9
481130	03/19/92	829.9	25.8	0.0	855.7
481169	02/26/90	0.0	0.0	0.0	0.0
481169	03/04/90	0.0	0.0	0.0	0.0
481169	09/18/90	0.0	0.0	0.0	0.0
481169	01/16/91	0.0	0.0	0.0	0.0
481169	03/07/91	0.0	0.0	0.0	0.0
481169	06/25/91	0.0	0.0	0.0	0.0
481169	01/30/92	0.0	0.0	0.0	0.0
481169	02/27/93	0.0	0.0	0.0	0.0
481169	08/11/93	0.0	0.0	0.0	0.0
481169	03/03/95	0.0	0.0	0.0	0.0
481169	07/19/95	0.0	0.0	0.0	0.0
481169	07/15/97	0.0	0.0	0.0	0.0
481169	05/27/99	0.0	0.0	85.0	85.0
481174	10/17/90	0.0	0.0	0.0	0.0
481174	02/14/91	0.0	0.0	0.0	0.0
481174	04/10/91	0.0	16.1	0.0	16.1
481174	03/26/92	0.0	0.0	0.0	0.0
481174	02/18/93	21.5	0.0	0.0	21.5
481174	03/31/93	58.1	0.0	0.0	58.1
481174	02/21/95	28.0	0.0	0.0	28.0
481174	03/21/95	108.7	0.0	0.0	108.7
481174	01/12/96	153.9	0.0	0.0	153.9
481174	04/22/97	491.9	6.5	0.0	498.4
481174	03/20/98	421.9	61.4	0.0	483.3
481178	04/10/89	0.0	0.0	0.0	0.0
481178	02/22/91	0.0	0.0	0.0	0.0
481178	05/28/91	0.0	0.0	0.0	0.0
481178	02/16/93	0.0	0.0	0.0	0.0

Table 11 (Cont'd) Alligator Cracking Data

Section	Survey Date	Low Severity Cracking (ft^2)	Medium Severity Cracking (ft^2)	High Severity Cracking (ft^2)	Total Alligator Cracking (ft^2)
481178	07/13/93	0.0	0.0	0.0	0.0
481178	02/17/95	8.6	0.0	0.0	8.6
481178	03/17/95	8.6	0.0	0.0	8.6
481183	09/25/90	0.0	0.0	0.0	0.0
481183	03/07/91	0.0	78.6	0.0	78.6
481183	10/02/91	0.0	0.0	0.0	0.0
481183	11/06/91	0.0	0.0	0.0	0.0
481183	01/26/93	23.7	0.0	0.0	23.7
481183	07/06/93	8.6	0.0	39.8	48.4
481183	04/11/94	8.6	8.6	60.3	77.5
483749	10/15/90	0.0	0.0	0.0	0.0
483749	10/17/90	0.0	0.0	0.0	0.0
483749	02/14/91	0.0	0.0	0.0	0.0
483749	04/09/91	0.0	0.0	0.0	0.0
483749	08/29/91	0.0	0.0	0.0	0.0
483749	03/16/92	0.0	0.0	0.0	0.0
483749	02/16/93	54.9	132.4	40.9	228.2
483749	02/21/93	127.0	0.0	0.0	127.0
483749	03/29/93	47.4	75.3	0.0	122.7
483749	02/21/95	209.9	172.2	176.5	558.6
483749	03/22/95	40.9	1045.2	0.0	1086.1
483749	03/28/97	115.2	343.4	1503.7	1962.3
489005	10/10/90	125.9	0.0	0.0	125.9
489005	03/27/91	19.4	0.0	0.0	19.4
489005	08/26/91	75.3	0.0	0.0	75.3
489005	02/17/93	23.7	0.0	0.0	23.7
489005	04/05/93	58.1	0.0	0.0	58.1
489005	02/20/95	0.0	0.0	0.0	0.0
489005	02/16/96	164.7	0.0	0.0	164.7
489005	07/09/96	202.4	0.0	0.0	202.4
489005	07/02/97	139.9	0.0	0.0	139.9
489005	07/10/98	109.8	0.0	0.0	109.8
501002	08/09/89	0.0	0.0	0.0	0.0
501002	08/08/90	0.0	0.0	0.0	0.0
501002	05/25/94	795.5	0.0	0.0	795.5
501002	08/17/94	305.7	0.0	0.0	305.7
501002	04/27/95	692.1	0.0	0.0	692.1
501002	10/17/96	40.9	301.4	0.0	342.3
501002	05/15/97	120.6	31.2	0.0	151.8
501002	10/23/97	667.4	120.6	0.0	787.9
501002	06/09/98	85.0	631.8	0.0	716.9
501002	09/29/99	0.0	1079.6	0.0	1079.6
501002	11/23/99	0.0	1956.9	0.0	1956.9
501002	03/08/00	18.3	1490.8	0.0	1509.1
501004	4/27/1993	46.3	0.0	0.0	46.3
501004	########	34.4	0.0	0.0	34.4

Table 11 (Cont'd) Alligator Cracking Data

Section	Survey Date	Low Severity Cracking (ft^2)	Medium Severity Cracking (ft^2)	High Severity Cracking (ft^2)	Total Alligator Cracking (ft^2)
501004	11/4/1997	390.7	673.8	0.0	1064.6
501004	7/14/1999	0.0	1898.8	0.0	1898.8
501004	5/25/2000	1035.5	468.2	0.0	1503.7
511002	04/10/89	127.0	229.3	30.1	386.4
511023	10/12/89	0.0	0.0	0.0	0.0
511023	03/20/91	0.0	0.0	0.0	0.0
511023	05/11/92	0.0	0.0	0.0	0.0
511023	10/10/92	12.9	0.0	0.0	12.9
511023	12/07/93	10.8	0.0	0.0	10.8
511023	09/18/95	61.4	0.0	0.0	61.4
511023	02/09/96	181.9	0.0	0.0	181.9
511023	03/24/97	275.6	0.0	0.0	275.6
512021	10/15/89	0.0	0.0	0.0	0.0
512021	03/11/91	31.2	0.0	0.0	31.2
512021	10/20/92	0.0	0.0	0.0	0.0
531008	07/04/91	10.8	17.2	5.4	33.4
531008	06/28/93	24.8	23.7	6.5	54.9
531008	06/16/94	134.5	439.2	414.4	988.1
561007	07/21/90	0.0	0.0	0.0	0.0
561007	05/13/91	0.0	0.0	0.0	0.0
561007	08/03/91	0.0	0.0	0.0	0.0
561007	08/12/93	0.0	0.0	0.0	0.0
561007	10/05/93	0.0	0.0	0.0	0.0
561007	12/09/93	5.4	0.0	0.0	5.4
561007	03/16/94	7.5	0.0	0.0	7.5
561007	04/19/94	0.0	0.0	0.0	0.0
561007	08/19/94	6.5	0.0	0.0	6.5
561007	02/16/95	0.0	0.0	0.0	0.0
561007	05/17/95	0.0	0.0	0.0	0.0
561007	09/08/95	0.0	0.0	0.0	0.0
561007	06/11/96	11.8	0.0	0.0	11.8
561007	10/24/96	0.0	0.0	0.0	0.0
561007	11/19/96	0.0	0.0	0.0	0.0
561007	03/10/97	0.0	0.0	0.0	0.0
561007	03/24/97	0.0	0.0	0.0	0.0
561007	08/07/97	0.0	0.0	0.0	0.0
561007	09/30/97	0.0	0.0	0.0	0.0

Table 12 Longitudinal Cracking Data

Section	Survey Date	Low Severity Cracking (ft)	Medium Severity Cracking (ft)	High Severity Cracking (ft)	Total Longitudinal Cracking (ft)
011001	09/20/91	0.00	0.00	0.00	0.0
011001	04/02/92	16.08	0.00	0.00	16.1
011001	07/24/92	14.11	0.00	0.00	14.1
011001	01/15/93	29.53	0.00	0.00	29.5
011019	06/19/91	3.94	0.00	0.00	3.9
011019	03/29/93	139.43	0.00	0.00	139.4
011019	03/22/94	4.27	0.00	0.00	4.3
011019	07/22/95	0.00	0.00	0.00	0.0
011019	01/08/96	39.04	0.00	0.00	39.0
011019	01/23/98	0.00	0.00	0.00	0.0
014126	06/05/89	0.00	0.00	0.00	0.0
014126	03/03/91	0.00	0.00	0.00	0.0
014126	03/30/93	0.00	0.00	0.00	0.0
014126	04/08/94	0.00	0.00	0.00	0.0
014126	12/11/95	0.00	0.00	0.00	0.0
014126	12/05/97	0.00	0.00	0.00	0.0
021001	05/31/90	0.00	0.00	0.00	0.0
021001	08/21/91	0.00	0.00	0.00	0.0
021001	08/26/93	26.90	0.00	0.00	26.9
021001	06/15/95	0.00	0.00	0.00	0.0
021001	08/22/97	0.00	0.00	0.00	0.0
021001	08/26/98	0.00	0.00	0.00	0.0
021001	06/24/99	0.00	0.00	0.00	0.0
021002	05/30/90	0.00	0.00	0.00	0.0
021002	08/22/91	6.23	0.00	0.00	6.2
021002	08/25/93	0.00	0.00	0.00	0.0
021002	06/14/95	0.00	0.00	0.00	0.0
021002	08/21/97	0.00	0.00	0.00	0.0
021002	05/14/98	0.00	0.00	0.00	0.0
040113	02/21/95	0.00	0.00	0.00	0.0
040113	03/30/95	11.15	0.00	0.00	11.2
040113	08/17/95	0.00	0.00	0.00	0.0
040113	11/08/95	0.00	0.00	0.00	0.0
040113	02/07/96	0.00	0.00	0.00	0.0
040113	04/03/96	0.00	0.00	0.00	0.0
040113	07/10/96	0.00	0.00	0.00	0.0
040113	08/14/96	0.00	0.00	0.00	0.0
040113	01/08/98	53.15	16.73	0.00	69.9
040113	01/13/98	78.41	0.00	0.00	78.4
040113	04/20/98	16.73	64.96	0.00	81.7
040113	06/11/98	23.62	59.05	0.00	82.7
040113	10/22/98	0.00	173.23	0.00	173.2
040113	02/16/99	16.73	181.76	0.00	198.5
040113	01/13/00	107.94	168.96	0.00	276.9
040114	02/15/95	0.00	0.00	0.00	0.0
040114	03/30/95	30.51	0.00	0.00	30.5

Table 12 (Cont'd) Longitudinal Cracking Data

Section	Survey Date	Low Severity Cracking (ft)	Medium Severity Cracking (ft)	High Severity Cracking (ft)	Total Longitudinal Cracking (ft)
040114	08/17/95	0.00	0.00	0.00	0.0
040114	11/07/95	0.00	0.00	0.00	0.0
040114	02/06/96	6.56	0.00	0.00	6.6
040114	04/02/96	8.53	0.00	0.00	8.5
040114	07/09/96	43.96	0.00	0.00	44.0
040114	08/13/96	0.00	0.00	0.00	0.0
040114	01/07/98	33.14	39.70	25.59	98.4
040114	04/21/98	0.00	41.34	0.00	41.3
040114	06/12/98	0.00	42.32	0.00	42.3
040114	10/23/98	37.73	23.29	0.00	61.0
040114	02/12/99	0.00	0.00	0.00	0.0
040114	01/13/00	12.47	212.27	188.97	413.7
040115	02/15/95	0.00	0.00	0.00	0.0
040115	03/30/95	32.81	0.00	0.00	32.8
040115	01/07/98	0.00	0.00	0.00	0.0
040115	02/11/99	47.57	0.00	0.00	47.6
040115	01/12/00	69.22	53.15	0.00	122.4
040116	02/17/95	0.00	0.00	0.00	0.0
040116	03/30/95	18.37	0.00	0.00	18.4
040116	01/08/98	0.00	0.00	0.00	0.0
040116	02/12/99	0.00	6.89	0.00	6.9
040116	01/13/00	3.61	7.22	0.00	10.8
040117	02/15/95	0.00	0.00	0.00	0.0
040117	03/30/95	13.78	0.00	0.00	13.8
040117	01/07/98	0.00	0.00	0.00	0.0
040117	02/11/99	4.92	0.00	0.00	4.9
040117	01/12/00	31.82	0.00	0.00	31.8
040118	02/17/95	0.00	0.00	0.00	0.0
040118	03/30/95	15.09	0.00	0.00	15.1
040118	01/08/98	0.00	0.00	0.00	0.0
040118	02/12/99	40.35	2.62	0.00	43.0
040118	01/13/00	47.24	0.00	0.00	47.2
041007	09/20/91	0.00	0.00	0.00	0.0
041007	02/02/93	56.76	0.00	0.00	56.8
041007	09/16/94	167.32	0.00	0.00	167.3
041024	10/29/92	0.00	0.00	0.00	0.0
041024	03/28/95	8.86	0.00	0.00	8.9
041024	07/17/95	22.97	0.00	0.00	23.0
041024	08/22/95	126.64	0.00	0.00	126.6
041024	11/09/95	109.25	0.00	0.00	109.3
041024	02/08/96	61.35	0.00	0.00	61.4
041024	04/04/96	79.07	0.00	22.97	102.0
041024	06/13/96	59.05	0.00	0.00	59.1
041024	08/15/96	58.73	0.00	0.00	58.7
041024	04/22/98	49.21	0.00	3.61	52.8
041024	06/15/98	49.21	0.00	4.27	53.5
041024	10/26/98	50.20	0.00	3.61	53.8

Table 12 (Cont'd) Longitudinal Cracking Data

Section	Survey Date	Low Severity Cracking (ft)	Medium Severity Cracking (ft)	High Severity Cracking (ft)	Total Longitudinal Cracking (ft)
081029	10/21/91	0.00	24.93	0.00	24.9
081029	07/15/94	44.29	0.00	0.00	44.3
081029	09/08/95	11.48	0.00	0.00	11.5
081053	04/13/93	91.53	0.00	0.00	91.5
081053	11/04/93	18.37	0.00	0.00	18.4
081053	12/06/93	33.14	0.00	0.00	33.1
081053	10/12/94	107.94	0.00	0.00	107.9
081053	02/13/95	227.69	0.00	0.00	227.7
081053	05/08/95	228.67	0.00	0.00	228.7
081053	05/10/96	0.00	0.00	0.00	0.0
081053	10/21/96	0.00	0.00	0.00	0.0
081053	11/14/96	32.81	0.00	0.00	32.8
081053	03/20/97	44.95	0.00	0.00	44.9
091803	08/22/91	6.89	0.00	0.00	6.9
091803	09/30/92	4.92	0.00	0.00	4.9
091803	05/12/94	103.35	0.00	0.00	103.3
091803	08/25/94	80.05	0.00	0.00	80.1
091803	05/25/95	207.35	6.56	0.00	213.9
091803	10/08/96	363.51	0.00	0.00	363.5
091803	05/08/97	557.08	0.00	0.00	557.1
091803	09/11/97	74.15	0.00	0.00	74.1
091803	06/17/98	279.20	11.15	0.00	290.4
091803	05/02/00	522.63	0.00	0.00	522.6
120103	12/18/96	0.00	0.00	0.00	0.0
120103	02/09/00	0.00	0.00	0.00	0.0
120103	02/16/00	0.00	0.00	0.00	0.0
120104	12/18/96	0.00	0.00	0.00	0.0
120104	02/09/00	0.00	0.00	0.00	0.0
120104	02/16/00	0.00	0.00	0.00	0.0
120105	12/18/96	0.00	0.00	0.00	0.0
120105	02/09/00	0.00	0.00	0.00	0.0
120105	02/15/00	0.00	0.00	0.00	0.0
120106	12/19/96	0.00	0.00	0.00	0.0
120106	02/09/00	0.00	0.00	0.00	0.0
120106	02/17/00	0.00	0.00	0.00	0.0
123995	04/15/92	34.45	0.00	0.00	34.4
123995	03/09/94	81.69	0.00	0.00	81.7
123995	01/17/96	215.22	0.00	0.00	215.2
123995	01/21/96	72.18	0.00	0.00	72.2
124105	04/12/89	0.00	0.00	0.00	0.0
124105	10/04/91	0.00	0.00	0.00	0.0
124105	03/08/93	0.00	0.00	0.00	0.0
124106	07/18/91	0.00	0.00	0.00	0.0
124106	03/09/94	9.84	0.00	0.00	9.8
124106	01/17/97	50.20	0.00	0.00	50.2
124106	07/13/99	233.59	0.00	0.00	233.6

Table 12 (Cont'd) Longitudinal Cracking Data

Section	Survey Date	Low Severity Cracking (ft)	Medium Severity Cracking (ft)	High Severity Cracking (ft)	Total Longitudinal Cracking (ft)
124107	12/06/89	0.00	0.00	0.00	0.0
124107	02/05/91	261.48	0.00	0.00	261.5
124107	07/18/91	342.84	0.00	0.00	342.8
124107	03/11/93	17.72	0.00	0.00	17.7
124107	03/09/94	37.40	13.45	0.00	50.9
124107	01/22/96	66.60	0.00	0.00	66.6
124107	03/31/97	0.00	0.00	0.00	0.0
124108	04/27/89	0.00	0.00	0.00	0.0
124108	01/16/91	0.00	0.00	0.00	0.0
124108	10/03/91	0.00	0.00	0.00	0.0
124108	03/21/94	6.56	0.00	0.00	6.6
124108	08/30/94	0.00	0.00	0.00	0.0
124108	01/16/96	0.00	0.00	0.00	0.0
124135	12/10/89	99.41	198.82	0.00	298.2
124135	01/29/91	412.07	270.67	0.00	682.7
131031	4/12/1991	0.00	0.00	0.00	0.0
131031	7/13/1992	0.00	0.00	0.00	0.0
131031	1/12/1993	0.00	0.00	0.00	0.0
131031	4/4/1994	0.00	0.00	0.00	0.0
131031	10/24/1994	0.00	0.00	0.00	0.0
131031	8/2/1995	0.00	0.00	0.00	0.0
131031	1/13/1996	3.61	0.00	0.00	3.6
131031	4/25/1996	22.97	0.00	0.00	23.0
134111	03/20/89	26.90	0.00	0.00	26.9
134111	03/04/91	290.68	0.00	0.00	290.7
134111	02/24/92	477.03	0.00	0.00	477.0
134112	05/04/89	0.00	0.00	0.00	0.0
134112	02/10/91	17.06	0.00	0.00	17.1
134112	04/09/91	0.00	0.00	0.00	0.0
134112	02/24/94	0.00	0.00	0.00	0.0
134112	10/27/94	0.00	0.00	0.00	0.0
134112	01/25/96	0.00	0.00	0.00	0.0
134112	02/26/97	0.00	0.00	0.00	0.0
134112	04/23/98	0.00	0.00	0.00	0.0
134113	05/04/89	0.00	0.00	0.00	0.0
134113	02/10/91	0.00	0.00	0.00	0.0
134113	04/09/91	0.00	0.00	0.00	0.0
134113	02/24/94	0.00	0.00	0.00	0.0
134113	10/27/94	0.00	0.00	0.00	0.0
134113	01/25/96	0.00	0.00	0.00	0.0
134113	02/26/97	31.17	0.00	0.00	31.2
134113	04/23/98	37.07	0.00	0.00	37.1
161001	07/17/89	155.18	0.00	0.00	155.2
161001	08/02/90	193.24	0.00	0.00	193.2
161001	06/30/93	78.41	0.00	0.00	78.4
161001	08/25/94	199.14	0.00	0.00	199.1

Table 12 (Cont'd) Longitudinal Cracking Data

Section	Survey Date	Low Severity Cracking (ft)	Medium Severity Cracking (ft)	High Severity Cracking (ft)	Total Longitudinal Cracking (ft)
161001	05/17/95	183.40	1.97	0.00	185.4
161001	07/09/97	66.93	63.32	44.29	174.5
161001	09/23/98	0.00	159.12	4.92	164.0
161009	07/08/92	0.00	0.00	0.00	0.0
161009	10/16/93	7.87	0.00	0.00	7.9
161009	06/05/96	0.98	0.00	0.00	1.0
161009	07/25/97	0.00	0.00	0.00	0.0
161009	08/10/99	0.00	0.00	0.00	0.0
161021	10/24/90	0.00	0.00	0.00	0.0
161021	08/13/91	0.00	0.00	0.00	0.0
161021	08/17/93	0.00	0.00	0.00	0.0
161021	09/12/95	0.00	0.00	0.00	0.0
161021	06/05/96	4.59	0.00	0.00	4.6
161021	07/29/97	0.00	0.00	0.00	0.0
161021	08/13/99	0.00	0.00	0.00	0.0
169034	06/30/93	11.81	0.00	0.00	11.8
169034	08/24/94	146.00	0.00	0.00	146.0
169034	07/09/97	217.19	0.00	0.00	217.2
169034	09/24/98	156.49	51.51	17.72	225.7
201009	08/25/88	0.00	0.00	0.00	0.0
201009	05/02/89	11.48	0.00	0.00	11.5
201009	12/10/90	209.64	5.25	0.00	214.9
201009	10/26/91	6.23	0.66	0.00	6.9
201009	04/08/93	8.53	0.00	0.00	8.5
201009	04/14/95	15.75	27.56	0.00	43.3
201009	04/23/96	0.00	0.00	0.00	0.0
201009	04/26/96	0.00	0.00	0.00	0.0
201009	01/13/99	0.00	0.00	0.00	0.0
251003	08/04/89	757.54	0.00	0.00	757.5
251003	09/06/90	691.26	0.00	0.00	691.3
251003	08/23/91	556.42	0.98	0.00	557.4
251003	09/30/92	600.39	0.00	0.00	600.4
251003	10/27/95	563.31	0.00	0.00	563.3
251003	10/23/96	39.04	0.00	0.00	39.0
251003	06/16/98	31.82	9.19	0.00	41.0
251004	08/04/89	0.00	0.00	0.00	0.0
251004	09/05/90	19.36	0.00	0.00	19.4
251004	08/22/91	16.40	0.00	0.00	16.4
251004	09/30/92	0.00	0.00	0.00	0.0
251004	10/29/95	0.00	0.00	0.00	0.0
251004	06/05/97	3.28	0.00	0.00	3.3
251004	06/15/98	2.62	0.00	0.00	2.6
251004	05/31/00	3.61	0.00	0.00	3.6
261001	07/19/88	0.00	0.00	0.00	0.0
261001	09/07/89	15.75	0.00	0.00	15.7
261001	07/21/90	23.62	0.00	0.00	23.6

Table 12 (Cont'd) Longitudinal Cracking Data

Section	Survey Date	Low Severity Cracking (ft)	Medium Severity Cracking (ft)	High Severity Cracking (ft)	Total Longitudinal Cracking (ft)
261001	07/16/91	0.00	0.00	0.00	0.0
261001	09/27/91	50.52	0.00	0.00	50.5
261001	09/01/92	0.00	0.00	0.00	0.0
261001	06/07/93	22.97	0.00	0.00	23.0
261001	06/09/93	0.00	0.00	0.00	0.0
261001	05/12/95	8.53	0.00	0.00	8.5
261001	07/05/96	4.59	0.00	0.00	4.6
261001	08/05/99	0.00	0.00	0.00	0.0
261004	09/13/89	321.19	0.00	0.00	321.2
261004	07/21/90	450.78	0.00	0.00	450.8
271018	04/24/89	0.00	0.00	0.00	0.0
271018	06/02/93	40.68	0.66	0.00	41.3
271018	07/14/93	42.65	0.00	0.00	42.7
271018	07/26/93	6.56	50.85	0.00	57.4
271018	03/08/94	58.40	39.37	0.00	97.8
271018	08/08/94	130.58	0.00	0.00	130.6
271087	10/25/91	0.00	0.00	0.00	0.0
271087	05/11/93	7.55	0.00	0.00	7.5
271087	10/05/94	23.95	0.00	0.00	23.9
271087	06/25/96	25.26	0.00	0.00	25.3
271087	08/03/99	13.45	0.00	0.00	13.5
271087	09/04/00	108.59	2.95	0.00	111.5
291008	02/16/92	0.00	0.00	0.00	0.0
291008	03/05/93	58.07	3.28	0.00	61.4
291008	03/26/93	0.00	0.00	0.00	0.0
291008	03/29/93	27.89	34.45	0.00	62.3
291008	04/17/96	129.59	0.00	0.00	129.6
291008	02/01/00	26.25	0.00	0.00	26.2
307088	09/27/89	0.00	0.00	0.00	0.0
307088	05/20/91	3.94	12.14	0.00	16.1
308129	07/06/92	0.00	0.00	0.00	0.0
308129	08/18/93	0.00	0.00	0.00	0.0
308129	12/14/93	0.00	0.00	0.00	0.0
308129	03/17/94	0.00	0.00	0.00	0.0
308129	10/31/94	0.00	0.00	0.00	0.0
308129	02/17/95	0.00	0.00	0.00	0.0
308129	05/18/95	0.00	0.00	0.00	0.0
308129	06/10/96	0.00	0.00	0.00	0.0
308129	10/28/96	0.00	0.00	0.00	0.0
308129	01/23/97	0.00	0.00	0.00	0.0
308129	03/12/97	0.00	0.00	0.00	0.0
308129	03/25/97	0.00	0.00	0.00	0.0
308129	08/11/97	0.00	0.00	0.00	0.0
308129	10/01/97	0.00	0.00	0.00	0.0
308129	06/23/99	0.00	0.00	0.00	0.0

Table 12 (Cont'd) Longitudinal Cracking Data

Section	Survey Date	Low Severity Cracking (ft)	Medium Severity Cracking (ft)	High Severity Cracking (ft)	Total Longitudinal Cracking (ft)
321020	07/23/91	33.79	0.00	0.00	33.8
321020	08/05/93	137.79	0.00	0.00	137.8
321020	09/14/94	28.54	20.34	0.00	48.9
321020	04/25/95	242.12	0.00	0.00	242.1
321020	06/05/97	9.19	0.00	0.00	9.2
321020	06/09/98	0.00	0.00	0.00	0.0
341031	04/06/92	332.67	0.66	0.00	333.3
341031	02/24/93	322.17	30.84	2.62	355.6
341031	10/26/95	0.00	352.03	169.95	522.0
341031	11/04/95	231.95	29.53	0.00	261.5
341033	04/05/92	52.16	2.30	0.00	54.5
341033	02/24/93	32.48	11.48	0.00	44.0
341033	11/03/95	54.79	0.00	0.00	54.8
341033	07/23/97	260.50	0.00	0.00	260.5
341034	10/05/89	0.00	0.00	0.00	0.0
341034	09/12/90	0.00	0.00	0.00	0.0
341034	04/06/92	0.00	0.00	0.00	0.0
341034	02/24/93	0.00	0.00	0.00	0.0
341034	11/04/95	2.62	0.00	0.00	2.6
341034	07/30/97	0.00	14.76	0.00	14.8
350101	05/01/97	0.00	0.00	0.00	0.0
350101	03/19/99	0.00	0.00	0.00	0.0
350101	10/08/99	0.00	0.00	0.00	0.0
350102	05/01/97	0.00	0.00	0.00	0.0
350102	03/19/99	0.00	0.00	0.00	0.0
350102	10/08/99	0.00	0.00	0.00	0.0
350103	05/01/97	0.00	0.00	0.00	0.0
350103	03/19/99	0.00	0.00	0.00	0.0
350103	10/08/99	0.00	0.00	0.00	0.0
350104	05/01/97	0.00	0.00	0.00	0.0
350104	03/19/99	0.00	0.00	0.00	0.0
350104	10/08/99	0.00	0.00	0.00	0.0
350105	05/02/97	0.00	0.00	0.00	0.0
350105	03/22/99	0.00	0.00	0.00	0.0
350105	10/08/99	0.00	0.00	0.00	0.0
350106	05/02/97	0.00	0.00	0.00	0.0
350106	03/22/99	0.00	0.00	0.00	0.0
350106	10/08/99	0.00	0.00	0.00	0.0
351005	10/31/89	0.00	0.00	0.00	0.0
351005	03/26/91	0.00	0.00	0.00	0.0
351005	10/24/92	0.00	0.00	0.00	0.0
351005	02/15/94	0.00	0.00	0.00	0.0
351005	03/18/95	0.00	0.00	0.00	0.0
351005	04/29/97	0.00	0.00	0.00	0.0
351005	03/16/99	0.00	0.00	0.00	0.0
351005	10/09/99	0.00	0.00	0.00	0.0

Table 12 (Cont'd) Longitudinal Cracking Data

Section	Survey Date	Low Severity Cracking (ft)	Medium Severity Cracking (ft)	High Severity Cracking (ft)	Total Longitudinal Cracking (ft)
351022	10/31/89	0.00	0.00	0.00	0.0
351022	03/26/91	0.00	0.00	0.00	0.0
351022	10/24/92	0.00	0.00	0.00	0.0
351022	02/15/94	0.00	0.00	0.00	0.0
351022	03/18/95	0.00	0.00	0.00	0.0
351022	04/30/97	0.00	0.00	0.00	0.0
351022	03/17/99	0.00	0.00	0.00	0.0
351112	03/27/91	0.00	0.00	0.00	0.0
351112	01/27/93	0.00	0.00	0.00	0.0
351112	02/16/94	0.00	0.00	0.00	0.0
351112	10/26/94	0.00	0.00	0.00	0.0
351112	03/15/95	14.44	0.00	0.00	14.4
351112	04/25/95	0.00	0.00	0.00	0.0
351112	06/27/95	0.00	0.00	0.00	0.0
351112	11/25/96	0.00	0.00	0.00	0.0
351112	04/28/97	0.00	0.00	0.00	0.0
351112	09/09/97	0.00	0.00	0.00	0.0
351112	03/15/99	0.00	0.00	0.00	0.0
351112	02/02/00	0.00	0.00	0.00	0.0
371024	04/10/92	2.95	0.00	0.00	3.0
371802	10/10/92	28.21	0.00	0.00	28.2
371802	04/15/94	0.00	0.00	0.00	0.0
371802	07/18/95	41.01	0.00	0.00	41.0
371802	04/02/96	0.00	0.00	0.00	0.0
371992	10/15/92	22.31	0.00	0.00	22.3
371992	04/20/94	0.00	0.00	0.00	0.0
371992	02/06/96	0.00	0.00	0.00	0.0
404087	01/17/90	0.00	0.00	0.00	0.0
404087	10/13/91	0.00	0.00	0.00	0.0
404087	10/15/91	0.00	0.00	0.00	0.0
404087	11/06/92	30.51	0.00	0.00	30.5
404087	02/08/93	35.43	0.00	0.00	35.4
404087	11/03/94	143.04	0.00	0.00	143.0
404087	02/09/95	112.20	0.00	0.00	112.2
404087	08/14/95	0.00	159.45	0.00	159.4
404087	06/18/97	10.17	0.00	0.00	10.2
404163	10/14/91	0.00	0.00	0.00	0.0
404163	11/05/92	0.00	0.00	0.00	0.0
404163	03/10/93	6.56	0.00	0.00	6.6
404163	11/02/94	0.00	0.00	0.00	0.0
404163	04/22/96	0.00	0.00	0.00	0.0
404163	08/20/97	45.28	8.20	0.00	53.5
404163	01/11/99	5.91	9.19	0.00	15.1
404165	10/14/91	3.94	0.00	0.00	3.9
404165	11/05/92	4.92	0.00	0.00	4.9
404165	03/10/93	19.03	0.00	0.00	19.0

Table 12 (Cont'd) Longitudinal Cracking Data

Section	Survey Date	Low Severity Cracking (ft)	Medium Severity Cracking (ft)	High Severity Cracking (ft)	Total Longitudinal Cracking (ft)
404165	10/13/94	8.86	0.00	0.00	8.9
404165	11/02/94	16.40	0.00	0.00	16.4
404165	04/18/95	23.95	0.00	0.00	23.9
404165	06/20/95	24.93	0.00	0.00	24.9
404165	04/22/96	24.93	0.00	0.00	24.9
404165	11/08/96	60.37	0.00	0.00	60.4
404165	05/23/97	26.25	0.00	0.00	26.2
404165	09/11/97	24.28	0.00	0.00	24.3
404165	09/20/99	17.72	0.00	0.00	17.7
404165	11/03/99	49.87	0.00	0.00	49.9
421599	03/01/93	0.00	0.00	0.00	0.0
421599	09/01/94	0.00	0.00	0.00	0.0
421599	06/21/95	8.20	0.00	0.00	8.2
421599	07/19/96	3.94	0.00	0.00	3.9
421599	03/26/98	1.97	0.00	0.00	2.0
451011	03/18/92	0.00	0.00	0.00	0.0
451011	10/24/92	0.00	0.00	0.00	0.0
451011	06/09/93	0.00	0.00	0.00	0.0
451011	01/27/96	15.75	0.00	0.00	15.7
451011	06/26/97	0.00	0.00	0.00	0.0
451011	02/11/99	0.00	0.00	0.00	0.0
480001	05/17/91	0.00	0.00	0.00	0.0
480001	02/17/93	0.00	0.00	0.00	0.0
480001	04/06/93	0.00	0.00	0.00	0.0
480001	02/20/95	0.00	0.00	0.00	0.0
480001	03/24/95	0.00	0.00	0.00	0.0
480001	05/08/97	34.45	0.00	0.00	34.4
480001	03/19/98	34.45	0.00	0.00	34.4
480001	05/12/99	38.06	0.00	0.00	38.1
481060	06/18/90	0.00	0.00	0.00	0.0
481060	02/14/91	0.00	0.00	0.00	0.0
481060	04/10/91	0.00	0.00	0.00	0.0
481060	03/26/92	12.14	0.00	0.00	12.1
481060	02/23/93	19.03	0.00	0.00	19.0
481060	03/31/93	22.97	0.00	0.00	23.0
481060	10/11/94	14.11	0.00	0.00	14.1
481060	02/23/95	28.21	0.00	0.00	28.2
481060	03/15/95	0.00	0.00	0.00	0.0
481060	03/20/95	14.11	0.00	0.00	14.1
481060	06/14/95	7.87	0.00	0.00	7.9
481060	04/22/97	30.84	0.00	0.00	30.8
481060	07/10/97	30.84	1.97	0.00	32.8
481060	09/30/97	32.15	0.00	0.00	32.2
481060	01/05/99	25.59	7.87	0.00	33.5
481077	11/07/91	0.00	0.00	0.00	0.0
481077	10/12/92	27.89	0.00	0.00	27.9

Table 12 (Cont'd) Longitudinal Cracking Data

Section	Survey Date	Low Severity Cracking (ft)	Medium Severity Cracking (ft)	High Severity Cracking (ft)	Total Longitudinal Cracking (ft)
481077	05/20/93	123.69	0.00	0.00	123.7
481077	10/24/94	143.37	0.00	0.00	143.4
481077	03/10/95	46.59	0.00	0.00	46.6
481077	04/20/95	180.77	0.00	0.00	180.8
481077	06/22/95	180.77	0.00	0.00	180.8
481077	08/11/95	180.77	0.00	0.00	180.8
481077	06/25/96	180.77	0.00	0.00	180.8
481077	05/15/97	228.02	9.84	0.00	237.9
481077	07/02/97	299.87	0.00	0.00	299.9
481077	09/16/97	276.24	0.00	0.00	276.2
481077	03/26/98	281.16	0.00	0.00	281.2
481109	05/29/91	123.03	0.00	0.00	123.0
481109	02/12/93	147.96	0.00	0.00	148.0
481109	07/14/93	335.63	0.00	0.00	335.6
481109	02/16/95	502.29	2.95	0.00	505.2
481109	05/12/95	571.19	0.00	0.00	571.2
481109	08/05/96	424.54	0.00	0.00	424.5
481130	04/11/89	0.00	0.00	0.00	0.0
481130	10/12/90	0.00	0.00	0.00	0.0
481130	03/25/91	15.09	0.00	0.00	15.1
481130	03/19/92	35.10	0.00	0.00	35.1
481169	01/16/91	0.00	0.00	0.00	0.0
481169	06/25/91	0.00	0.00	0.00	0.0
481169	02/27/93	0.00	0.00	0.00	0.0
481169	08/11/93	0.00	0.00	0.00	0.0
481169	03/03/95	6.56	0.00	0.00	6.6
481169	07/19/95	0.00	0.00	0.00	0.0
481169	07/15/97	0.00	0.00	0.00	0.0
481169	05/27/99	2.30	0.00	0.00	2.3
481174	04/10/91	201.11	0.00	0.00	201.1
481174	03/26/92	204.07	0.00	0.00	204.1
481174	02/18/93	138.45	0.00	0.00	138.4
481174	03/31/93	185.37	0.00	0.00	185.4
481174	02/21/95	219.81	9.51	0.00	229.3
481174	03/21/95	179.46	0.00	0.00	179.5
481174	01/12/96	160.43	0.00	0.00	160.4
481174	04/22/97	0.00	0.00	0.00	0.0
481174	03/20/98	49.21	0.00	0.00	49.2
481178	04/10/89	78.08	0.00	0.00	78.1
481178	02/22/91	61.02	0.00	0.00	61.0
481178	05/28/91	47.90	0.00	0.00	47.9
481178	02/16/93	43.63	0.00	0.00	43.6
481178	07/13/93	94.49	0.00	0.00	94.5
481178	02/17/95	92.19	0.00	0.00	92.2
481178	03/17/95	56.76	0.00	0.00	56.8

Table 12 (Cont'd) Longitudinal Cracking Data

Section	Survey Date	Low Severity Cracking (ft)	Medium Severity Cracking (ft)	High Severity Cracking (ft)	Total Longitudinal Cracking (ft)
481183	09/25/90	0.00	0.00	0.00	0.0
481183	03/07/91	0.00	0.00	0.00	0.0
481183	10/02/91	4.27	0.00	0.00	4.3
481183	11/06/91	11.15	0.00	0.00	11.2
481183	01/26/93	19.03	0.00	0.00	19.0
481183	07/06/93	3.28	0.00	0.00	3.3
481183	04/11/94	3.28	0.00	0.00	3.3
483749	10/15/90	0.00	0.00	0.00	0.0
483749	04/09/91	0.00	0.00	0.00	0.0
483749	08/29/91	0.00	0.00	0.00	0.0
483749	03/16/92	0.00	0.00	0.00	0.0
483749	02/16/93	0.00	0.00	0.00	0.0
483749	02/21/93	4.59	0.00	0.00	4.6
483749	03/29/93	0.00	0.00	0.00	0.0
483749	02/21/95	49.21	0.00	0.00	49.2
483749	03/22/95	0.00	0.00	0.00	0.0
483749	03/28/97	1.97	0.00	0.00	2.0
489005	10/10/90	168.96	0.00	0.00	169.0
489005	03/27/91	214.89	0.00	0.00	214.9
489005	08/26/91	223.09	0.00	0.00	223.1
489005	02/17/93	106.30	0.00	0.00	106.3
489005	04/05/93	240.48	0.00	0.00	240.5
489005	02/20/95	169.29	0.00	0.00	169.3
489005	02/16/96	273.62	0.00	0.00	273.6
489005	07/09/96	252.95	0.00	0.00	252.9
489005	07/02/97	324.80	0.00	0.00	324.8
489005	07/10/98	278.21	0.00	0.00	278.2
501002	05/25/94	2.30	0.00	0.00	2.3
501002	08/17/94	0.00	0.00	0.00	0.0
501002	04/27/95	7.87	0.00	0.00	7.9
501002	10/17/96	16.08	0.00	0.00	16.1
501002	05/15/97	65.94	124.67	0.00	190.6
501002	10/23/97	9.51	4.92	0.00	14.4
501002	06/09/98	10.50	25.92	0.00	36.4
501002	09/29/99	0.00	0.00	0.00	0.0
501002	11/23/99	0.00	0.00	0.00	0.0
501002	03/08/00	10.50	0.00	0.00	10.5
501004	04/27/93	33.79	10.50	0.00	44.3
501004	10/12/95	7.55	4.27	0.00	11.8
501004	11/04/97	6.56	2.62	0.00	9.2
501004	07/14/99	0.00	0.00	0.00	0.0
501004	05/25/00	0.00	0.00	0.00	0.0
511002	04/10/89	8.86	41.99	59.05	109.9
511023	10/12/89	0.00	0.00	0.00	0.0
511023	03/20/91	0.00	0.00	0.00	0.0
511023	05/11/92	0.00	0.00	0.00	0.0

Table 12 (Cont'd) Longitudinal Cracking Data

Section	Survey Date	Low Severity Cracking (ft)	Medium Severity Cracking (ft)	High Severity Cracking (ft)	Total Longitudinal Cracking (ft)
511023	10/10/92	20.67	0.00	0.00	20.7
511023	12/07/93	0.00	0.00	0.00	0.0
511023	09/18/95	104.99	0.00	0.00	105.0
511023	02/09/96	166.99	0.00	0.00	167.0
511023	03/24/97	3.61	0.00	0.00	3.6
512021	10/20/92	20.67	0.00	0.00	20.7
531008	07/04/91	6.23	0.00	0.00	6.2
531008	06/28/93	66.27	0.00	0.33	66.6
531008	06/16/94	7.87	4.92	7.87	20.7
561007	05/13/91	0.00	0.00	0.00	0.0
561007	08/12/93	13.12	0.00	0.00	13.1
561007	10/05/93	25.59	0.00	0.00	25.6
561007	12/09/93	3.94	0.00	0.00	3.9
561007	03/16/94	5.58	0.00	0.00	5.6
561007	04/19/94	0.00	0.00	0.00	0.0
561007	08/19/94	5.58	0.00	0.00	5.6
561007	02/16/95	6.56	0.00	0.00	6.6
561007	05/17/95	0.00	0.00	0.00	0.0
561007	09/08/95	0.00	0.00	0.00	0.0
561007	06/11/96	4.92	0.00	0.00	4.9
561007	10/24/96	0.00	0.00	0.00	0.0
561007	11/19/96	2.30	0.00	0.00	2.3
561007	03/10/97	0.00	0.00	0.00	0.0
561007	03/24/97	0.00	0.00	0.00	0.0
561007	08/07/97	2.62	0.00	0.00	2.6
561007	09/30/97	0.00	0.00	0.00	0.0

Table 13 Thermal Cracking Data

Section	Survey Date	Low Severity Transverse Cracking (ft)	Medium Severity Transverse Cracking (ft)	High Severity Transverse Cracking (ft)	Weighted Average (ft)
011001	09/20/91	0	0	0	0
011001	07/24/92	1.0	0	0	0.11
011001	01/15/93	10.2	0	0	1.13
011019	06/19/91	1.0	0	0	0.11
011019	03/29/93	0.0	0	0	0.00
011019	07/22/95	4.3	0	0	0.47
011019	01/23/98	12.5	0	0	1.39
021001	05/31/90	76.1	0	0	8.46
021001	08/21/91	69.2	0	0	7.69
021001	08/26/93	78.1	0	0	8.68
021001	06/15/95	94.8	0	0	10.54
021001	08/22/97	53.8	26.9	0.0	14.95
021001	08/26/98	23.3	27.9	27.9	27.38
021001	06/24/99	6.6	35.1	37.1	33.03
021002	05/30/90	64.0	15.1	0.0	12.14
021002	08/22/91	83.0	0	0	9.22
021002	08/25/93	97.1	0	0	10.79
021002	06/14/95	26.6	12.1	49.9	34.70
021002	08/21/97	16.7	24.3	51.8	38.75
021002	05/14/98	12.1	12.5	88.3	54.53
040113	02/21/95	0	0	0	0.00
040113	08/17/95	0	0	0	0.00
040113	11/08/95	0	0	0	0.00
040113	02/07/96	0	0	0	0.00
040113	04/03/96	0	0	0	0.00
040113	07/10/96	0	0	0	0.00
040113	08/14/96	0	0	0	0.00
040113	01/08/98	0	0	0	0.00
040113	01/13/98	0	0	0	0.00
040113	04/20/98	0	0	0	0.00
040113	06/11/98	0	0	0	0.00
040113	10/22/98	0	0	0	0.00
040113	02/16/99	0	0	0	0.00
040113	01/13/00	10.8	3.9	0	2.52
040114	02/15/95	0	0	0	0.00
040114	08/17/95	0	0	0	0.00
040114	11/07/95	0	0	0	0.00
040114	02/06/96	3.3	0	0	0.36
040114	04/02/96	3.9	0	0	0.44
040114	07/09/96	0	0	0	0.00
040114	08/13/96	0	0	0	0.00
040114	01/07/98	0	0	0	0.00
040114	04/21/98	0	0	0	0.00
040114	06/12/98	0	0	0	0.00
040114	10/23/98	0	0	0	0.00
040114	02/12/99	3.3	0	0	0.36
040114	01/13/00	3.0	0	0	0.33

Table 13 (Cont'd) Thermal Cracking Data

Section	Survey Date	Low Severity Transverse Cracking (ft)	Medium Severity Transverse Cracking (ft)	High Severity Transverse Cracking (ft)	Weighted Average (ft)
040115	02/15/95	0	0	0	0.00
040115	01/07/98	0	0	0	0.00
040115	02/11/99	0	0	0	0.00
040115	01/12/00	0	0	0	0.00
040116	02/17/95	0	0	0	0.00
040116	01/08/98	0	0	0	0.00
040116	02/12/99	0	0	0	0.00
040116	01/13/00	0	0	0	0.00
040117	02/15/95	0	0	0	0.00
040117	01/07/98	0	0	0	0.00
040117	02/11/99	0	0	0	0.00
040117	01/12/00	0	0	0	0.00
040118	02/17/95	0	0	0	0.00
040118	01/08/98	0	0	0	0.00
040118	02/12/99	0	0	0	0.00
040118	01/13/00	0	0	0	0.00
041007	09/20/91	74.8	0	0	8.31
041007	09/16/94	250.3	2.0	0	28.47
041016	01/24/94	78.7	108.6	121.4	112.39
041024	07/17/95	0	0	0	0.00
041024	08/22/95	20.0	0	0	2.22
041024	11/09/95	28.9	0	0	3.21
041024	02/08/96	23.0	0	0	2.55
041024	04/04/96	23.0	0	0	2.55
041024	06/13/96	0	0	0	0.00
041024	08/15/96	0	0	0	0.00
041024	01/15/98	20.0	0	0	2.22
041024	04/22/98	21.0	0	0	2.33
041024	06/15/98	21.0	0	0	2.33
041024	10/26/98	21.0	0	0	2.33
041024	01/26/00	0	0	0	0.00
081029	10/21/91	24.0	366.8	0	124.93
081029	09/08/95	136.8	0	0	15.20
081047	10/22/91	0.0	0	0	0.00
081053	04/13/93	4.6	0	0	0.51
081053	12/06/93	1.6	0	0	0.18
081053	03/14/94	2.6	0	0	0.29
081053	10/12/94	10.5	0	0	1.17
081053	02/13/95	10.5	0	0	1.17
081053	05/08/95	10.5	0	0	1.17
081053	10/21/96	2.0	0	0	0.22
081053	11/14/96	8.5	0	0	0.95
081053	03/07/97	4.9	0	0	0.55
081053	03/20/97	5.2	0	0	0.58
081053	08/05/97	0.0	0	0	0.00
081053	09/26/97	3.6	0	0	0.40
081053	08/24/98	7.2	0	0	0.80

Table 13 (Cont'd) Thermal Cracking Data

Section	Survey Date	Low Severity Transverse Cracking (ft)	Medium Severity Transverse Cracking (ft)	High Severity Transverse Cracking (ft)	Weighted Average (ft)
091803	05/12/94	66.3	12.1	0	11.41
091803	08/25/94	57.4	0	0	6.38
091803	05/25/95	107.6	0	0	11.96
091803	10/08/96	183.1	0	0	20.34
091803	05/08/97	276.6	24.3	0	38.82
091803	09/11/97	146.7	32.8	0	27.23
091803	06/17/98	143.4	54.1	0	33.97
091803	05/02/00	163.7	73.5	23.6	55.81
120103	12/18/96	0	0	0	0.00
120103	02/16/00	0	0	0	0.00
120104	12/18/96	0	0	0	0.00
120104	02/16/00	0	0	0	0.00
120105	12/18/96	0	0	0	0.00
120105	02/15/00	0	0	0	0.00
120106	12/19/96	0	0	0	0.00
120106	02/17/00	0	0	0	0.00
123995	01/17/96	65.3	15.1	0	12.28
123997	08/15/90	0	0	0	0.00
123997	10/04/91	0	0	0	0.00
123997	03/08/93	0	0	0	0.00
123997	03/16/94	0	0	0	0.00
124105	10/04/91	0	0	0	0.00
124105	03/08/93	0	0	0	0.00
124106	07/18/91	0	0	0	0.00
124106	01/17/97	0	0	0	0.00
124106	07/13/99	0	0	0	0.00
124107	07/18/91	0	0	0	0.00
124107	03/11/93	0	0	0	0.00
124107	03/31/97	5.6	3.3	0	1.71
124108	10/03/91	0	0	0	0.00
124108	08/30/94	0	0	0	0.00
124135	03/12/93	0	0	0	0.00
131031	04/12/91	2.0	0	0	0.22
131031	07/13/92	17.7	0	0	1.97
131031	01/12/93	14.4	0	0	1.60
131031	10/24/94	76.1	0	0	8.46
131031	08/02/95	101.0	0	0	11.23
131031	04/25/96	190.3	0	0	21.14
134111	02/24/92	9.8	0	0	1.09
134112	04/09/91	0	0	0	0.00
134112	10/27/94	3.3	0	0	0.36
134112	02/26/97	0	0	0	0.00
134112	04/23/98	0	0	0	0.00
134113	04/09/91	0	0	0	0.00
134113	10/27/94	0	0	0	0.00
134113	02/26/97	6.6	0	0	0.73
134113	04/23/98	6.9	0	0	0.77

Table 13 (Cont'd) Thermal Cracking Data

Section	Survey Date	Low Severity Transverse Cracking (ft)	Medium Severity Transverse Cracking (ft)	High Severity Transverse Cracking (ft)	Weighted Average (ft)
134119	02/24/92	0	0	0	0.00
134119	10/24/94	0	0	0	0.00
134119	11/08/95	5.6	0	0	0.62
161001	08/25/94	31.5	0	0	3.50
161001	07/09/97	44.3	0	0	4.92
161001	09/23/98	18.7	19.7	10.2	14.29
161009	07/08/92	124.0	55.1	13.8	39.81
161009	07/25/97	16.1	28.2	151.9	95.58
161009	08/10/99	0	39.0	149.0	95.76
161021	10/24/90	0	0	0	0.00
161021	08/13/91	0	0	0	0.00
161021	09/12/95	0	0	0	0.00
161021	07/29/97	0	0	0	0.00
161021	08/13/99	0	0	0	0.00
169034	08/24/94	2.3	0	0	0.26
169034	07/09/97	17.4	0	0	1.93
169034	09/24/98	11.5	0	0	1.28
201009	08/25/88	0	0	0	0.00
201009	04/14/95	48.6	76.8	65.6	67.44
201009	04/26/96	0	0	0	0.00
201009	01/13/99	0	0	0	0.00
251003	10/23/96	138.1	27.9	0	24.64
251003	06/16/98	135.5	120.1	0	55.08
251004	06/05/97	22.0	0	0	2.44
251004	06/15/98	22.0	3.3	0	3.54
261001	07/19/88	0	0	0	0.00
261001	07/16/91	0	0	0	0.00
261001	09/01/92	0	0	0	0.00
261001	06/07/93	0	0	0	0.00
261001	05/12/95	2.6	0	0	0.29
261004	07/25/89	0	0	0	0.00
261004	07/07/94	32.5	0	0	3.61
271018	04/24/89	0	0	0	0.00
271018	07/14/93	236.9	157.8	0	78.92
271018	07/26/93	33.5	220.5	118.1	142.83
271018	03/08/94	34.4	81.0	254.3	172.10
271018	08/08/94	57.4	169.9	121.4	130.47
271087	10/06/88	0	0	0	0.00
271087	10/05/94	95.8	132.9	0	54.94
271087	08/03/99	37.4	124.7	87.3	94.20
291008	08/17/88	0	0	0	0.00
291008	02/16/92	0	0	0	0.00
291008	03/26/93	0	0	0	0.00
291008	03/29/93	0	0	0	0.00
291008	02/01/00	94.2	0	0	10.46
307088	05/20/91	38.1	64.0	11.2	31.75

Table 13 (Cont'd) Thermal Cracking Data

Section	Survey Date	Low Severity Transverse Cracking (ft)	Medium Severity Transverse Cracking (ft)	High Severity Transverse Cracking (ft)	Weighted Average (ft)

308129	07/06/92	0	0	195.5	108.63
308129	12/14/93	194.9	0	0	21.65
308129	03/17/94	189.0	0	0	21.00
308129	10/31/94	5.9	173.6	12.5	65.43
308129	02/17/95	5.9	173.6	12.5	65.43
308129	05/18/95	7.5	173.6	12.5	65.62
308129	10/28/96	22.6	189.3	0	65.62
308129	01/23/97	56.4	202.1	0	73.64
308129	03/12/97	227.4	0	0	25.26
308129	03/25/97	27.9	170.6	24.9	73.82
308129	08/11/97	214.9	0	0	23.88
308129	10/01/97	186.0	24.3	0	28.76
308129	06/23/99	5.2	215.6	0	72.43
321020	09/14/94	115.8	76.4	0	38.35
321020	06/05/97	222.4	43.0	55.1	69.66
321020	06/09/98	16.4	43.6	58.1	48.63
321020	04/13/99	361.5	66.3	12.1	69.01
341003	03/11/99	13.5	0	0	1.49
341011	07/29/97	259.5	165.4	0	83.95
341031	10/26/95	48.2	59.1	13.1	32.33
341033	07/23/97	177.5	0	0	19.72
341034	07/30/97	32.5	0	0	3.61
350101	05/01/97	0	0	0	0.00
350101	03/19/99	0	0	0	0.00
350102	05/01/97	0	0	0	0.00
350102	03/19/99	0	0	0	0.00
350103	05/01/97	0	0	0	0.00
350103	03/19/99	0	0	0	0.00
350104	05/01/97	0	0	0	0.00
350104	03/19/99	0	0	0	0.00
350105	05/02/97	0	0	0	0.00
350105	03/22/99	0	0	0	0.00
350106	05/02/97	0	0	0	0.00
350106	03/22/99	0	0	0	0.00
351005	03/26/91	0	0	0	0.00
351005	02/15/94	0	0	0	0.00
351005	04/29/97	0	0	0	0.00
351005	03/16/99	0	0	0	0.00
351022	03/26/91	0	0	0	0.00
351022	02/15/94	0	0	0	0.00
351022	04/30/97	0	0	0	0.00
351022	03/17/99	7.5	0	0	0.84
351112	03/27/91	0	0	0	0.00
351112	02/16/94	0	0	0	0.00
351112	10/26/94	0	0	0	0.00
351112	04/25/95	0	0	0	0.00
351112	06/27/95	0	0	0	0.00

Table 13 (Cont'd) Thermal Cracking Data

Section	Survey Date	Low Severity Transverse Cracking (ft)	Medium Severity Transverse Cracking (ft)	High Severity Transverse Cracking (ft)	Weighted Average (ft)
351112	11/25/96	0	0	0	0.00
351112	04/28/97	0	0	0	0.00

351112	09/09/97	0	0	0	0.00
351112	03/15/99	3.3	0	0	0.36
351112	02/02/00	15.1	0	12.1	8.42
371006	08/17/91	0	0	0	0.00
371006	04/18/94	11.5	0	0	1.28
371006	09/20/94	0	0	0	0.00
371024	04/10/92	0	0	0	0.00
371802	04/15/94	7.5	0	0	0.84
371802	07/18/95	262.5	3.3	0	30.26
371802	04/02/96	137.8	5.9	0	17.28
371817	08/30/90	5.9	0	0	0.66
371992	04/20/94	0	0	0	0.00
371992	04/22/98	0	0	0	0.00
404087	10/15/91	0	0	0	0.00
404087	11/06/92	0	0	0	0.00
404087	11/03/94	0	0	0	0.00
404087	08/14/95	0	0	0	0.00
404087	06/18/97	0	0	0	0.00
404163	10/14/91	0	0	0	0.00
404163	11/05/92	0	0	0	0.00
404163	11/02/94	15.4	0	0	1.71
404163	08/20/97	21.3	19.7	0	8.93
404163	01/11/99	32.8	11.5	11.5	13.85
404165	10/14/91	6.9	0	0	0.77
404165	11/05/92	6.6	0	0	0.73
404165	10/13/94	19.4	0	0	2.15
404165	11/02/94	18.7	0	0	2.08
404165	04/18/95	10.5	0	0	1.17
404165	06/20/95	9.5	13.5	0	5.54
404165	11/08/96	39.4	0	0	4.37
404165	05/23/97	36.7	24.3	0	12.18
404165	09/11/97	38.4	24.3	0	12.36
404165	09/20/99	38.1	19.4	12.1	17.42
421599	09/01/94	0	0	0	0.00
421599	06/21/95	0	0	0	0.00
421599	03/26/98	0	0	0	0.00
451011	03/18/92	0	0	0	0.00
451011	06/09/93	0	0	0	0.00
451011	06/26/97	0	0	0	0.00
451011	02/11/99	0	0	0	0.00
473104	08/23/89	0	0	0	0.00
473104	08/13/91	0	0	0	0.00
473104	08/04/93	0	0	0	0.00
473104	10/25/96	214.2	0	0	23.80

Table 13 (Cont'd) Thermal Cracking Data

Section	Survey Date	Low Severity Transverse Cracking (ft)	Medium Severity Transverse Cracking (ft)	High Severity Transverse Cracking (ft)	Weighted Average (ft)
480001	05/17/91	0	0	0	0.00
480001	04/06/93	0	0	0	0.00
480001	03/24/95	0	0	0	0.00
480001	05/08/97	2.0	0	0	0.22
480001	03/19/98	2.0	0	0	0.22

480001	05/12/99	2.0	0	0	0.22
481060	04/10/91	0	0	0	0.00
481060	03/26/92	0	0	0	0.00
481060	03/31/93	8.5	0	0	0.95
481060	10/11/94	0	0	0	0.00
481060	03/15/95	0	0	0	0.00
481060	03/20/95	0	0	0	0.00
481060	06/14/95	0	0	0	0.00
481060	04/22/97	0	0	0	0.00
481060	07/10/97	0	0	0	0.00
481060	09/30/97	0	0	0	0.00
481060	01/05/99	0	0	0	0.00
481077	11/07/91	39.0	0	0	4.34
481077	05/20/93	38.7	24.0	0	12.28
481077	10/24/94	48.6	19.4	0	11.85
481077	04/20/95	102.0	0	0	11.34
481077	06/22/95	130.9	0	0	14.55
481077	08/11/95	102.0	0	0	11.34
481077	06/25/96	135.2	0	0	15.02
481077	05/15/97	233.9	20.3	0	32.77
481077	07/02/97	266.4	0	0	29.60
481077	09/16/97	280.5	0	0	31.17
481077	03/26/98	302.2	0	0	33.57
481109	05/29/91	2.0	0	0	0.22
481109	07/14/93	16.1	0	0	1.79
481109	05/12/95	16.7	0	0	1.86
481109	08/05/96	17.4	0	0	1.93
481109	06/24/97	0	0	0	0.00
481109	08/31/99	10.8	0	0	1.20
481130	03/25/91	51.8	12.1	0	9.81
481130	03/19/92	36.1	0	0	4.01
481169	01/16/91	12.1	0	0	1.35
481169	06/25/91	0	0	0	0.00
481169	08/11/93	20.0	0	0	2.22
481169	07/19/95	51.2	0	0	5.69
481169	07/15/97	59.7	0	0	6.63
481169	05/27/99	105.3	0	0	11.70
481174	04/10/91	8.9	0	0	0.98
481174	03/26/92	7.9	0	0	0.87
481174	03/31/93	8.2	0	0	0.91
481174	03/21/95	10.5	0	0	1.17
481174	01/12/96	23.3	0	0	2.59

Table 13 (Cont'd) Thermal Cracking Data

Section	Survey Date	Low Severity Transverse Cracking (ft)	Medium Severity Transverse Cracking (ft)	High Severity Transverse Cracking (ft)	Weighted Average (ft)
481174	04/22/97	10.8	0	0	1.20
481174	03/20/98	7.2	0	0	0.80
481178	05/28/91	80.1	0	0	8.89
481178	07/13/93	91.2	0	0	10.13
481178	03/17/95	99.4	0	0	11.05
481178	05/11/95	0	0	0	0.00
481183	09/25/90	120.1	0	0	13.34

481183	03/07/91	55.1	16.1	53.1	41.01
481183	11/06/91	79.1	12.1	12.1	19.58
481183	07/06/93	44.3	68.9	0	27.89
481183	04/11/94	70.2	73.8	3.9	34.59
483749	10/15/90	0	0	0	0.00
483749	04/09/91	0	0	0	0.00
483749	08/29/91	0	0	0	0.00
483749	02/16/93	4.9	3.3	0	1.64
483749	03/29/93	0	0	0	0.00
483749	03/22/95	4.3	0	0	0.47
483749	03/28/97	4.9	15.1	0	5.58
489005	10/10/90	8.9	0	0	0.98
489005	03/27/91	14.1	0	0	1.57
489005	08/26/91	9.8	0	0	1.09
489005	04/05/93	9.8	0	0	1.09
489005	02/16/96	0.0	0	0	0.00
489005	07/09/96	28.9	0	0	3.21
489005	07/02/97	36.1	0	0	4.01
489005	07/10/98	38.7	0	0	4.30
489005	05/12/99	0	0	0	0.00
501002	05/25/94	82.3	0	0	9.15
501002	08/17/94	67.3	0	0	7.47
501002	04/27/95	89.9	27.2	0	19.07
501002	10/17/96	141.1	53.5	0	33.50
501002	05/15/97	165.7	75.8	0	43.67
501002	10/23/97	152.9	85.6	19.7	56.47
501002	06/09/98	72.2	150.3	7.2	62.12
501002	09/29/99	23.0	124.0	0	43.89
501002	11/23/99	87.3	40.4	6.6	26.79
501002	03/08/00	187.3	15.7	0	26.06
501004	11/04/97	202.8	126.0	0	64.52
501004	07/14/99	0	51.5	0	17.17
511002	04/10/89	0	13.1	0	4.37
511023	05/11/92	0	0	0	0.00
511023	12/07/93	6.9	0	0	0.77
511023	09/18/95	10.8	0	0	1.20
511023	03/24/97	57.4	0	0	6.38
512021	05/21/96	0	0	0	0.00
531008	06/16/94	3.0	24.0	294.9	172.17

Table 13 (Cont'd) Thermal Cracking Data

Section	Survey Date	Low Severity Transverse Cracking (ft)	Medium Severity Transverse Cracking (ft)	High Severity Transverse Cracking (ft)	Weighted Average (ft)
531801	06/05/91	39.0	47.9	12.8	27.41
531801	06/22/94	176.2	3.0	8.5	25.30
531801	10/31/95	64.3	158.1	0	59.86
531801	03/27/97	82.0	175.5	0	67.62
561007	05/13/91	238.8	0.0	0	26.54
561007	08/12/93	66.6	12.8	0	11.67
561007	12/09/93	239.5	9.2	0	29.67
561007	03/16/94	233.3	7.2	0	28.32
561007	04/19/94	174.5	46.3	0	34.81
561007	08/19/94	97.1	145.3	0	59.24

561007	02/16/95	67.9	171.9	0	64.85
561007	05/17/95	153.2	89.9	0	46.99
561007	09/08/95	214.9	21.3	0	30.99
561007	10/24/96	214.6	39.0	0	36.85
561007	11/19/96	217.2	35.4	0	35.94
561007	03/10/97	230.6	45.9	0	40.94
561007	03/24/97	201.4	54.1	0	40.43
561007	08/07/97	246.1	0	0	27.34
561007	09/30/97	319.6	0	0	35.51
841684	08/01/95	60.7	37.1	91.5	69.95

Table 14 Summary of Distress Data Available

Section ID	Rutting	Alligator Cracking	Longitudinal Cracking	Thermal cracking
011001				
011019				
014126				X
021001				
021002				
040113	X			
040114				
040115				
040116				
040117				
040118				
041007				
041016		X	X	
041024				
081029				
081047		X	X	
081053				
091803				
120103	X			
120104	X			
120105	X			
120106	X			
123995				
123997			X	
124105				
124106				
124107				
124108				
124135				
131031		X		
134111				
134112				
134113				
134119		X	X	
161001				
161009				
161021				
169034				
201009				
251003				
251004				
261001				
261004				
271018				
271087				
291008				
307088				

Table 14 (Cont'd) Summary of Distress Data Available

Section ID	Rutting	Alligator Cracking	Longitudinal Cracking	Thermal cracking
308129				
321020				
341003		X	X	
341011		X	X	
341031				
341033				
341034				
350101				
350102				
350103				
350104				
350105				
350106				
351005				
351022				
351112				
371006		X	X	
371024				
371802				
371817		X	X	
371992				
404087				
404163				
404165	X			
421599				
451011				
473104			X	
480001				
481060				
481077				
481109				
481130				
481169				
481174				
481178				
481183				
483749				
489005				
501002				
501004				
511002	X			
511023				
512021				
531008				
531801		X	X	
561007				
841684		X	X	

ANNEX- B

Groundwater Table Depth Information Provided by Harold Von Quintus as part of the Report *Calibration and Validation of the Fatigue Cracking and Rutting Prediction Models for the 2002 Design Guide* Submitted on March 20, 2001

Table B-1. Summary of Subgrade Soil Profile and Depth to a Rigid Layer and Water Table for The LTPP Test Sections Used for the Calibration of HMA Pavements with Unbound Aggregate Base or Rubblized PCC Layers.

State	SHRP ID	County	Roadway	Summary of Boring Log		Depth to Water Table			Depth to Rigid Layer			
				Strata or Material	Depth, inches	From Boring Log, in.	Soil Reports & Maps	Suggested Value	From Boring Log, in.	Cal. from Deflection Basins	Soil Reports & Maps	Suggested Value
Alabama	01-100 SPS-1	Lee	US 280	Silty & sandy clay	0-240	>240	Deep	>240	>240	NA	>120, Weathered bedrock	
	4126-A											
Alaska	1001	Kenai Peninsula	SH 1	Poorly Graded Gravel	0-42	>240	NA	>240	>240	Infinite	NA	Infinite
				Silty Gravel	42-240							
Arizona	04-100 SPS-1	Mohave	US 93	Silty, clayey sand & gravel	0-60	>240	Deep	>240	>240	600	10-40+, Thick cemented pan soils	600
				Silty, sand, gravel cobbles	60-204							
				Silty sand, gravel and boulders	204-240							
Arizona	1024	Yavapai	I 40	Crushed Gravel	0-12	>240	Deep	>240	>240	Infinite	24-60; Lime hardpan, Sandstone	Infinite
				Clay with Sand	12-48							
				Silty Sand	48-240							
Arkansas	05-100 SPS-1	Craighead	US 63	Sand & gravel	0-12	>240	12-48, Apparent Jan-April		>240	NA	Deep	
				Silty sand to sandy clay	12-72							
				Sandy clay	72-180							
				Silty sand & sand	180-228							

Colorado	1053	Delta	US 50	Crushed Gravel	0-12		Localized, subject to build up of water table	>240		Infinite	18-40; Shale-Severely Weathered rock	Infinite
				Soil-Aggregate	12-30							
				Clay	30+							
Connecticut	1803	New London	SH 117	Silt with Gravel	0-48		Deep	>240	48	Infinite	>24-72, Unweath. Schist, Hard	Infinite
				Large Rock	48+							
Delaware	10-100 SPS-1	Sussex	US 113	Silty sand	0-24	84	80	84		NA		
				Clayey sand	24-60							
				Silty sand, wet	60-84							
				Sand, water	84-156							
Florida	12-100 SPS-1	Palm Beach	US 27	Limerock fill, wet	0-96+		12+, Apparent June-Feb	36		NA	20-60, Hard layer	
Florida	3997	Clay	US 17	Clayey Sand	0-12		0-18, Apparent; Dec-April	120	NA	600		600
				Sand	12-90							
				Silty Sand	90+							
Florida	4106	Palm Beach	I 95	Sand	0-30	36	0-36, Apparent June-Feb	36	NA	236	96, Weakly cemented sand	236
				Sand, Moist	30+							
Georgia	1031	Dawson	SH 247C	Silty Sand w/clay	0-96		Deep	>240	NA	600	Deep	600
				Sand w/Stiff Seams	96+							
Idaho	1009	Cassia	I 84	Silty Sand	0-240	>240	Deep; Seepage >30, June-Sept	>240	>240	Infinite	>60; Cemented hardpan	Infinite
Idaho	1020	Jerome	US 93	Silty Sand	0-60		NA		66 & 120	Infinite	NA	120
				Sandy Clay	60-84							
				Silty sand	84-120							
				Rock	120+							
Idaho	1021	Jefferson	US 20	Poorly graded	0-30		36-60;	48	NA	Infinite	>60;	Infini

				gravel			Apparent, July-Sept				Localized Hardpan	te
Idaho	9034	Bonner	US 95	Dense silty sand	0-36		24-36 Perched, Feb-May		NA	Infinite	>80	Infinite
				Very dense silty sand w/large rocks	36-80+							
Iowa	19-100 SPS-1	Lee	US 61	NA			12-48, Perched, April-July			NA	>100	
Kansas	20-100 SPS-1	Kiowa	US 54	Clay w/sand - clayey sand	0-120	>240	Deep	>240	>240	NA	Deep, 18-60 lime layers	
				Sand – Sandy clay	120-204							
				Sandy clay - clay	204-240							
Louisiana	22-100 SPS-1	Calcasieu	US 171	Clayey silt	0-36	156	0-24, Perched Dec-April	148	>240	NA	Deep	
				Silty clay	36-156							
				Water	156							
				Silty caly	156-240							
Michigan	26-100 SPS-1	Clinton	US 27	Fill	0-84	156	Highly variable	156	>240	NA	Deep	
				Sand-clay fill	84-180							
				Sandy clay, Silt w/rock, sand/gravel, wet	180-240							
Minnesota	1018	Morrison	US 10	Sand w/gravel	0-6	20	18-60, Apparent Oct.-May	24		91	Deep	100
				Sand, moist	6-15							
				Silty, clayey sand	15-20							
				Water bearing	20+							
Montana	30-100 SPS-1	Cascade	IH 15	Sandy silt, silty sand & gravel	0-24	204	Deep	204	>240	NA	20-40, Rippable, Indurated sandstone large rocks	
				Sand, sandy silt, silty clay	24-144							

				Silt, sand, silty clay, wet	144-180							
				Silt, silty sand	180-240							
Montana	8129	Golden Valley	US 12	Soil-Aggr. Mixture	0-18		NA			Infinite	NA	Infinite
				Sandy Clay	18-66							
				Silty Sand	66-138							
Nebraska	31-100 SPS-1	Thayer	US 81	NA			Very Deep	>240		600	18-36+ Large amount of lime	600
Nevada	32-100 SPS-1	Lander	IH 80	Soil-aggr. Fill	0-36	180	>60, Seasonal	180	>240	NA	>40, Strongly cemented horizons	
				Sandy, silty clay w/sand & gravel	36-204							
				Clayey sand Sandy silt, slightly cemented	204-240							
New Mexico	35-100 SPS-1	Dona Ana	IH 25	Silty clay, sand, silt, damp	0-60	>240	Deep	>240		NA	>60, Calcareous	
				Sandy silt, silty sand	60-180							
				Sand, silty sand	120-180							
				Sand, sandy silt, damp	180-240							
New Mexico	1112	Lea	US 62	Sand w/clay	0-78		Deep	>240		Infinite	12-24, Indurated caliche	Infinite
				Limestone Seams	78-90							
				Clayey Silt to Sandy clay	90-192							
				Limestone Gravel	192+							
North Carolina	1006	Wake	I 40	Sandy Silt w/gravel	0-240	>240	>24, Seasonal	240	>240	600	60-180	600

North Carolina	**1024**	**Jackson**	**SH 107**	**Sandy Silt w/Mica** **Rock**	**0-60** **60+**		**Deep**	**>240**	**60**	**Infinite, Highly variable deflection**	**Bedrock varies greatly**	**Infinite**
North Carolina	**1802**	**Granville**	**1195**	**Clayey Silt** **Sandy Silt**	**0-114** **114-240**	**>240**	**Deep**	**>240**	**>240**	**Infinite, Highly variable deflection**	**Deep**	**Infinite**
North Carolina	**1992**	**Chatham**	**US 421**	**Silt w/clay** **Sandy Silt** **Silty sand**	**0-96** **96-144** **144-240**	**>240**	**NA**	**>240**	**>240**	**Infinite, Abrupt change in deflection**	**NA**	**Infinite**
Ohio	**39-100 SPS-1**	**Delaware**	**US 23**	**Clay w/stone fragments** **Clay w/stone fragments** **Wet @ 25 ft.**	**0-144** **144-240**	**360**	**18+, Seasonal**	**>240**	**>240**	**NA**	**>60, Shale, sandstone Blocky structure**	
Oklahoma	**40-100 SPS-1**	**Comanche**	**US 62**	**Sand, silty-clayey sand** **Sandy clay, clay** **Silty/sandy clay to sand, varies**	**0-36** **36-168** **168-240**	**>240**	**Deep**	**>240**	**>240**	**NA**	**Deep granite, 60-90, beds of gravel**	
Pennsylvania	**1599**	**Elk**	**SH 120**	**Silty clay** **Clayey silt** **Rock**	**0-120** **120-240** **90+**	**>240**	**18-36, Perched, Nov.-Mar.**	**240**	**90 & >240**	**300**	**>72, Sandstone over shale**	**300**
Tennessee	**3104**	**Union**	**SH 370**	**Crushed stone** **Clay** **Rock**	**0-6** **6-84** **84+**		**NA**	**>240**	**84 & 108**	**300, Highly variable deflection**	**NA**	**300**

Texas	48-100 SPS-1	Hidalgo	US 281	Silty to cemented sand w/clay	0-60	>240	Deep	>240	>240	NA	Deep loamy cal. deposits	
				Sandy clay, variable	60-120							
				Silty, cemented sand w/clay	120-240							
Texas	0001	Travis	Loop 1	Clay w/gravel	0-36		Seasonal during wet weather	204	36+	300	12-120 Hard limestone	300
				Boulders & limestone	36+							
Texas	1060	Refugio	US 77	Clay	0-6	132+				600		600
				Sandy clay	6-30							
				Clay	30-132							
				Clay, wet	132+							
Texas	1076	Terry	US 62	Silty sand	0-50+				>240	Infinite, Consist. Change in deflection		Infinite
Texas	1077	Hall	US 287	Silty sand	0-120		Deep	>240		Infinite	Deep	Infinite
				Sand	120-180							
				Sandy clay	180+							
Texas	1113	Rusk	US 259	Sandy clay	0-24		36-54, Perched, Dec.-April	84			Deep soft shale	
				Sandy clay, moist	24-138							
				Sandy clay, moist	138+							
Texas	1116	Rusk	US 259	Clay	0-18		36-54, Perched, Dec.-April	84			Deep soft shale	
				Sandy clay	18-48							
				Sandy clay, moist	48+							
Texas	1169	Rusk	US 322	Clayey sand	0-12	96+	42-60 Perched, Jan.-April	96	>240	240	>72 Soft shale, sandstone	240
				Sandy clay	12-24							
				Sand	24-96							
				Clayey sand	96-204+							

Texas	**1174**	**Nueces**	**SH 44**	**Crushed stone** **Clay, moist** **Sandy clay**	**0-10** **10-198** **198-240**	**100+**			**>240**	**Infinite, Consist. Change in deflection**		**Infinite**
Texas	**1178**	**Burleson**	**SH 21**	**Crushed stone** **Clay** **Clay, moist**	**0-12** **12-108** **108+**				**>240**	**600**		**600**
Texas	**3729**	**Cameron**	**US 83**	**Clay** **Clayey sand**	**0-204** **204+**	**204**	**36-120 Seasonal, Localized**	**>240**	**>240**	**600**	**Weakly cemented calcium carbonate**	**600**
Texas	**3749**	**Duval**	**US 59**	**Gravel-soil mixture** **Silty clay, moist** **Silt w/gravel Calichie** **Silty sand, dry**	**0-12** **12-120** **120-180** **180+**				**>240**	**Infinite**		**Infinite**
Texas	**3769**	**El Paso**	**US 62**	**Silty-sandy gravel & sand** **Sandy clay** **Clay**	**0-90** **90-132** **132-144+**		**Deep**	**180**			**28-60, cemented, Indurated caliche**	
Texas	**9005**	**Bexar**	**1560**	**Clay, moist w/gravel** **Limestone pieces** **Gravel w/clay**	**0-216** **168+** **216+**	**>240**	**Deep**	**>240**	**>240**	**300, Abrupt change in deflection**	**>48, hard limestone**	**300**
Vermont	**1002**	**Addison**	**US 7**	**Gravelly silt** **Silty clay**	**0-108** **108-240**	**>240**	**6-18, Seasonal**	**>240**	**>240**	**Infinite**	**>60, Hard layers**	**Infinite**
Vermont	**1004**	**Grand Isle**	**US 2**	**Soil-aggr. mixture** **Sandy clay**	**0-36** **36-192**	**>240**	**NA**		**>240**	**600**	**NA**	**600**

				Silty clay	**192-240**							
Virginia	**51-100 SPS-1**	**Pittsylvania**	**SH 29**	**Sand, clay w/silt, varies**	**0-24**	**>240**	**Deep**	**>240**	**>240**	**NA**	**>78, Hard rock fragments**	
				Sandy clay, Clay, rocks, sandy silt, varies	**24-144**							
				Silt w/gravel & stone	**144-240**							
Virginia	**1002**	**Floyd**	**SH 8**	**HMA**	**0-5**		**NA**	**>240**	**72**	**Infinite, Consist. Change in deflection**	**NA**	**Infinite**
				Aggr. base	**5-12**							
				Rock	**12-72+**							
Virginia	**1023**	**Prince George**	**I 95**	**Clayey sand**	**0-216**	**220**	**48-84, Perched, Jan.-Mar.**	**120**	**>240**	**600**	**>120**	**600**
				Sandy silt, wet	**216-240**							
Virginia	**1464**	**York**	**I 64**	**NA**			**NA**	**>240**		**300, Consist. Change in deflection**	**NA**	**300**
Wisconsin	**55-100 SPS-1**	**Marathon**	**SH 29**	**NA**			**Deep, 36-60, localized areas with seasonal**	**>240**		**NA**	**Deep**	
Wyoming	**1007**	**Park**	**US 20**	**Soil-Aggr. mixture**	**0-10**	**>240**	**NA**		**132**	**Infinite**	**NA**	**Infinite**
				Silty sand	**10-84**							
				Siltstone	**84-132+**							

Table B-2. Summary of Subgrade Soil Profile and Depth to a Rigid Layer and Water Table for The LTPP Test Sections Used for the Calibration of Deep Strength or Full Depth HMA Pavements.

Note: All of the SPS-1 projects and test sections are included in the previous table (Table B-1).

State	SHRP ID	County	Roadway	Summary of Boring Log		Depth to Water Table			Depth to Rigid Layer			
				Strata or Material	Depth, inches	From Boring Log, in.	Soil Reports & Maps	Suggested Value	From Boring Log, in.	Calculated from Deflection Basins	Soil Reports & Maps	Suggested Value
Alabama	1019	Washington	US 43	Sand-Gravel	0-12	144	NA	144		252	NA	252
				Sand	12-24							
				Clayey sand	84-144							
				Silty clay, wet	144+							
Alabama	4073	Jackson	US 72	Crushed stone	0-6		NA	240	200	Infinite	NA	Infinite
				Sandy clay	6-120							
				Silty clay	120-132							
				Clay w/fractured limestone	132-180+							
Colorado	2008	Bent	US 50	Clay	0-240	>240	<40; Seasonal	240	>240	Infinite; Consist. Change in deflection	None; Blocky w/ lime spots; strongly calcareous	Infinite
Georgia	4119	Barrow	I 401	Clayey sand	0-6		Very deep	>240		Infinite	Moderate depth to saprolite 200	Infinite
				Clayey silt	6-48							
				Silty clay	48-180							
				Silty clay, moist	180+							
Oklahoma	4163	Blaine	US 270	Sandy clay	0-96	204	>36, Seepage	204	>240	Infinite	Deep, Sandstone	Infinite
				Clayey sand	96-168							

				Sandy clay	168-204+							
Oklahoma	4164						NA				NA	
Oklahoma	4165	Major	US 60	Clayey sand	0-12	132	Deep	180		Infinite	Deep, Shale, siltstone, gypsum	Infinite
				Sandy clay	12-36							
				Clayey sand	36-72							
				Silty sand	72-180+							
Texas	1109	Walker	SH 19	Clay	0-6		0-18; Perched, Oct.-May	>240	>240	Infinite, Highly variable deflection	36-80; Soft sandstone, siltstone	Infinite
				Sandy clay, moist	6-204							
				Clay, dry	204+							
Texas	3559	Walker	SH 30	Clayey sand	0-48		24-48; Perched, Oct.-May	>240		Infinite	Deep	Infinite
				Sandy clay	48-90							
				Clayey sand	90-120+							
Virginia	2021	Carroll	US 58	Silt	0-240	>240	>48; Seasonal		42 & 240	197, Consist. Change in deflection	>82; Weathered Mica, Schist	200
				Rock	42+							
Prince Edward Island	1647	2	SH 2	NA						300		300
Prince Edward	4119-A						NA				NA	

Table B-3. Summary of Subgrade Soil Profile and Depth to a Rigid Layer and Water Table for The LTPP Test Sections Used for the Calibration of HMA Pavements with Cement Treated Layers.

State	SHRP ID	County	Roadway	Summary of Boring Log		Depth to Water Table, inches			Depth to Rigid Layer, inches			
				Strata or Material	Depth, inches	From Boring Log	Soil Reports & Maps	Suggested Value	From Boring Log	Calculated from Deflection Basins	Soil Reports & Maps	Suggested Value
Arkansas	2042	Ashley	US 82	Clayey sand	0-12	24	12-60; Seasonal, Dec-April	24	>240	94, Highly variable deflection	>72	100
				Silty clay	12-36							
				Clayey silt	36-60							
				Silty clay	60-192							
				Sandy clay	192-228							
				Sand	228+							
Louisiana	3056	Rapides	I 49	Sandy clay	0-42	42	12-48, perched water table, Dec-April	42		600	Fragipan >240	600
				Watered sand	42-156							
				Clay	156-192							
				Sandy clay	192+							
New Jersey	1638	Gloucester	SH 55	NA			NA			600	NA	600
North Carolina	1645	Columbus	US 76	Silty sand	0-240	>240	24-36, Apparent, Dec-April	240	>240	600	Deep	600
North Carolina	2824	Chatham	US 421	Silty clay	0-54		NA	>240	55	Infinite, Consist. Change in deflection	NA	Infinite
				Clayey silt w/rock strands	54+							
Oklahoma	4154	Grady	US 81	Sandy clay	0-30	84	Deep	84		600	Deep, Areas w/hard layer but rippable >40	600
				Clayey sand, moist	30-84							
				Sandy clay, wet	84+							
Texas	2176	Hale	SH 445	Sandy clay	0-144	>240	Deep	>240	>240	600, Highly variable deflection	Deep	600
				Silty clay	144-162							
				Clayey sand	162-192							
				Sand	192-210							
				Sandy clay	210+							

Texas	**3669**	**Angelina**	**SH 94**	**Sandy clay** **Clayey sand**	**0-45** **45-69+**		**30-42; Perched, Jan.-April**	**84**	**>240**	**600, Abrupt change in deflection**	**40-60; Soft siltstone, shale**	**600**
Texas	**3679**	**Angelina**	**SH 103**	**Clayey sand** **Silty clay, moist** **Sand, dry**	**0-60** **60-216** **216+**	**>240**	**48-60; Apparent, Nov.-Feb.**	**>240**	**>240**	**429, Highly variable deflection**	**>120**	**430**
Virginia	**2004**	**Pittsylvania**	**SH 265**	**NA**			**Deep**	**>240**		**600, Highly variable deflection**	**>78, Hard rock fragments**	**600**
Wyoming	**2015**	**Laramie**	**I 25**	**CTB** **Silty sand** **Sandstone**	**0-12** **12-84** **84+**		**30-72; Apparent, Apr.-Nov.**	**>240**	**84**	**300, Abrupt change in deflection**	**>84; Soft sandstone**	**300**
Wyoming	**2017**	**Campbell**	**SH 387**	**CTB** **Clay**	**0-18** **18+**		**NA**			**Infinite, Highly variable deflection**	**NA**	**Infinite**
Wyoming	**2020**	**Sheridan**	**I 90**	**Sandy-Silty clay** **Clayey silt** **Siltstone**	**0-60** **60-132** **132+**		**NA**		**132**	**600**	**NA**	**600**
Wyoming	**2037**	**Sweetwater**	**SH 789**	**CTB** **Silty sand** **Clay** **Claystone/Shale**	**0-18** **18-96** **96-120** **120+**		**36; Perched, June-Aug.**	**>240**	**120**	**Infinite**	**20-40; Soft shale**	**Infinite**
Wyoming	**7773**	**Natrona**	**SH 487**	**CTB** **Clay** **Silty Sand w/gravel** **Silt w/sand** **Silty sand**	**0-18** **18-48** **48-162** **162-204** **204+**	**>240**	**Deep**	**>240**	**>240**	**Infinite**	**Deep**	**Infinite**

ANNEX- C

GWT Depth and Depth to Bedrock Data Gathered from US Geological Survey, State DOTs, and LTPP Boring Logs

GWT Depth and Depth to Bedrock Data Gathered from US Geological Survey, State DOTs, and LTPP Boring Logs

State Code	State	SHRP ID	Latitude N	Longitude W	Elevation (ft)	GWT Depth (ft) USGS	Date Measure was Taken	Remarks	GWT Depth (ft) Another Source	Remarks	GWT Depth Value Used (ft)	Depth to Bedrock (ft)	Remarks
1	AL	1001	32.533	85.050	495	27.96	12/6/1967	4 mi; very old; 61-67			31	>5	USGS
						171.79	6/27/1961	4 mi; very old; 61, deep aqfr					
						9.30	5/20/1961	3 mi; very old; 61-67					
						31.35	5/20/1992	2 mi; new; 92					
1	AL	4126	34.179	86.875	760	12.34	6/28/1999	15 mi; new; 99	30		30	13.6	LTPP: 13.6'; DOT: 15'
2	AK	1002	60.759	149.239	839	75.00	8/15/1973	8 mi; old; 73	10		10		
4	AZ	1007	33.437	112.581	1044	174.70	12/3/1991	1 mi; new; 82-91	400		175	200	DOT: 200'; LTPP INV_GENERAL
						205.20	1/13/1986	1 mi; old; 72-86					USGS: 200'
						225.60	1/9/1986	1 mi; old; 82-86					
4	AZ	1016	31.638	111.058	3218	68.79	1/10/1939	1 mi, very old; 39	200		68	20	DOT: 50'; LTPP INV_GENERAL:
						95.80	2/23/1982	0.5 mi; old; 40-82					
						88.44	12/15/1987	0.5 mi; old; 87					
8	CO	1029	40.626	107.919	5920	25.09	6/18/1975	30 mi; old; 75			25		
8	CO	1047						No wells within 20-mile radius				35	LTPP INV_GENERAL
12	FL	3995	26.501	80.078	19			No wells within 20-mile radius	9	LTPP boring log: Moist soil	9		
12	FL	4105	30.400	81.590	20	36.60	4/27/2000	1.5 mi; new; 81-00	10	LTPP boring log: Moist soil	10		
12	FL	4107	27.393	80.459	26	38.98	9/13/2000	14 mi; new; 00	16.8	LTPP boring log: Watered sand	16.8		
						33.57	9/12/2000	15 mi; new; 00					
12	FL	4108	30.380	86.431	19			Average used			34		
						47.46	7/7/1978	2 mi; old; 78					
						21.47	3/6/1979	2 mi; old; 79					
12	FL	4135	27.861	81.589	130	41.72	8/15/1989	1.25 mi; new; 87-89	15	LTPP boring log: Wet sand	15		
						4.06	8/10/1999	1.25 mi; new; 88-99					
13	GA	4111	33.932	83.423	735	14.00	11/24/1987	5 mi; old; 87	20 - 50'		34	30	DOT: 20' - 40'
						33.74	8/18/1990	4 mi; new; 90					
						15.00	10/1/1958	8 mi; very old; 58					
13	GA	4112	31.029	81.606	13	15.45	5/17/1991	3 mi; new; 91	5 - 15'		15	150	> 150'
						13.41	9/8/2000	5 mi; new; 65-99					
						12.64	9/8/2000	5 mi; new; 91-00					
						20.42	9/11/2000	8 mi; new; 91-00					
13	GA	4113	31.082	81.614	13	15.45	5/17/1991	2.5 mi; new; 91	5 - 15'		15	150	> 150'
						20.42	9/11/2000	6 mi; new; 91-00					
16	ID	1001	47.774	116.790	2150			Average used			307	5	Sum Thickness LTPP;
						307.25	3/21/1978	0.25 mi; old; 77-78					LTPP(INV_GENERAL): 99.9
						301.63	8/16/1978	0.25 mi; old; 77					
						309.72	9/21/1988	0.25 mi; old; 77-88					
						308.25	3/20/1978	0.25 mi; old; 77-78					
20	KS	1009	37.998	98.747	1922	19.00	8/1/1968	2.5 mi; very old; 68			15	145	USGS
						19.00	1/1/1954	1 mi; very old; 54					
						15.00	12/1/1973	0.75 mi; old; 73					
						20.40	9/1/1942	1.25 mi; very old; 42					
25	MA	1003	42.301	71.335	138	4.00	1/1/1954	2 mi; very old; 54			11		
						7.00	1/11/1950	2 mi; very old; 50					
						11.00	1/11/1950	1 mi; very old; 50					
						18.00	1/11/1950	1.5 mi; very old; 50					
25	MA	1004	41.654	70.902	49	3.00	7/1/1968	1 mi; very old; 68			1		

GWT Depth and Depth to Bedrock Data Gathered from US Geological Survey, State DOTs, and LTPP Boring Logs

State Code	State	SHRP ID	Latitude N	Longitude W	Elevation (ft)	GWT Depth (ft) USGS	Date Measure ment Taken	Remarks	GWT Depth (ft) Another Source	Remarks	GWT Depth Value Used (ft)	Depth to Bedrock (ft)	Remarks
26	MI	1004	47.101	88.605	984			Average of two closest values used			5	3.7	DOT boring logs
						41.00	9/2/1980	14 mi; old; 80					
						51.00	8/4/1980	13 mi; old; 80					
						9.00	6/6/1984	13 mi; old; 84					
						1.50	9/26/1986	12 mi; old; 86					
27	MN	1007	44.807	93.228	800	100.00	10/3/1973	1 mi; old; 73			85		
						92.00	1/1/1983	0.75 mi; very old; 83					
						85.00	11/15/1966	0.6 mi; very old; 66					
						59.00	11/18/1977	1.25 mi; old; 77					
29	MO	1006	37.237	94.579	860	25.00	2/15/1965	1.4 mi; very old; 65	34		34	37.8	DOT
						3.00	9/16/1976	1.25 mi; old; 76					
						32.00	4/23/1965	0.75 mi; very old; 65					
30	MT	2008	45.812	110.004	4072	83.75	5/31/1981	2.5 mi; old; 81			70		
						7.51	4/8/1981	2.5 mi; old; 81					
						11.41	4/8/1981	2.5 mi; old; 81					
						70.00	7/22/1981	1.5 mi; old; 81					
32	NV	1029	38.529	118.610	4272	261.20	3/21/1996	2.5 mi; new;42-96			211		
						300.53	10/21/1957	1 mi; very old; 54-57					
						211.40	4/24/1967	1 mi; new; 52-67					
						187.86	2/17/1974	1 mi; old; 74					
34	NJ	1003	41.010	74.616	1156	32.00	11/3/1952	8 mi; very old; 52			70	3.3	LTPP
						70.00	1/07/81	2 mi; old; 81					
						32.76	9/7/1999	10 mi; new; 91-99					
34	NJ	1011	40.180	74.556	107	100.01	11/16/1998	2.5 mi; new; 98			5		
						84.03	10/28/1998	2.5 mi; new; 81-98					
						4.73	10/21/1993	1.5 mi; new; 69-93					
34	NJ	1031	39.544	75.062	85	16.03	2/11/1995	2.5 mi; new; 95			5		
						4.71	7/24/1998	0.5 mi; new; 96-98					
						31.65	11/1/1995	2.1 mi; new; 86-95					
						5.90	7/24/1998	2.25 mi; new; 96-98					
34	NJ	1033	40.414	74.894	207	41.47	3/6/1999	1.5 mi; new; 90-99			41	11.7	LTPP
						30.00	6/5/1953	2 mi; very old; 53					
34	NJ	1034	39.824	75.108	54	90.37	9/15/1999	1.5 mi; new; 89-99			90		
						90.43	11/6/1990	1.5 mi; new; 82-98					
35	NM	1005	35.509	106.238	5523	102.75	2/9/1998	12 mi; new; 73-98			131	1500	USGS
						131.20	6/1/2001	11 mi; new; 73-01					
						264.14	7/26/2001	13 mi; new; 64-01					
35	NM	1022	36.374	107.834	6727			No wells within 20-mile radius			--------	1377	USGS
37	NC	1017	36.055	80.161	850	35.00	1948	0.25 mi; very old; 48			35		
						15.00	1948	2.5 mi; very old; 48					
						50.00	1948	3 mi; very old; 48					
38	ND	2001	47.933	97.427	922	12.00	1/1/1990	5 mi; very old; 90	10-20'		10	150	DOT
						40.00	1/1/2029	3.75 mi; very old; 29					
						27.84	8/27/1968	4.25 mi; very old; 68					
						8.64	9/30/1966	2.75 mi; very old; 66					
40	OK	4067	34.638	99.288	1350	8.25	3/29/1994	0.5 mi; new; 89-94			7.5		
						7.71	3/29/1994	0.5 mi; new; 89-94					
						6.66	8/14/1993	0.5 mi; new; 89-93					

GWT Depth and Depth to Bedrock Data Gathered from US Geological Survey, State DOTs, and LTPP Boring Logs

State Code	State	SHRP ID	Latitude N	Longitude W	Elevation (ft)	GWT Depth (ft) USGS	Date Measure was Taken	Remarks	GWT Depth (ft) Another Source	Remarks	GWT Depth Value Used (ft)	Depth to Bedrock (ft)	Remarks
48	TX	1089	32.617	96.426	425			No wells within 20-mile radius					
48	TX	1113							7	Harold von Quintus report	7		
48	TX	1130	29.580	97.944	519	217.53	9/13/1999	20 mi; new; 99			54		
						64.07	10/13/1999	18 mi; new; 99					
						148.70	8/8/2001	23 mi; new; 45-01					
48	TX	1168	32.680	95.498	418			No wells within 20-mile radius			----------		
48	TX	1178	30.561	96.670	425			No wells within 20-mile radius	>240"	Harold von Quintus report	20	50	Harold von Quintus report
48	TX	1183	33.329	101.522	2994			No wells within 20-mile radius					
48	TX	3729							>240"	Harold von Quintus report	17	50	Harold von Quintus report
									17'	LTPP boring log			
48	TX	3739	28.984	97.796	36								
48	TX	3749	27.800	98.556	570			No wells within 20-mile radius	>240"	Harold von Quintus report	20	Infinite	Harold von Quintus report
48	TX	3769	31.800	106.250	3991	9.53	12/7/2000	10 mi; new; 56-00	15	Harold von Quintus report	15	3.7	Harold von Quintus report
						120.37	12/8/2000	11 mi; new; 56-00					
						122.03	12/9/2000	12 mi; new; 56-00					
						351.56	12/11/2000	3 mi; new; 53-00					
48	TX	3955	29.900	96.807	320			No wells within 20-mile radius			----------		
51	VA	1002							6	Harold von Quintus report	6	6	Harold von Quintus report: Infinite
													LTPP boring log: 6' ; USGS: 150'
51	VA	1023	37.015	77.391	98			Average used	>240"	Harold von Quintus report	47.5	50	Harold von Quintus report
						50.05	5/28/1980	1.5 mi; old; 71-80					USGS: 850'
						45.00	1978	1.5 mi; old; 78					
51	VA	1464	37.332	76.709	62	135.28	6/30/1984	1.5 mi; old; 42-84	>240"	Harold von Quintus report	124	25	Harold von Quintus report
						142.83	9/19/1985	2 mi; old; 78-85					
						105.81	3/19/1990	1.25 mi; new; 71-90					
						124.11	4/22/1989	0.05 mi; old; 89					
53	WA	1008	47.558	117.394	2356			Average used			54.5		
						60.00	6/11/1991	0.4 mi; new; 91					
						50.00	4/13/1976	0.4 mi; old; 76					
						20.00	4/21/1983	0.25 mi; old; 83					
						82.00	8/27/1976	0.3 mi; old; 76					
53	WA	1001	45.571	122.313	440	4.00	7/1/1949	0.2 mi; very old; 49			18.7	5	Refusal - LTPP boring log
						31.00	10/13/1965	0.5 mi; very old; 65					
						15.00	4/30/1957	0.5 mi; very old; 57					
91	HB,Can	1004	45.849	66.643	79								
88	HS,Can	1645	46.324	63.663	150				30		30	14	DOT
19	IA	0100	40.703	91.250	530	28.00	4/20/1999	5 mi; new; 99	12-48"	Harold von Quintus report	2.5		Harold von Quintus report: >100"
						6.95	4/21/1999	5.25 mi; new; 99		Perched water			
						5.85	4/21/1999	5.1 mi; new; 99					
						16.95	4/20/1999	4.75 mi; new; 99					
20	KS	0100	37.600	99.250	2177	119.80	1/20/1998	1.75 mi; old; 63-88			110		
						114.77	1/13/1998	1.5 mi; new; 89-98					
						136.00	2/1/1968	2.25 mi; very old; 68					
						118.00	8/1/1968	1.25 mi; very old; 67					
31	NE	0100	40.071	97.624	1611	150.31	4/9/1998	1.75 mi; old; 81-86	13.9	LTPP Database	13.9	50	Harold von Quintus report
						140.80	4/6/2000	1.5 mi; new; 79-00					
						10.73	7/15/1939	2.2 mi; very old; 39					
32	NV	0100	40.693	117.006	4590	63.52	4/4/1996	1.5 mi; new; 82-96	15.17	LTPP boring log Water	15.17		

Depth to Bedrock Information for New Calibration Sections Provided by the US Geological Survey (USGS)

011001 – Alabama – Lee County

Using the Smiths Ala.-Ga. 7.5-minute USGS topographic map the point you identified plots in the SE1/4 sec. 24, T. 18 N., R. 29 E. approximately 1 mi. SE of Smiths at an elevation of ~500 ft. The geology of this area as shown on Geological Survey of Alabama Special Map 220 "Geologic Map of Alabama," is Tuscaloosa Group undifferentiated (sand, gravel, clay of the Gulf Coastal Plain) which overlies the Phenix City Gneiss (high-grade metamorphic and igneous rocks) of the Uchee Complex, Southern Piedmont. The depth to bedrock is dependent on site-specific characteristics of the topography, rock types, soils, drainage, etc. The USDA "Soil Survey of Lee County," (1981) identifies the soil associations in this area as Marvyn loamy sand, 1 to 6 percent slopes and Uchee loamy sand, 6 to 10 percent slopes with a **depth to bedrock greater than 60 in.**

21002 – Alaska - Kenai Peninsula

Regarding the type and depth of bedrock at 60 deg, 45'32", 149 deg, 14'21", which is located on the Kenai Peninsula S of the village of Hope. The only type of bedrock in this area is the late Cretaceous Valdez Group. This unit consists of slate and greywacke. As far as depth to bedrock at this particular location, I did not pull out a lat-long grid and figure out the precise location. There are various glacial and fluvial deposits that overlie bedrock in this region. They are generally not more than few hundred feet thick in this region. To answer the question more precisely, one would need to hire a Geotechnical engineer to go to the exact location and conduct an investigation.

41007 - Arizona – Maricopa County

Working with 1:250,000 depth to bedrock maps for the Phoenix and Nogales quadrangles and an engineer's ruler to calculate latitude and longitude, I've arrived at the following:
Maricopa -- 33-26-11.5N, 112-34-52.8W
This comes in just south of the White Tank Mountains. I calculated it to be between the 400 ft. contour and bedrock, **probably around 200 ft**. However, the 1:1,000,000 Arizona geologic map shows the road running over granitoid rock (Middle Proterozoic; 1400 Ma). We can probably say that the bedrock is granitoid, but the depth to it can run from 400 ft. to 0 ft. depending on the slop in mapping due to scale and the slop in my measuring the latitude and longitude of the spot. Depth to bedrock calculations come from Oppenheimer, J.M. and Sumner, J.S., 1980, Depth to bedrock mas (Phoenix and Nogales quadrangles) - unpublished bluelines, probably used to make the 1:1,000,000 depth to bedrock map for Arizona.

41016 – Arizona – Santa Cruz County

Santa Cruz -- 31-38-19.1N, 111-03-27.9W
My measurement came out less than a mile west of the highway where I calculated the depth to be **around 2000 ft**. If the site is on the highway you are probably closer to 3000 ft in depth. Both sites are between the 1600 ft. and the 3200 ft contour, which are about 2 miles apart at that point. The Quaternary material at the site seems to overlie volcanic rocks (middle Miocene to Oligocene; 15 - 38 Ma)--Silicic to mafic flows and pyroclastic rocks; includes some sub-volcanic

intrusions or by Sedimentary rocks (Pliocene to middle Miocene)--Units deposited during and after late Tertiary normal faulting, sedimentary parts of the Bidahochi Formation, and the Bouse Formation; commonly capped by patches of Quaternary surficial deposits.

81029 – Colorado – Moffat County
The bedrock at the requested point in Moffat County is the Browns Park Formation-a Tertiary (Miocene) fluvial siltstone, claystone, conglomerate, loosely consolidated eolian sandstone, and volcanic ash. I don't have any info on depth to bedrock in this area.

201009 – Kansas – Stafford County
Dan Suchy, from Kansas, reports that bedrock at the Stafford County site is shale with some redbeds, sand, or limestone - reports vary. There is an oil well within 300 feet of the site, and **depth to bedrock there is 140 ft to 150 ft**.

25 – Massachusetts Sites
I have checked with a couple of people in our office and no one has done any project work in that area. I can check out to see if we have any ground water wells in that area and check the drillers logs to see if there was refusal and if that does not work I might be able to get it from a surficial Geology map.

291008 – Missouri – Jasper County
The latitude and longitude plots to approximately the NE Corner, SE 1/4, NE 1/4, Sec. 24, T. 29 N., R. 34 W. on the Carl Junction 7.5 Minute Quadrangle. We have no drill hole information in the vicinity of this location that shows depth to bedrock. **There may be approximately 6 feet of silty clay underlain by 4 feet of cherty clay residuum on top of limestone bedrock.** Elevation of the top of bedrock is expected to vary in this area.

351005 - New Mexico - Location 1. 35-30-30.8N 106-14-16W
Depth to bedrock in this area is approximately 1300 ft. Data are from a well cited in Abbot, J.C., Cather, S.M., and Goodwin, L.B., 1995, Paleogene synorogenic sedimentation in the Galisteo Basin related to the Tijeras-Canoncito fault system: New Mexico Geological Society, Guidebook to 46th field conference, pp. 271-278.

351022 - New Mexico - Location 2. 36-22-26.7N 107-50-2.0W
It will depend on what you mean by bedrock in this area. A well within one mile has depth to Kirtland Formation at **1377 ft** and depth to Fruitland Formation at 1763 ft.

382001 – North Dakota – Grand Forks County
Based on the information readily available to me right now, I can only provide an approximate answer to your question. I don't have specific test-hole data for the precise location about which you asked. The depth to bedrock in the location you specified, within about a mile or so from that location, ranges between about **220 and 250 feet**. That is, approximately 220 to 250 feet of alternating glacial and lake sediment overlie the bedrock in that area. The bedrock at that location is Cretaceous shale (Mowry-Skull Creek, undifferentiated). The easternmost limit of shale subcrop in this general area is approximately 3 to 5 miles to the east of this location. The shale on top of basal Cretaceous sand of the Inyan Kara Formation, which subcrops to the east of

the pinchout. It may be that one of our geologists will be able to find a test hole very near the exact location you specified, and if so it may be possible to provide more accurate information. Otherwise, the accuracy of the thickness is based on an interpolation between contours on an isopach map (100-foot contour interval). The identification of the bedrock formation should be correct. I am unsure how thick the shale interval is at the point you specified.

48 - Texas Sites

We won't have any information about depth to bedrock for these coordinates. The best information that we have for type of bedrock would be on our surface geology maps. The scale of these maps is 1:250,000. USGS 7.5 topos were used as the base maps and aerial photos and some field work were the typical data used to determine the surface geology features. At this scale, accuracy for specific coordinates could be in question. Here is a list of the counties of interest and the maps where they are located:

481060 - Refugio - GA 0005 - Beeville, Bay City map
481130 - Guadalupe - GA 0029 and GA 0030 - San Antonio and Seguin maps
481178 - Burleson - GA 0003 - Austin map
483739 - Kenedy - GA 0010 and GA 0023 – Corpus Christi and McAllen, Brownsville maps
483769 - El Paso - GA 0036 - Van Horn, El Paso map

511002 – Virginia – Floyd County

Floyd site: +/- 70 ft. to the biotite gneiss of the Ache Formation Prince George site: around **150 ft.** (<200 ft) through the Bacon Castle Formation to an unnamed Triassic basin of mudstone with sand, silts, and clays.

511464 – Virginia – York County

York site: around **850 ft**. to granite gneiss.

ANNEX- D

Estimating Original Air Voids of GPS-LTPP Sections.

Estimating Original Air Voids of GPS - LTPP Sections

PROBLEM STATEMENT

The air voids at the time of construction (original air voids) of the asphalt mixture placed on a pavement section is required for the calibration and validation of the distress models used in the 2002 Design Guide. This information is needed for all the asphalt layers within the pavement section. As of date, a total of 56 GPS sites have been identified that will be used for the calibration of the distress models in the 2002 Design Guide. These sections were selected from the LTPP database that conforms to some minimum data requirements. The data was extracted from LTPP database by Fugro-BRE and was transferred to ASU research team for calibration of distress models for the new flexible design sections.

During the review of the data, it was observed that the information on the original air voids or the air voids at the time of construction might be in error. It was of paramount importance to make sure that the data used for calibration was error free. It was thus decided to carry out an investigation on the reliability of the original air voids obtained from the LTPP database.

PRELIMINARY INVESTIGATION

As a general criteria used in practice, "Design Air Voids" for dense graded mixes falls between 3-6% range while "Construction Air Voids" is generally 3-5% higher than the design air voids value. Information was obtained from the LTPP database both on the construction and design air voids. The results obtained are shown in Figure 1. It can be observed that in most instances the Design Air Voids are either equal or higher than the Construction Air Voids. This is unrealistic and in contrast from what it should be. As a consequence, the original air voids (construction air voids) data for the cited sections were considered unreliable given the magnitude of the values. Since the original air voids at the time of construction is the key information required for the calibration of the distress models, it was decided to look for information that can be used to estimate the initial air voids value for the selected sections. A study was carried out and the results are presented in this report.

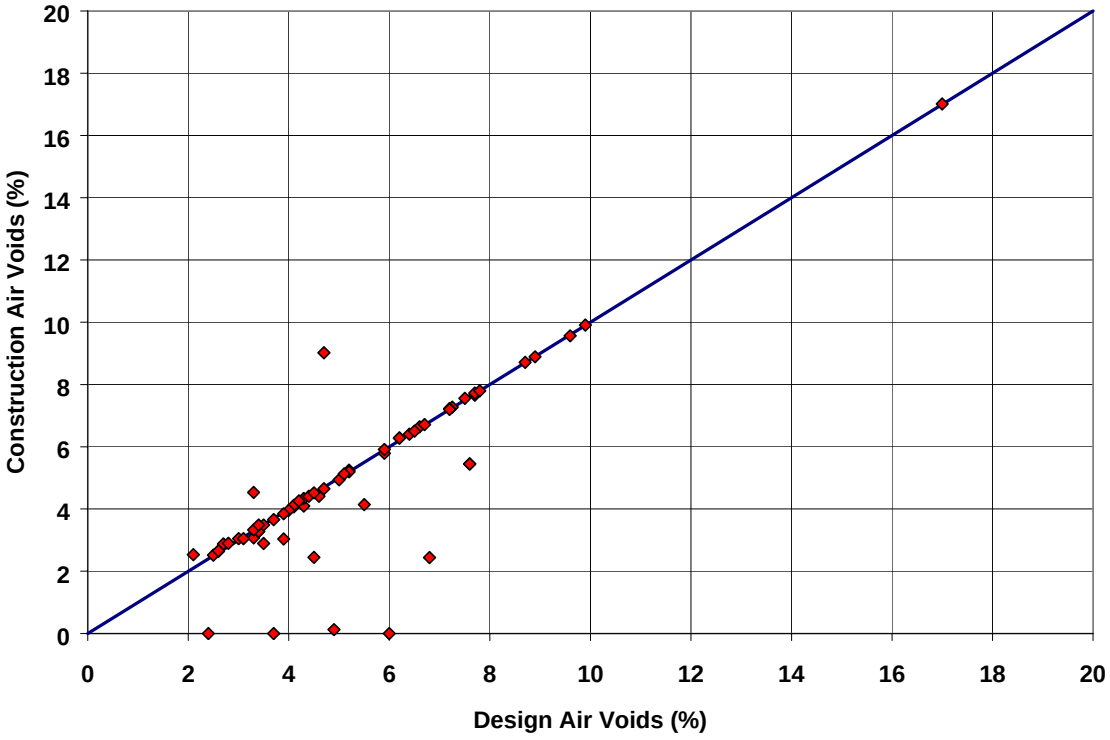


Figure 1. Design versus Construction Air Voids for 56 GPS Sections from LTPP Inventory Database

LITERATURE REVIEW

Not much information and quantitative research is available to predict the change of in-situ mix air voids as a function of mix densification due to repeated loads under different environmental conditions for different mix types. However, it is well understood as to which factors contribute to the change in air voids in the real pavement. Among, several contributing factors, four major factors are logically felt to influence the rate of change of air voids as a function of time. These factors are:

1. Traffic.
2. Compaction/ Initial Air Voids.
3. Environmental Regime.
4. Mix and Bitumen Considerations.

A brief description of each of the above factors is given below.

Traffic

Traffic is one of the most important factors that influence the change in air voids for a particular mix. In general, the overall traffic effect is a function of the vehicular loads, gear configurations, traffic volumes and speed of the vehicles operating on the asphalt pavement. As the number of repetitions increase, the density of the asphalt concrete increases which results in a decrease in the air voids. High volume roads are more susceptible to larger changes of air voids compared to low volume roads, if all of the other variables are kept constant.

Compaction/Original Air Voids

Compaction, at the time of construction, defines the initial mix density and the initial air voids (original air voids). The initial air void content of a mix will influence the rate of change in air voids due to traffic. The initial air void value is a function of both, the specific mix design and the field compaction. Higher initial air voids will result in greater change in air voids compared to lower initial air voids. It is known that an ultimate value of air voids is achieved after a certain period of time depending upon the mix, traffic and environmental conditions. This is commonly called the voids at refusal. Thus, it is important that any statistical model developed to capture this phenomenon approaches an asymptotic value.

Environmental Regime

While the fundamental environmental factors that influence asphalt aging are not clearly understood; it is clear that temperature does play a major role in the behavioral response of any asphalt mix. As a general indicator, the mean annual air temperature (as a surrogate parameter for the environment) does directly influence the change in air voids. Since asphalt mixtures are viscous materials, they are greatly affected by changes in temperature. Higher temperatures will make the asphalt less viscous, the mix less stiff and more susceptible to compaction under traffic loads. Thus, higher mean annual air temperatures will generally result in a greater change of air voids if all other variables are kept constant.

Mix and Bitumen Consideration

Under the same environmental conditions and traffic, harder asphalt cements will result in stiffer mixes. Stiffer mixes, under the same environment and traffic, will have less change in air voids compared to softer mixes.

Existing Predictive Approach

Mirza at el. (AAPT 1995), at the University of Maryland has developed a regression model based upon the information obtained from the field to predict the change in air voids as a function of time. The model developed is given below:

$$VA = \frac{VA_{orig} + 0.0111\ t - 2}{1 + 0.000424\ t\ \ Maat + 0.001169\ \frac{t}{\eta_{orig,77}}} + 2 \qquad (1)$$

where:

Va = aged air voids at time , t (%)

Va_{orig} = original air voids at the time of construction (%)

Maat = mean annual air temperature, deg F

$\eta_{orig,77}$ = original viscosity at 77 deg F

t = time (months)

In the above regression model a value of two percent was arbitrarily selected as a minimum air void for mathematical convenience. This value of 2% does have engineering justification in that sound or stable rut resisting mixtures will generally reach this threshold void level (2-3%) prior to excessive shear displacement caused by plastic flow. The selection was also influenced by the minimum standard error of estimate. The above model has a standard error of 1.65 and coefficient of multiple determination (R^2) of 0.96. It should be observed that the model is not a function of the traffic. This variable was not included in the model since no information was available on the traffic level, for the sections used in the development of this regression model. Table 1 gives the summary of the field projects used in the analysis. ANNEX A gives the summary of the data.

Table 1 Summary of Data Points

Line No.	Test RD/Source	*No. of Sections* at each Test Road	No of Data Points
85-99	**Michigan**	6	36
348-394	Delaware	8	24
535-568	Texas (Dickens)	5	16
577-612	Texas (Dumas)	5	17
615-641	Texas (Lufkin)	3	9
1082-1084	Florida	1	3
1102-1250	Zaca Wigmore	15	56
1834-1836	Minnesota	1	3
1902-1939	BPR-Was, DC	6	28
	TOTAL	50	192

Revised Model with NCAT Data

Revised coefficients were obtained for Mirza's model using additional data obtained from the National Center for Asphalt Testing (NCAT). A summary of the data obtained from NCAT is given in ANNEX B. ANNEX B-1 shows the raw data obtained from NCAT, whereas, ANNEX B-2 shows the reduced data used in the analysis. All sections that do not have aged air voids value but only initial construction air voids were excluded from the analysis. The model obtained including Mirza's and NCAT data is given below.

$$VA = \frac{VA_{orig} + 0.0398\ t - 2}{1 + 0.00065\ t\ Maat + 0.00000101\ \frac{t}{\eta_{orig,77}}} + 2 \quad (2)$$

$R^2 = 0.84$; $S_e/S_y = 0.613$

Figure 2 shows the goodness of fit plot along with the residuals. The total number of data points used for the analysis was 268. This includes 192 data points from Mirza's study, whereas remaining points were obtained from 22 additional projects provided by NCAT. The NCAT project location information is provided in Table 2. As mentioned earlier, the entire data is presented in Appendices A and B. The reduced data presented in ANNEX B-2 was obtained by averaging the value corresponding to each section, and also eliminating outliers. An observation was considered an outlier, if an increase in air voids value was observed as a function of time. The air voids should decrease with time due to traffic loading and thus an increase is considered to be an outlier.

It can be observed in figure 2 that the model presented in Equation (2) is slightly bias. The predicted values for air voids less than 5% is slightly higher. That is the model has the tendency to predict higher values at longer periods of time, values that generally correspond to air voids for the aged condition. Furthermore, the model presents an asymptotic value of 2% that could be serios limitation in the back calculation of $\boldsymbol{VA_{orig}}$. In other words, the model is invalid for aged air voids that are less than 2%.

FINAL MODEL

In order to develop the final model for the prediction of air voids as a function of time numerical optimization techniques were used for curve fitting. Several different structural model forms were used in the analysis. These included: exponential, logarithmic and hyperbolic functional forms. The selection of the final model was made with the consideration that it should be statistically and theoretically sound. Equation (3) presents the chosen model:

$$VA = \frac{VA_{orig} + \exp^{(-1.0528*t)} - 1}{1 + 0.01406t + 0.00125t^{0.2307} Maat - 0.00325t\,\eta_{orig,77}} \quad (3)$$

$R^2 = 0.89$; $S_e/S_y = 0.516$

The above model has a better R^2 compared to the model represented by Equation (2). The goodness of fit plot along with the residual analysis are shown in Figure 3. It is obvious that the bias observed by Equation (2) is no longer present for the predictions made with Equation (3). In addition, no asymptotic value was used in this case as in Equation (2); that uses a value of 2%. As stated before, a value of 2% was arbitrarily selected as a minimum air void for mathematical convenience and does have engineering justification in that sound or stable rut resisting mixtures will generally reach this threshold void level (2-3%) prior to excessive shear displacement caused by plastic flow. However, for the purpose of

this study, it imposes a serious limitation, as it will be seen later when the above equation will be used to predict or back-calculate the initial air voids (VA_{orig}), given the aged air voids value.

A sensitivity analysis was carried out for all the independent variables in Equation (3). Figure 4a and Figure 4b show the relative importance of the original air voids at two different temperatures, at a constant low viscosity value and at a constant high viscosity value, respectively. It can be observed that the rate of change of air voids with time is dependent on the original air voids. Higher initial air voids show a greater change where compared to lower initial air voids. This is logical since higher air voids mixes have more compressibility potential under the given traffic and environmental conditions. Figures 5 shows the effect of Viscosity on the predicted *VA* at the same mean annual air temperature, *Maat*. Furthermore, Figure 6 shows the effect of *Maat* on the predicted *VA* at the same viscosity value. It can be observed that as the viscosity increases, or temperature decreases, the rate of change of air voids decreases. These results are quite rational. The predicted model indicates that harder asphalt and cold temperatures result in lower changes of air voids, and hence the sensitivity analysis shows that the model selected is rational and theoretically correct.

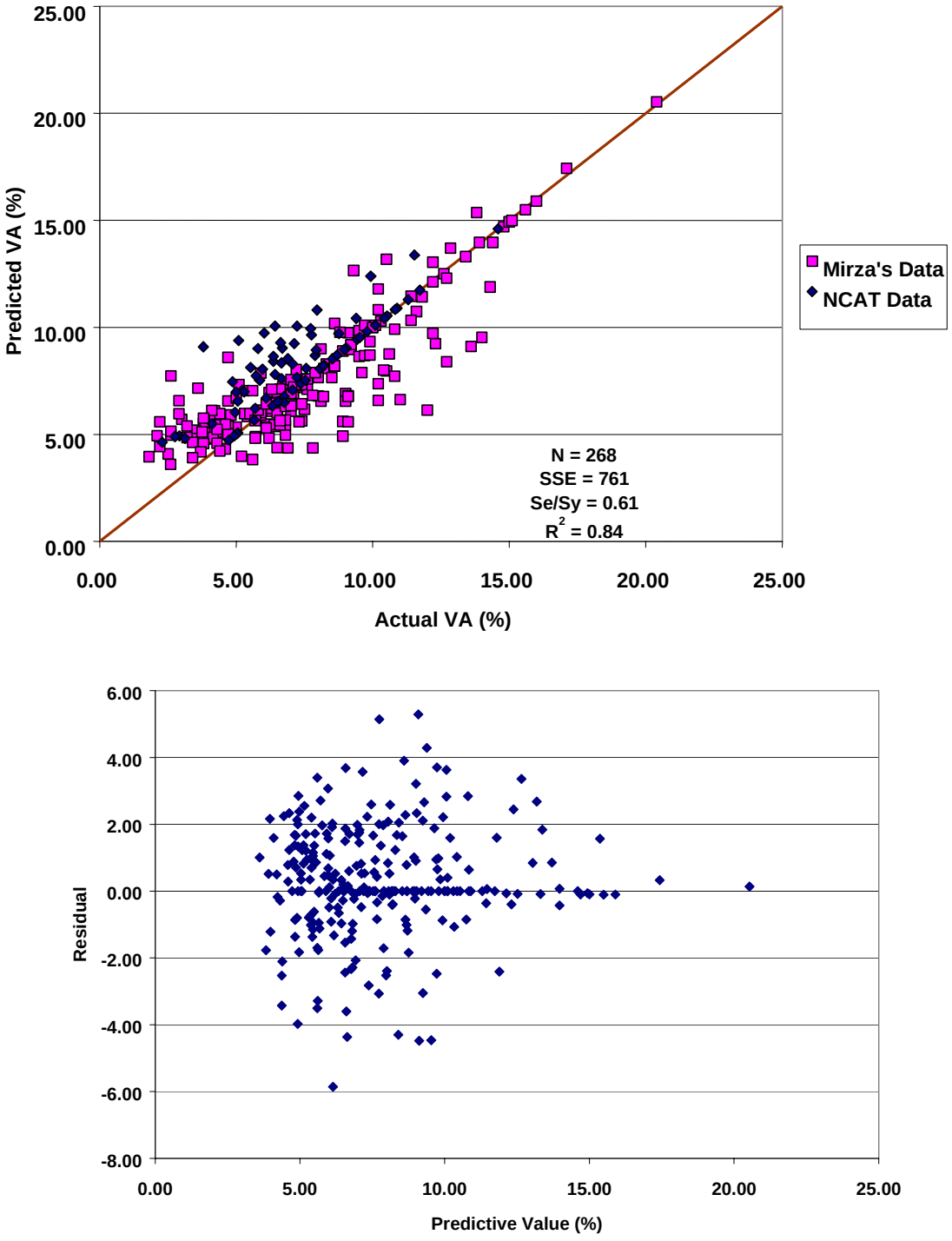
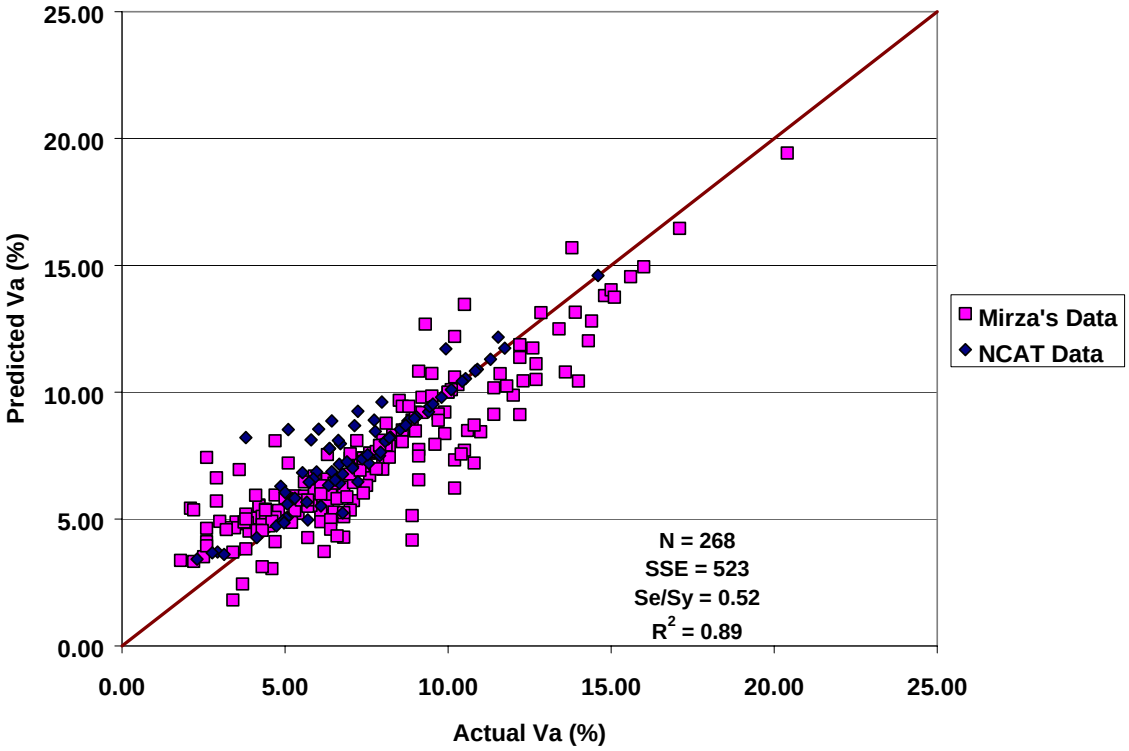


Figure 2. Actual versus Predicted VA – Equation 2 – Mirza & NCAT Data

Table 2

Project Locations for NCHRP 9-9 (1) Field Projects

Project ID	State	Location	Binder Grade
1-1	AL	Highway 157, south bound lane, app. 5 miles north of Moulton.	PG 67-22
1-2	AL	Highway 168, east bound lane, app. 2 miles east of Boaz.	PG 67-22
1-3	AL	Highway 80, west bound lane, near White Hall	PG 76-22
1-4	AL	Highway 84, east bound lane, near Monroeville	PG 67-22
1-5	AL	Highway 167, north bound lane, near Enterprise	PG 67-22
1-6	AL	Andrews Road, city street located in Opelika	PG 67-22
2-1	FL	Davis Highway, city street located in Pensacola, app. 2 miles south of I-10.	AC-30
3-1	MI	Highway 50, north bound lane, in Jackson	PG 58-28
3-2	MI	Highway 52 near Owosso	PG 58-28
3-3	MI	Interstate 75 north bound lane near Flint	PG 70-28
4-1	WI	Highway 45 south bound lane near Wisconsin Avenue in Milwaukee	PG 70-28
5-1	CO	Highway 9, south bound lane, in Frisco	PG 58-28
5-2	CO	Highway 82, south bound lane, south of Glenwood Springs	PG 64-28
5-3	CO	Pitkin Avenue at the intersection of 10^{th} street in Grand Junction	PG 76-28
5-4	CO	Highway 13 north bound lane, just north of Meeker	PG 64-28
5-5	CO	Highway 82, south bound lane, south of Glenwood Springs	PG 64-28
6-1	UT	Highway 150, west of Kamas	PG 64-34
7-1	IN	Highway 136 east bound lane near East Main Street in Brownsburg	PG 64-22
7-2	IN	Interstate 69 southbound near Auburn	PG 64-22
8-1	KY	Washington County Road 1786, near Lebanon	PG 64-22
8-2	KY	Interstate 64, east bound, near Olive Hill	PG 76-22
8-3	KY	Shelby County Road 1779, near Frankfurt	PG 64-22



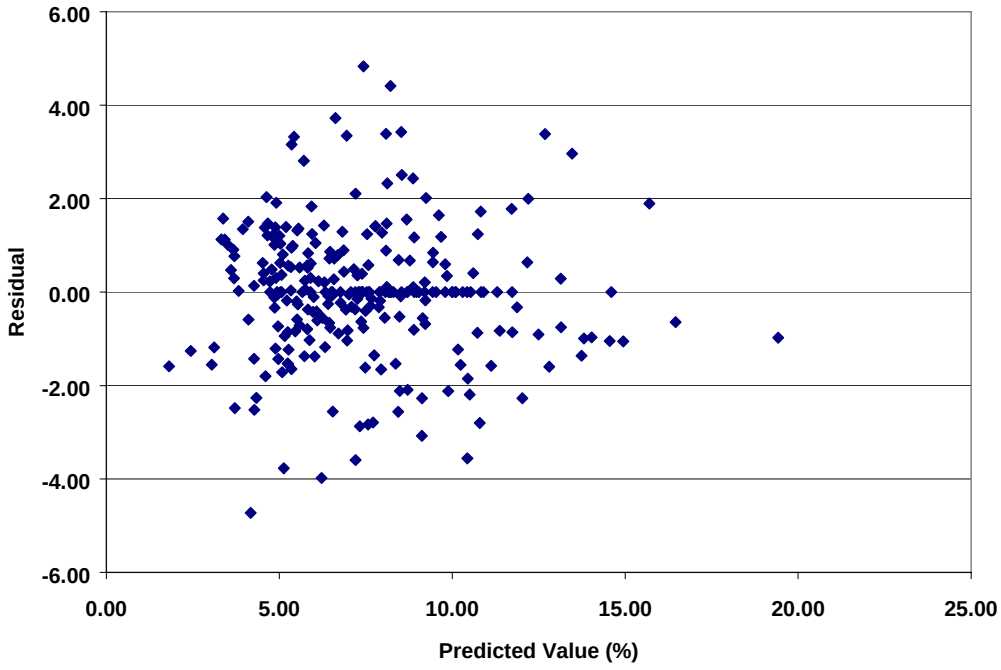


Figure 3. Actual versus Predicted VA – Equation 3 – Mirza & NCAT Data

BACK-CALCULATION OF ORIGINAL AIR VOIDS FOR GPS SECTIONS

As mentioned earlier, the objective of this study was to estimate the air voids at the time of construction. This was needed because reliable data for initial air voids could not be obtained from the LTPP database for the selected sections. The Equation (3) previously developed was used to back-calculate the original air voids (air voids at construction). For this purpose, the following information was needed:

1. Air voids at any time, t
2. Mean annual air temperature
3. Original viscosity at 77 deg F

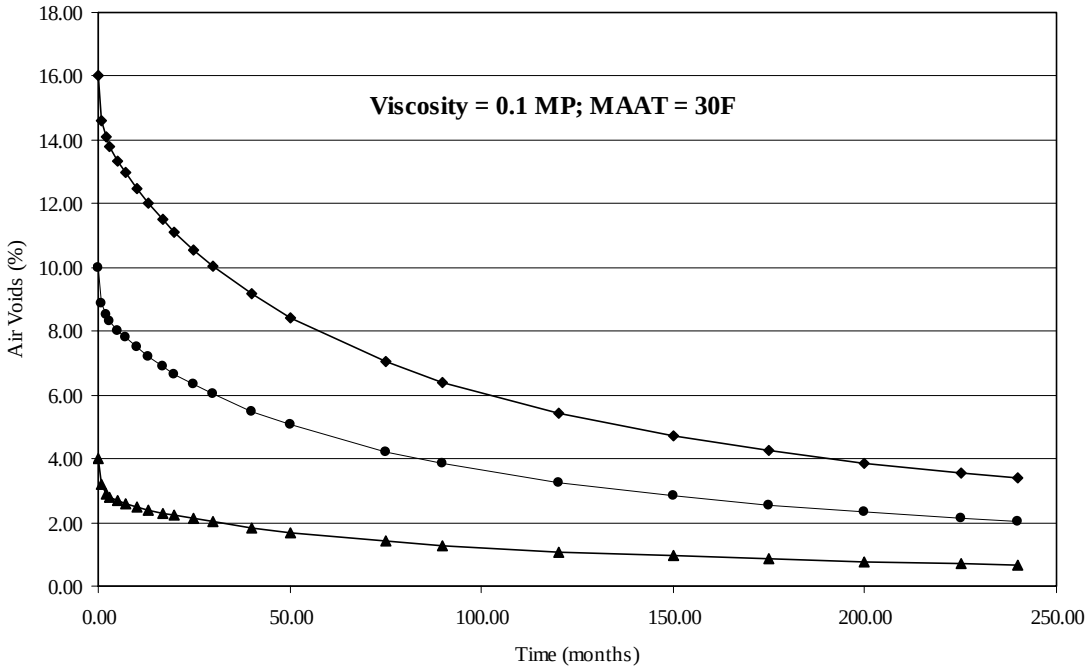
Item 1 and 2 were obtained directly from the LTTP database for the selected sections, but no information was available for viscosity at 77^{o}F. However, penetration at 77^{o}F was available in the LTTP database. The penetration values were converted to viscosity values by the model developed by Mirza et al. (AAPT 1995), at the University of Maryland. The regression model used is given below.

$$\log \eta = 10.5012 - 2.2601 \log(Pen) + 0.00389 \log(Pen)^2 \qquad (4)$$

The η value is expressed in Poises. Accurate viscosity predictions over a *Pen* range from 3 to 300 have been observed for the above-mentioned predictive model (Equation 4).

Once the viscosity values were obtained, Equation (3) was then used to estimate the VA_{orig} for all the 56 sections to be used for the calibration of distress models for the 2002 Design Guide. The needed data and the back-calculated original air voids are shown in Table 3. The following observations were made with the back-calculated values.

1. It was observed that the "Design Air Voids" values are less than the predicted "Original or Construction Air Voids" values and that is considered logically correct. This is in contradiction to the data obtained from the LTTP database.
2. In some situations, extremely high air voids were predicted by Equation (3). This is due to the fact, that relatively high air voids values are reported for the aged conditions as obtained from the LTPP database. That is, if the air voids at 252 months is reported to be 13%, then, the back-calculated value will be in excess of 30% in some instances. This is an unrealistic value and should not be used.



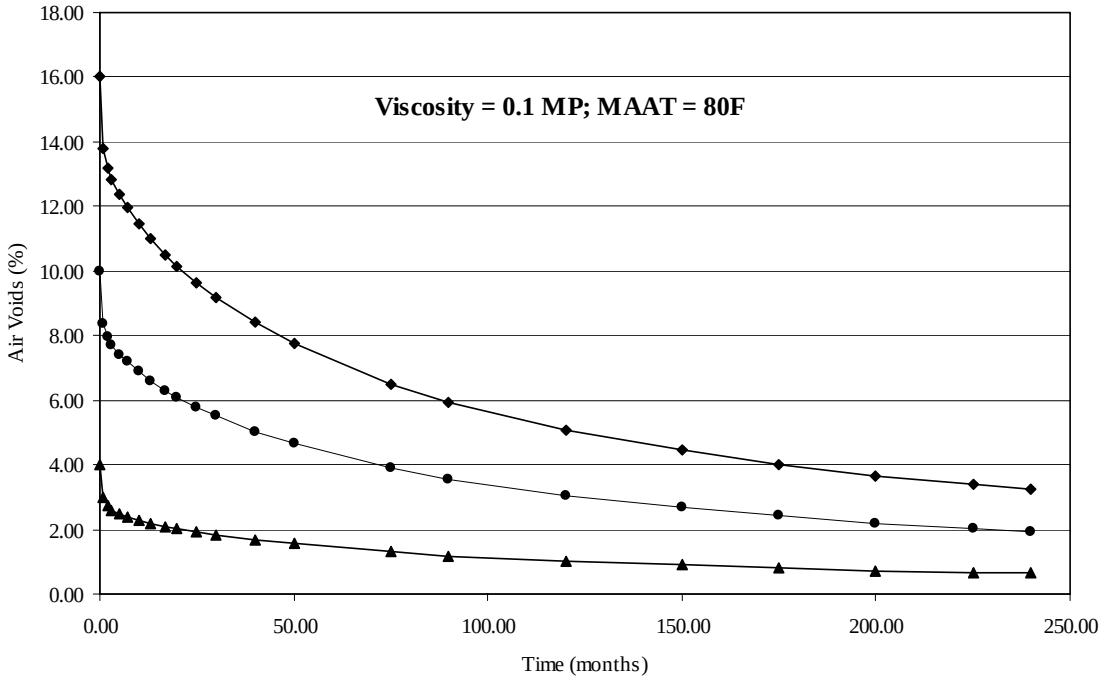
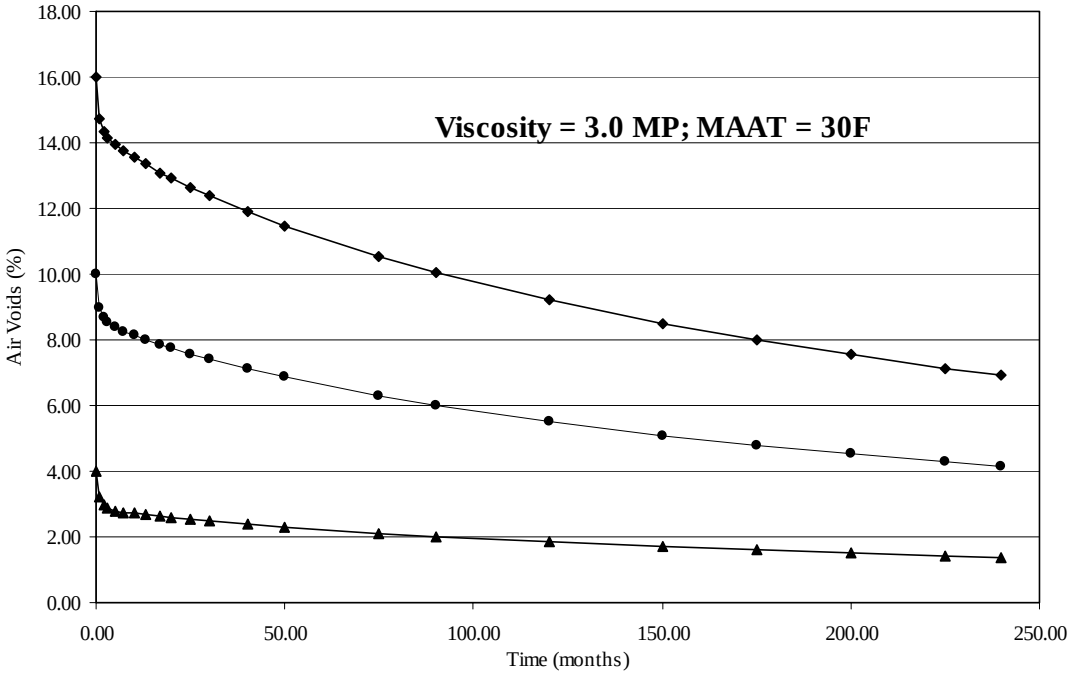


Figure 4a. Relative Importance of Initial Air Voids and the Effect of Mean Annual Air Temperature (η_{77F} = 0.1 MP)



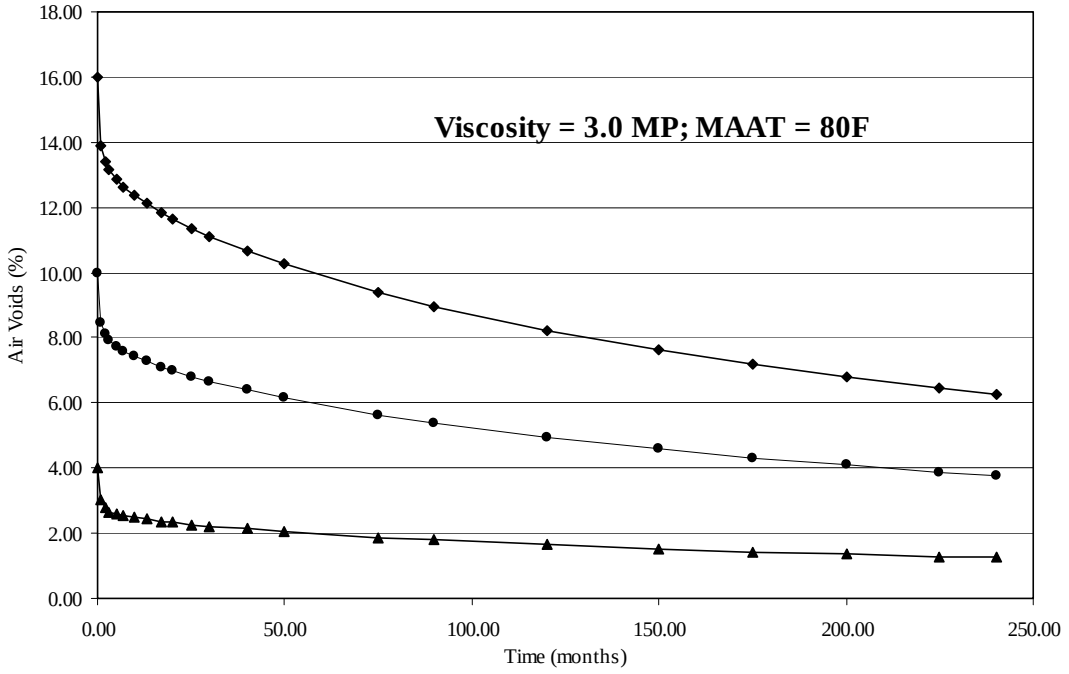


Figure 4b. Relative Importance of Initial Air Voids and the Effect of Mean Annual Air Temperature (η_{77F} = 3.0 MP)

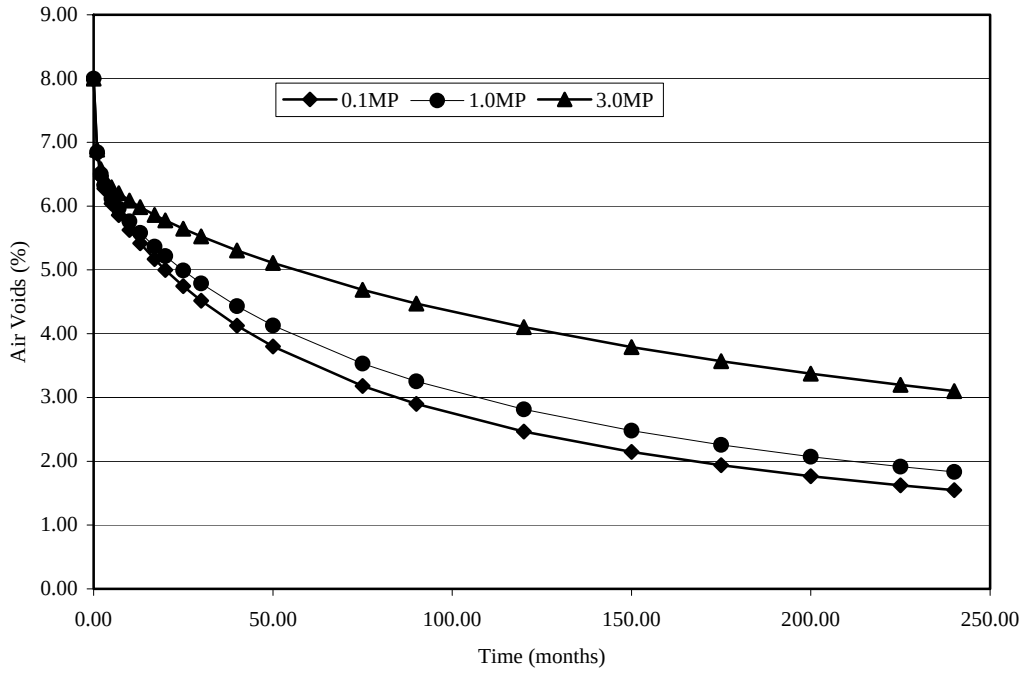


Figure 5. Effect of Viscosity on Predicted Air Voids (Maat = 50F)

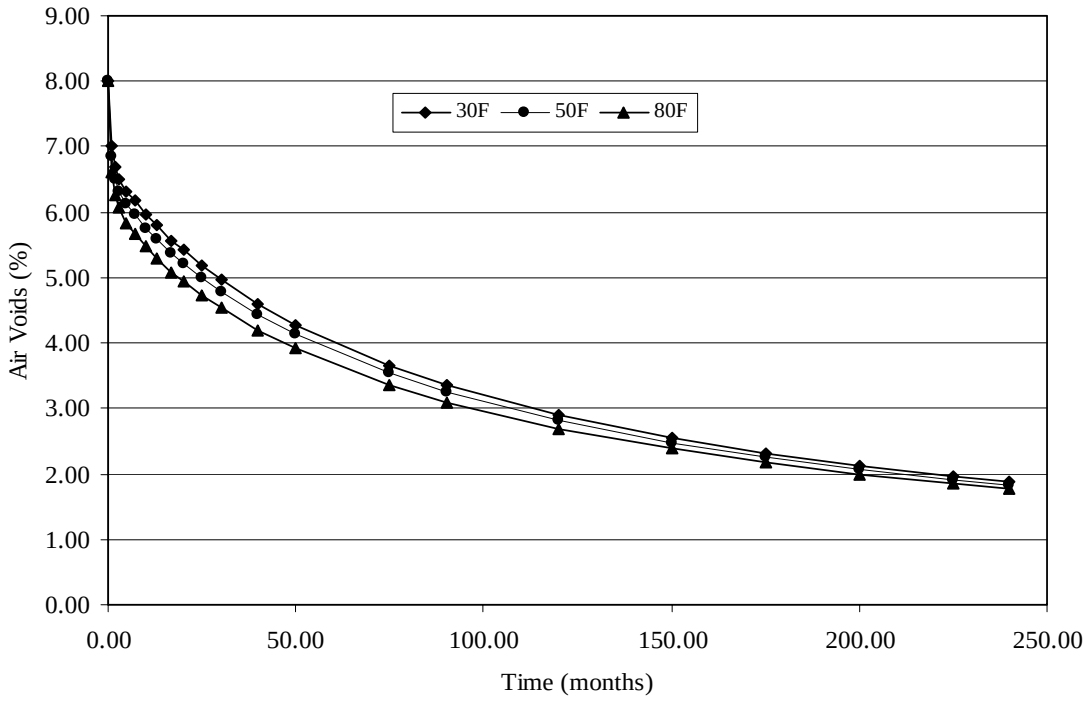


Figure 6.

Effect of Mean Annual Air Temperature (Viscosity = 1.0 MP)

The model developed was based upon surface mixes data and therefore, should only be applicable for the top layer. However, in some situations, especially for the full depth asphalt sections, more than one layer of asphalt is used in the pavement structure. Prediction of air voids for layers other than the top layer should be used with caution.

Because of these shortcomings and special situations, it was decided to come up with reasonable values in those instances where the values given by the model represented by Equation (3) were not considered reliable. For this purpose, the same data collected and used to develop Equation (3) was used to establish a band of reasonable predicted air voids. The mentioned band can be represented by an equation that involves the parameters found to significantly affect the air voids with time. Equation (5) represents the family of curves that better represent the collected data:

$$VA = VA_{orig} + \frac{3.29658 - 0.20201t}{1 + 0.00392t\ Maat\eta_{orig}} - 3.29658 \qquad (5)$$

$R^2 = 0.85$; $S_e/S_y = 0.49$

The goodness of fit plot and the residual analysis for Equation (5) are shown in Figure 7. Figures 8a and 8b show the relative importance of the original air voids at two different temperatures, at a constant low viscosity value and at a constant high viscosity value, respectively. In these figures it can be seen that the rate of change of air voids with time is irrespective or independent of the original air voids. It indicates that even though Equation (5) is statistically sound, it is not theoretically accurate, and therefore should not be considered as a predictive model, but rather as a representation of a band of reasonable air voids values.

Table 3. Back-calculated VA_{orig} for the GPS-LTPP Sections

STATE CODE	SHRP ID	LAYER	VA (LTPP Inventory)	Va_{orig} (LTPP Inventory)	Va design (LTPP Inventory)	AGE (months)	Maat (°F)	Viscosity (M-Poises)	Pred. VA_{orig} Eq. (2)	Pred. VA_{orig} Eq. (3)	Pred. VA_{orig} Eq. (5)	Suggested Value for Calibration
1	1019	1	-	-	**2.4**	-	65.5	1.89	-	-	-	8.0
1	4073	1	8.130	6.404	6.4	72	58.8	1.32	22.2	16.5	**11.9**	11.9
2	1001	1	1.642	-	4	132	37.0	0.33	-4.8	5.7	**8.1**	8.1
4	0115	1	9.210	-	-	12	60.9	11.97	12.2	**12.1**	12.5	12.0
4	0122	1	10.744	-	-	12	60.9	8.22	14.4	14.4	14.0	12.0
4	1024	1	6.766	3.037	3.9	204	53.3	0.93	32.5	24.6	**11.0**	11.0
5	2042	1	1.199	-	2.7	264	62.1	2.61	-17.9	4.3	4.8	6.0
8	1053	1	1.723	2.893	3.5	120	51.0	1.51	-4.2	5.0	5.6	6.0
8	2008	1	3.523	2.881	2.7	264	54.3	0.74	7.3	16.2	**8.0**	8.0
9	1803	1	6.288	3.048	3.1	108	50.5	2.28	17.3	13.0	**10.0**	10.0
12	3997	1	2.481	2.655	2.6	240	69.3	1.29	-1.9	**10.1**	6.3	10.1
12	4106	1	6.091	5.129	5.1	84	74.9	3.01	19.5	**10.9**	9.6	10.9
13	1031	1	3.415	6.710	6.7	156	58.6	1.04	5.6	**10.9**	7.4	10.9
13	4119	1	3.764	-	5	192	59.8	2.21	9.3	**10.7**	7.4	10.7
16	1009	1	0.652	4.407	4.6	240	47.7	0.56	-19.0	3.7	5.7	6.0
16	1020	1	5.780	0.124	4.9	96	48.9	0.75	13.5	14.2	**10.2**	10.2
16	1021	1	1.084	4.139	5.5	108	44.5	0.27	-6.1	3.8	**7.5**	7.5
16	9034	1	3.428	6.275	6.2	72	45.6	0.93	3.6	**7.7**	7.6	7.7
22	3056	1	5.146	3.279	3.4	84	66.3	3.01	13.2	**9.2**	8.6	9.2
27	1018	1	2.180	-	-	180	43.3	0.62	-4.1	**8.3**	7.1	8.3
30	8129	1	2.474	-	4.5	72	44.5	1.23	0.6	5.6	**6.5**	6.5
34	1638	1	6.330	-	7.7	108	54.9	1.78	18.8	14.3	**10.1**	10.1
35	1112	1	6.419	4.406	4.4	120	60.8	1.09	22.7	17.0	**10.4**	10.4
37	1006	1	11.230	17.012	17	144	60.3	1.26	57.8	31.0	15.1	12.0
37	1024	1	4.593	-	**8.75**	168	56.4	2.01	13.9	12.5	8.3	9.0
37	1645	1	4.580	8.889	8.9	96	61.9	1.55	10.8	**10.6**	8.3	10.6
37	1802	1	4.624	8.714	8.7	108	58.2	1.06	11.1	**11.9**	8.6	11.9
37	1992	1	5.351	9.562	**9.6**	48	58.7	1.95	9.6	9.3	8.9	10.0
37	2824	1	7.326	9.016	4.7	132	58.7	1.73	29.0	18.1	**11.1**	11.1
40	4154	1	9.862	4.652	4.7	60	61.3	1.73	26.3	17.8	13.5	12.0
40	4163	1	3.495	-	4.5	84	59.8	3.12	5.1	**6.4**	7.0	6.4
40	4165	1	5.264	-	5	120	58.7	2.07	15.5	12.1	**8.9**	8.9
42	1599	1	8.686	3.846	3.9	84	45.3	1.68	22.0	17.3	12.5	12.0
47	3104	1	7.913	2.449	4.5	96	56.2	2.80	24.9	14.3	**11.5**	11.5
48	0001	1	-	9.908	9.9	-	-	1.84	-	-	-	10.0
48	1076	1	2.033	2.529	2.1	204	60.2	1.26	-5.8	**7.7**	5.9	7.7
48	1077	1	2.350	-	3.6	144	61.4	0.68	-1.4	**7.9**	6.7	7.9
48	1109	1	4.866	4.940	5	120	67.5	3.37	15.2	**8.9**	8.4	8.9
48	1169	1	-	-	3.7	-	-	2.07	-	-	-	8.0
48	1174	1	-	-	-	-	-	0.80	-	-	-	9.0
48	2176	1	4.399	-	-	288	58.7	2.07	19.4	15.9	**8.1**	8.1
48	3559	1	5.613	5.912	5.9	288	67.2	-	-	-	-	9.0
48	3669	1	3.093	4.116	4.1	132	66.3	1.73	4.1	**8.3**	6.8	8.3
48	3679	1	9.971	3.328	3.3	72	65.9	1.68	31.8	19.4	13.6	12.0
48	9005	1	-	7.202	**7.2**	-	-	0.63	-	-	-	10.0
50	1002	1	3.358	4.260	4.2	120	43.7	1.20	3.2	**9.0**	7.5	9.0
50	1004	1	1.642	3.483	3.4	120	45.9	1.92	-4.4	4.5	5.4	6.0
51	2004	1	6.516	5.451	7.6	156	58.1	1.29	27.0	19.1	**10.4**	10.4
51	2021	1	5.891	5.451	7.6	108	53.0	1.29	16.1	14.3	**9.8**	9.8
56	1007	1	1.669	7.795	**7.8**	168	45.2	0.77	-6.7	6.2	6.2	9.0
56	2015	1	2.030	7.224	7.2	192	46.7	0.95	-5.4	**7.7**	6.4	7.7
56	2017	1	4.417	7.556	7.5	144	45.9	1.09	9.1	12.9	**8.6**	8.6
56	2020	1	3.021	3.658	3.7	108	45.1	4.71	2.0	4.1	**6.5**	6.5
56	2037	1	2.082	3.958	4	108	41.8	3.24	-2.0	4.2	5.7	6.0

Table 3. Back-calculated VA_{orig} for the GPS-LTPP Sections (Contd)

STATE CODE	SHRP ID	LAYER	VA (LTPP Inventory)	Va_{orig} (LTPP Inventory)	Va_{design} (LTPP Inventory)	AGE (months)	Maat (^oF)	Viscosity (M-Poises)	Pred. VA_{orig} Eq. (2)	Pred. VA_{orig} Eq. (3)	Pred. VA_{orig} Eq. (5)	Suggested Value for Calibration
56	7773	1	3.711	3.485	3.5	84	45.2	2.90	4.6	**6.7**	7.3	6.7
88	1647	1	4.461	3.071	3.3	96	**42.0**	0.36	7.1	**11.7**	10.2	11.7
1	1019	2	3.766	-	3.2	96	65.5	1.89	7.2	**8.5**	7.4	8.5
1	4073	2	-	2.640	2.6	-	58.8	1.78	-	-	-	8.0
4	0115	2	5.931	-	-	12	60.9	3.30	7.3	**8.0**	9.2	8.0
4	0122	2	6.396	-	-	12	60.9	2.77	8.0	**8.7**	9.7	8.7
5	2042	2	2.529	-	4.4	264	62.1	2.61	-2.3	**8.0**	6.1	8.0
8	2008	2	-	-	-	-	54.3	0.74	-	-	-	9.0
9	1803	2	0.232	-	**7.6**	108	50.5	2.28	-10.4	1.4	3.9	9.0
13	1031	2	3.904	7.656	7.7	156	58.6	1.04	9.1	12.3	**7.9**	7.9
13	4119	2	5.881	-	7	192	59.8	2.21	27.3	16.1	**9.5**	9.5
16	1009	2	3.361	4.096	4.3	240	47.7	1.11	4.0	13.5	**7.5**	7.5
16	9034	2	2.499	6.275	6.2	72	45.6	0.93	0.7	5.9	**6.7**	6.7
22	3056	2	6.477	3.279	3.4	84	66.3	3.01	19.4	**11.3**	10.0	11.3
27	1018	2	9.950	4.334	4.3	180	43.3	0.53	43.3	34.8	15.2	12.0
34	1638	2	6.389	-	7.1	108	54.9	1.78	19.1	14.4	**10.1**	10.1
37	1006	2	5.180	6.504	6.5	144	60.3	1.26	17.5	14.9	**9.1**	9.1
37	1645	2	2.983	7.275	**7.25**	96	61.9	1.55	3.0	7.2	6.7	9.0
37	1802	2	6.223	7.724	7.7	108	58.2	1.06	19.3	15.7	**10.2**	10.2
37	2824	2	5.870	6.640	6.6	132	58.7	1.73	20.2	14.7	**9.6**	9.6
40	4154	2	6.331	5.248	5.2	60	61.3	1.73	14.3	**11.8**	10.0	11.8
40	4163	2	6.373	-	4.3	84	59.8	3.12	17.4	**10.8**	9.9	10.8
40	4165	2	7.031	-	-	120	58.7	2.07	25.4	15.8	**10.7**	10.7
42	1599	2	5.501	4.531	3.3	84	45.3	1.68	10.9	**11.3**	9.3	11.3
48	0001	2	-	-	-	-	-	1.84	-	-	-	9.0
48	1076	2	7.556	-	9.6	204	60.2	0.82	44.0	28.1	**11.8**	11.8
48	1077	2	2.233	-	2.5	144	61.4	2.61	-2.2	5.6	5.8	6.0
48	1109	2	-	5.790	5.9		67.5	3.37	-	-	-	9.0
48	1174	2	12.121	-	**13.2**	252	71.6	0.80	121.4	52.0	16.2	13.5
48	2176	2	-	3.047	3	-	-	2.07	-	-	-	8.0
48	3559	2	-	2.899	2.8	-	-	-	-	-	-	8.0
48	3669	2	7.054	5.192	5.2	132	66.3	1.89	30.7	17.2	**10.7**	10.7
50	1002	2	1.143	-	-	120	43.7	1.20	-6.6	3.7	5.3	6.0
50	1004	2	1.718	4.516	4.5	120	45.9	1.26	-4.1	5.1	5.8	6.0
51	2004	2	4.999	-	6	156	58.1	1.29	16.5	14.9	**8.9**	8.9
51	2021	2	-	2.440	6.8	-	-	1.29	-	-	-	10.0
88	1647	2	-	2.517	2.5	-	-	0.19	-	-	-	8.0
1	1019	3	7.102	-	3.4	96	65.5	1.89	24.2	15.2	**10.7**	10.7
4	0122	3	-	-	-	-	60.9	-	-	-	-	9.0
22	3056	3	8.267	4.065	4.1	84	66.3	3.01	27.7	14.2	**11.8**	11.8

* Numbers in bold represent the criteria used to choose the suggested value

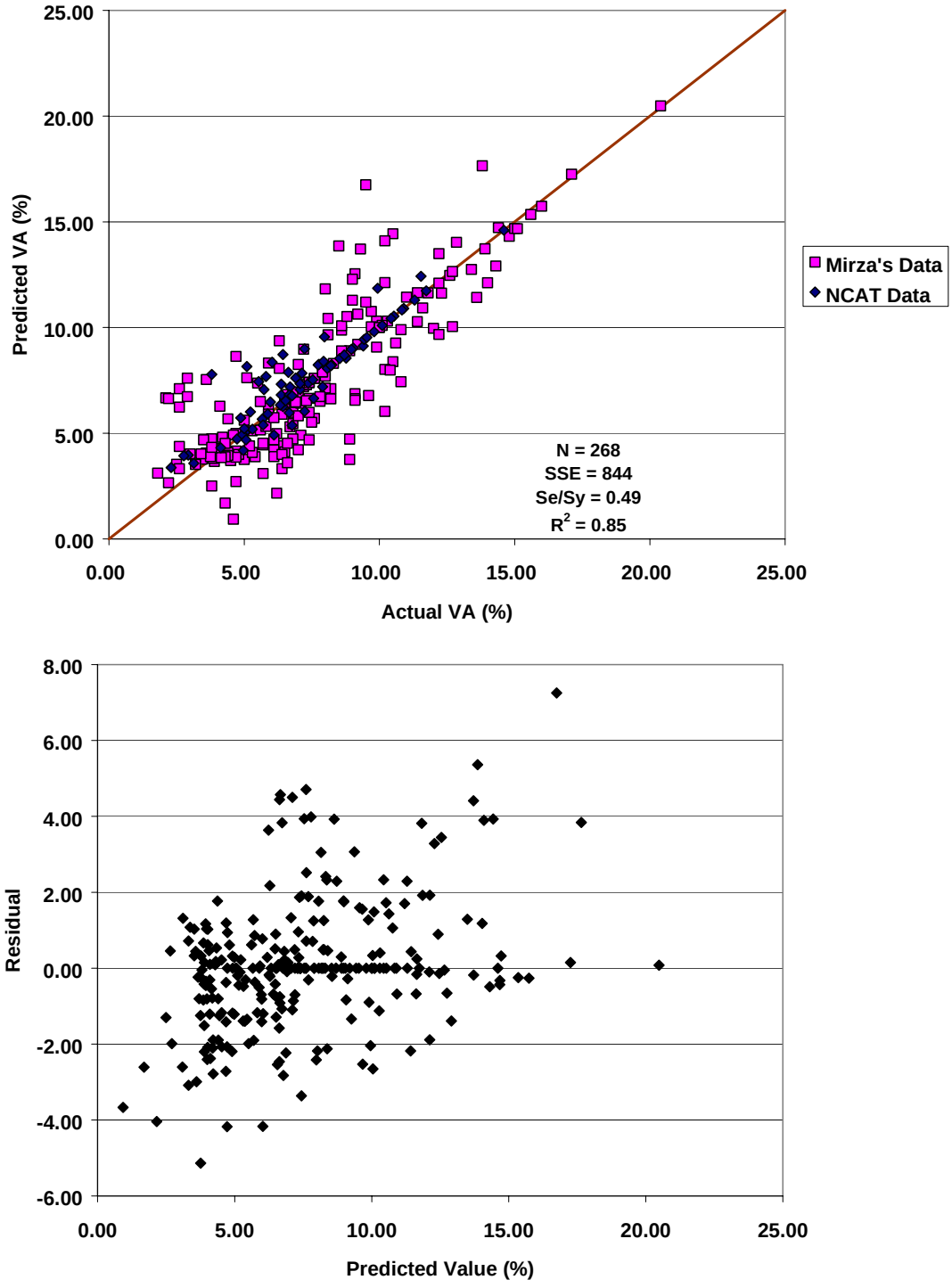
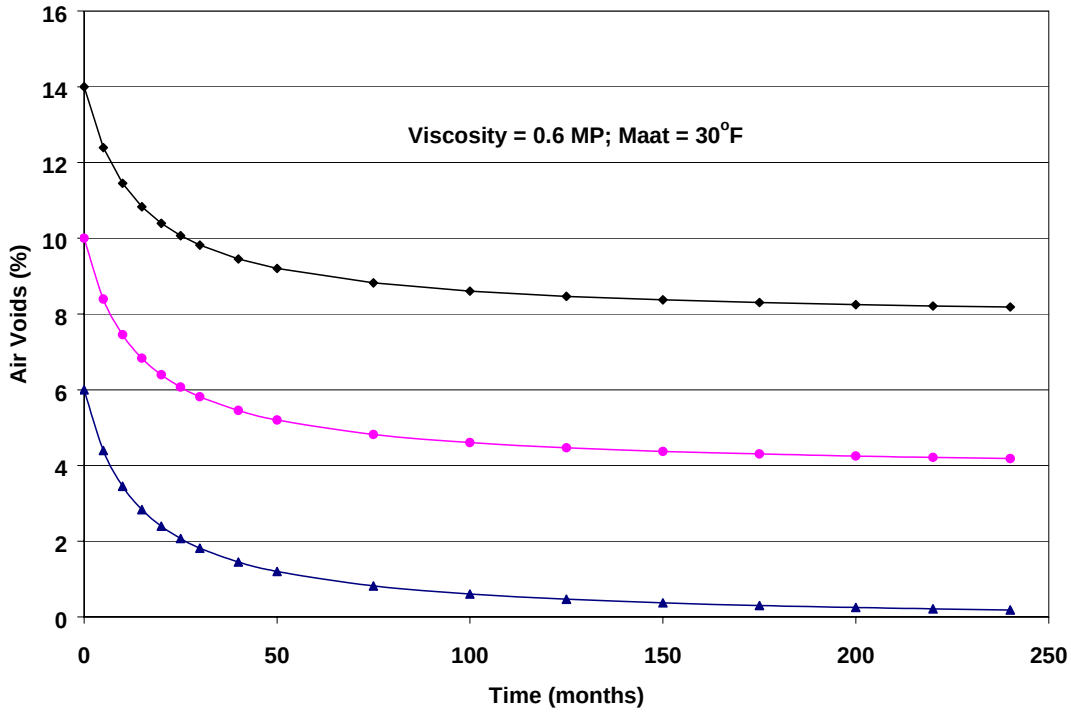


Figure 7. Actual versus Predicted VA values by Equation 5



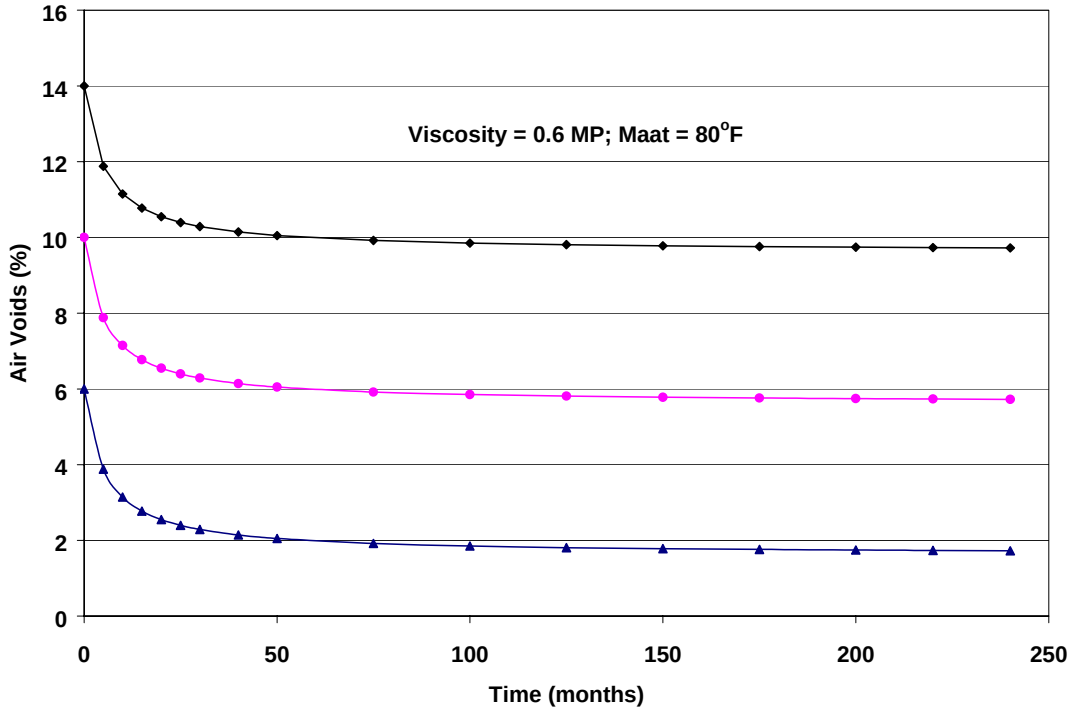
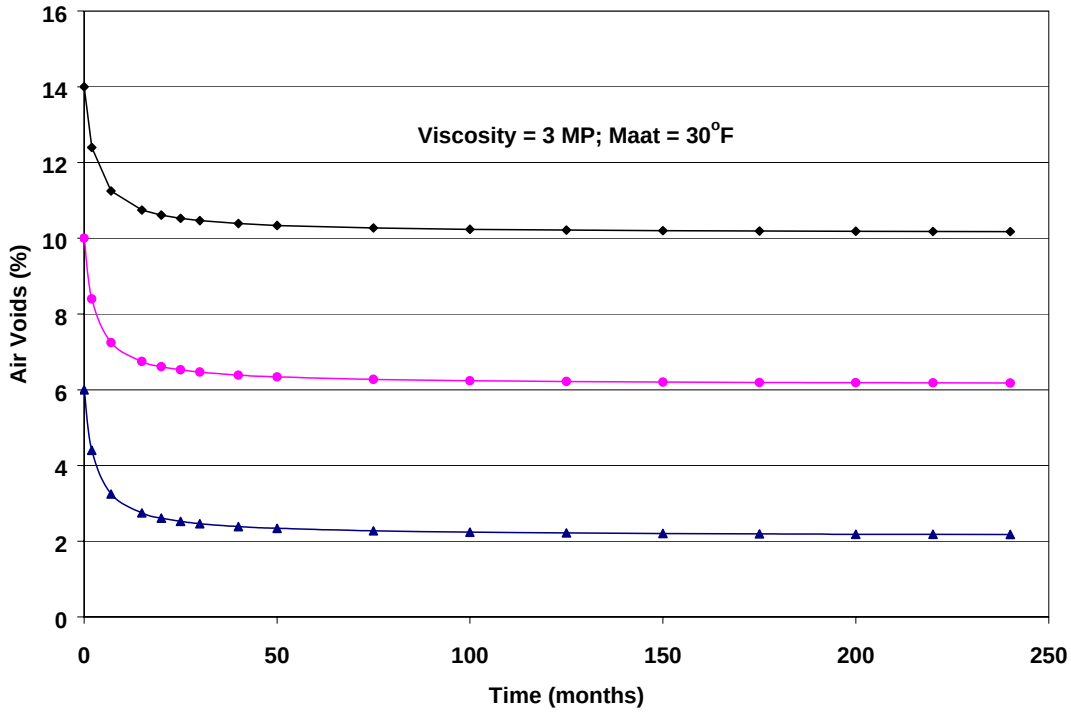


Figure 8a. Relative Importance of Initial Air Voids and the Effect of Mean Annual Air Temperature (η_{77F} = 0.6 MP)



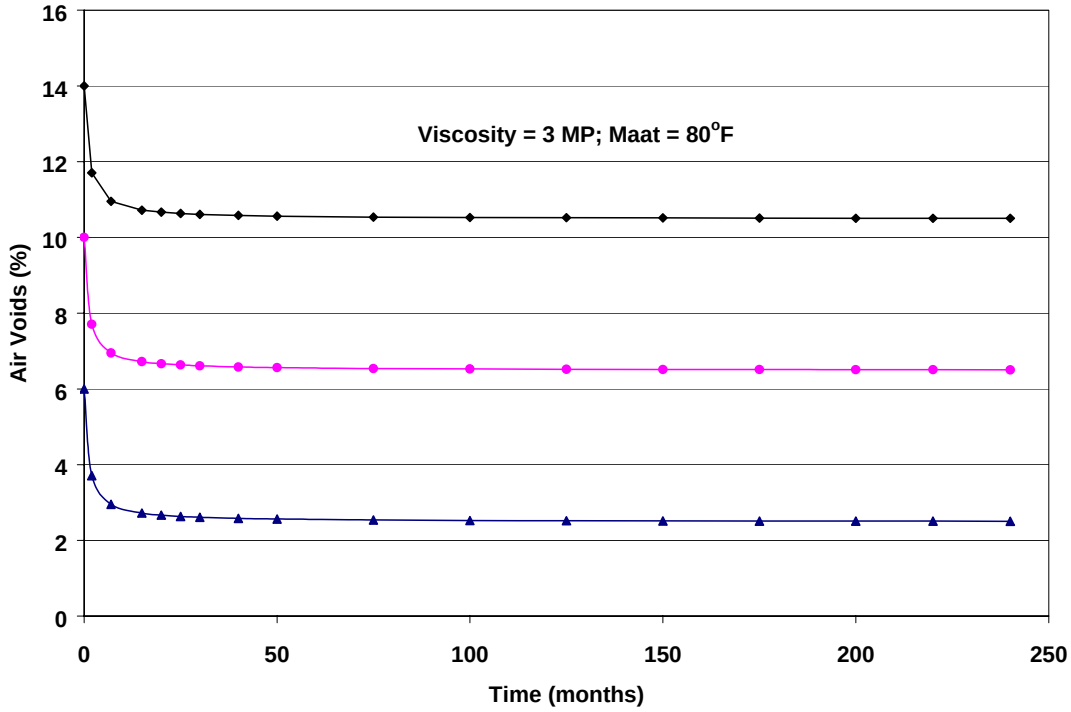


Figure 8b. Relative Importance of Initial Air Voids and the Effect of Mean Annual Air Temperature (η_{77F} = 3.0 MP)

Suggested VA_{orig} Values for the GPS-LTPP Sections

Given the limitations encountered with the model depicted with Equation (3), it was decided to come up with suggested values for the situations where the model could not predict a reliable value. Table 3 provides the suggested or recommended values that should be used for the calibration of the distress models for the 2002 Design Guide. The suggested values are generally the ones given by Equation (3), however, for those instances where the predictions were not considered reliable, values based on the band represented by Equation (5) were recommended. The guidelines used to choose the suggested VA_{orig} values for the GPS sections are listed below.

- The design air voids value given by the LTPP database should always be smaller that the predicted VA_{orig}.
- VA_{orig} should be between 6% and 12%.
- The value given by the model represented by Equation (3) was suggested if it fulfilled the above criteria.
- For the sections where Equation (3) predicted unrealistic values, the suggested value was given by Equation (5).
- For those sections where information was not available to predict VA_{orig}, a value between 8% and 10% was assumed.

Exceptions to these guidelines are observed for section 371006, where the design air voids was reported as 17%, values that was considered extremely high; and for section 481174, where the design value was reported as 13.2%.

The results obtained from this study are not perfect. However, the research team believes that the approach used above is the best to obtain the original air voids information needed for the calibration of the distress models.

ANNEX D1

Mirza's Data Set

Line	Test_Road	Mix_ID	VA (%)	Vaorig (%)	t (months)	Viscosity (Mega-Poises)	Maat (F)	Predicted VA
84	MICHIGAN	1	7.60	7.600	0	3.01	47.5	7.60
86	MICHIGAN	1	6.70	7.600	3	3.01	47.5	7.31
87	MICHIGAN	1	4.20	7.600	17	3.01	47.5	6.30
88	MICHIGAN	1	4.70	7.600	29	3.01	47.5	5.71
89	MICHIGAN	1	4.00	7.600	40	3.01	47.5	5.32
90	MICHIGAN	1	3.60	7.600	52	3.01	47.5	4.98
94	MICHIGAN	2	7.20	7.200	0	3.01	47.5	7.20
96	MICHIGAN	2	7.10	7.200	3	3.01	47.5	6.93
97	MICHIGAN	2	5.40	7.200	17	3.01	47.5	6.00
98	MICHIGAN	2	5.00	7.200	29	3.01	47.5	5.46
99	MICHIGAN	2	4.50	7.200	40	3.01	47.5	5.09
100	MICHIGAN	2	3.90	7.200	52	3.01	47.5	4.79
104	MICHIGAN	3	8.30	8.300	0	2.28	47.5	8.30
106	MICHIGAN	3	5.90	8.300	3	2.28	47.5	7.97
107	MICHIGAN	3	4.70	8.300	17	2.28	47.5	6.81
108	MICHIGAN	3	4.20	8.300	29	2.28	47.5	6.15
109	MICHIGAN	3	3.80	8.300	40	2.28	47.5	5.69
110	MICHIGAN	3	3.50	8.300	52	2.28	47.5	5.31
114	MICHIGAN	4	7.30	7.300	0	3.12	47.5	7.30
116	MICHIGAN	4	6.20	7.300	3	3.12	47.5	7.03
117	MICHIGAN	4	4.80	7.300	17	3.12	47.5	6.07
118	MICHIGAN	4	4.70	7.300	29	3.12	47.5	5.52
119	MICHIGAN	4	3.85	7.300	40	3.12	47.5	5.15
120	MICHIGAN	4	3.45	7.300	52	3.12	47.5	4.84
124	MICHIGAN	5	7.40	7.400	0	3.01	47.5	7.40
126	MICHIGAN	5	5.30	7.400	3	3.01	47.5	7.12
127	MICHIGAN	5	4.40	7.400	17	3.01	47.5	6.15
128	MICHIGAN	5	4.30	7.400	29	3.01	47.5	5.59
129	MICHIGAN	5	3.75	7.400	40	3.01	47.5	5.21
130	MICHIGAN	5	3.20	7.400	52	3.01	47.5	4.88
134	MICHIGAN	6	7.40	7.400	0	2.80	47.5	7.40
136	MICHIGAN	6	5.60	7.400	3	2.80	47.5	7.12
137	MICHIGAN	6	5.30	7.400	17	2.80	47.5	6.14
138	MICHIGAN	6	4.40	7.400	29	2.80	47.5	5.59
139	MICHIGAN	6	4.30	7.400	40	2.80	47.5	5.20
140	MICHIGAN	6	4.15	7.400	52	2.80	47.5	4.88
347	DELAWARE	AF-DEL	7.40	7.400	0	3.12	56.2	7.40
349	DELAWARE	AF-DEL	6.30	7.400	12	3.12	56.2	6.29
350	DELAWARE	AF-DEL	6.10	7.400	24	3.12	56.2	5.59
351	DELAWARE	AF-BPR	7.60	7.600	0	2.90	56.2	7.60
353	DELAWARE	AF-BPR	6.30	7.600	12	2.90	56.2	6.45
354	DELAWARE	AF-BPR	6.10	7.600	24	2.90	56.2	5.72
363	DELAWARE	AR-BPR	10.30	10.300	0	2.90	56.2	10.30
365	DELAWARE	AR-BPR	8.20	10.300	12	2.90	56.2	8.55
366	DELAWARE	AR-BPR	7.00	10.300	24	2.90	56.2	7.44

Line	Test_Road	Mix_ID	VA (%)	Vaorig (%)	t (months)	Viscosity (Mega-Poises)	Maat (F)	Predicted VA

367	DELAWARE	AR-AI	8.90	8.900	0	3.01	56.2	8.90
369	DELAWARE	AR-AI	7.60	8.900	12	3.01	56.2	7.46
370	DELAWARE	AR-AI	7.50	8.900	24	3.01	56.2	6.54
375	DELAWARE	BF-BPR	7.30	7.300	0	2.52	56.2	7.30
377	DELAWARE	BF-BPR	6.50	7.300	12	2.52	56.2	6.21
378	DELAWARE	BF-BPR	6.10	7.300	24	2.52	56.2	5.52
383	DELAWARE	BR-DEL	5.90	5.900	0	2.61	56.2	5.90
385	DELAWARE	BR-DEL	4.70	5.900	12	2.61	56.2	5.12
386	DELAWARE	BR-DEL	3.80	5.900	24	2.61	56.2	4.63
387	DELAWARE	BR-BPR	7.40	7.400	0	2.52	56.2	7.40
389	DELAWARE	BR-BPR	7.00	7.400	12	2.52	56.2	6.29
390	DELAWARE	BR-BPR	6.40	7.400	24	2.52	56.2	5.58
391	DELAWARE	BR-AI	6.50	6.500	0	2.52	56.2	6.50
393	DELAWARE	BR-AI	6.40	6.500	12	2.52	56.2	5.59
394	DELAWARE	BR-AI	5.70	6.500	24	2.52	56.2	5.01
535	TEXAS (Dickens)	(A)AC-20	13.40	13.409	0.25	4.00	59.5	13.34
537	TEXAS (Dickens)	(A)AC-20	12.70	13.409	24	4.00	59.5	9.28
538	TEXAS (Dickens)	(A)AC-20	12.00	13.409	60	4.00	59.5	6.80
541	TEXAS (Dickens)	(A)AC-10	16.00	16.024	0.25	1.35	59.5	15.94
542	TEXAS (Dickens)	(A)AC-10	14.30	16.024	12	1.35	59.5	12.82
543	TEXAS (Dickens)	(A)AC-10	9.10	16.024	24	1.35	59.5	10.84
544	TEXAS (Dickens)	(A)AC-10	9.00	16.024	60	1.35	59.5	7.76
547	TEXAS (Dickens)	(B)AC-20	15.60	15.612	0.25	1.20	59.5	15.53
549	TEXAS (Dickens)	(B)AC-20	14.00	15.612	24	1.20	59.5	10.57
550	TEXAS (Dickens)	(B)AC-20	8.00	15.612	60	1.20	59.5	7.59
553	TEXAS (Dickens)	IAC-20	14.80	14.809	0.25	2.75	59.5	14.73
555	TEXAS (Dickens)	IAC-20	13.60	14.809	24	2.75	59.5	10.14
556	TEXAS (Dickens)	IAC-20	9.00	14.809	60	2.75	59.5	7.34
565	TEXAS (Dickens)	(E)AC-20	15.00	15.053	0.25	1.90	59.5	14.97
567	TEXAS (Dickens)	(E)AC-20	12.30	15.053	24	1.90	59.5	10.27
568	TEXAS (Dickens)	(E)AC-20	11.00	15.053	60	1.90	59.5	7.41
577	TEXAS (Dumas)	(A)AC-20	13.90	14.071	0.25	1.90	55.4	14.00
578	TEXAS (Dumas)	(A)AC-20	11.60	14.071	12	1.90	55.4	11.50
579	TEXAS (Dumas)	(A)AC-20	9.20	14.071	24	1.90	55.4	9.85
580	TEXAS (Dumas)	(A)AC-20	8.10	14.071	60	1.90	55.4	7.23
588	TEXAS (Dumas)	(B)AC-10	12.20	12.214	0.25	0.36	55.4	12.15
590	TEXAS (Dumas)	(B)AC-10	10.50	12.214	24	0.36	55.4	8.41
591	TEXAS (Dumas)	(B)AC-10	5.50	12.214	60	0.36	55.4	6.19
598	TEXAS (Dumas)	(D)AC-10	12.60	12.601	0.25	0.53	55.4	12.54
599	TEXAS (Dumas)	(D)AC-10	12.20	12.601	12	0.53	55.4	10.23
600	TEXAS (Dumas)	(D)AC-10	8.60	12.601	24	0.53	55.4	8.75
603	TEXAS (Dumas)	(E)AC-20	17.10	17.559	0.25	1.60	55.4	17.47
604	TEXAS (Dumas)	(E)AC-20	10.50	17.559	12	1.60	55.4	14.20
605	TEXAS (Dumas)	(E)AC-20	10.20	17.559	24	1.60	55.4	12.06
606	TEXAS (Dumas)	(E)AC-20	8.50	17.559	60	1.60	55.4	8.66
609	TEXAS (Dumas)	(E)AC-10	20.40	20.692	0.25	0.97	55.4	20.58
Line	**Test_Road**	**Mix_ID**	**VA (%)**	**Vaorig (%)**	**t (months)**	**Viscosity (Mega-Poises)**	**Maat (F)**	**Predicted VA**
610	TEXAS (Dumas)	(E)AC-10	13.80	20.692	12	0.97	55.4	16.58
612	TEXAS (Dumas)	(E)AC-10	9.50	20.692	60	0.97	55.4	9.86
615	TEXAS (Lufkin)	(A)AC-20	8.60	10.268	0.25	1.80	66.7	10.21
616	TEXAS (Lufkin)	(A)AC-20	2.60	10.268	12	1.80	66.7	8.26

617	TEXAS (Lufkin)	(A)AC-20	2.10	10.268	60	1.80	66.7	5.28
625	TEXAS (Lufkin)	IAC-20	6.60	7.173	0.25	1.55	66.7	7.14
626	TEXAS (Lufkin)	IAC-20	3.00	7.173	12	1.55	66.7	5.94
627	TEXAS (Lufkin)	IAC-20	2.50	7.173	60	1.55	66.7	4.12
639	TEXAS (Lufkin)	(E)AC-20	6.50	6.696	0.25	1.90	66.7	6.67
640	TEXAS (Lufkin)	(E)AC-20	3.20	6.696	12	1.90	66.7	5.59
641	TEXAS (Lufkin)	(E)AC-20	1.80	6.696	60	1.90	66.7	3.95
1082	FLORIDA	Lowlight	15.10	16.653	3	1.28	69.5	15.48
1083	FLORIDA	Lowlight	12.85	16.653	6	1.28	69.5	14.48
1084	FLORIDA	Lowlight	9.30	16.653	9	1.28	69.5	13.63
1102	ZACA WIGMORE	A-1	12.70	14.023	5	0.17	56.9	12.47
1104	ZACA WIGMORE	A-1	9.90	14.023	20	0.17	56.9	9.58
1106	ZACA WIGMORE	A-1	6.30	14.023	59	0.17	56.9	6.49
1111	ZACA WIGMORE	C-1	10.20	13.423	5	0.13	56.9	11.86
1113	ZACA WIGMORE	C-1	8.10	13.423	20	0.13	56.9	9.02
1114	ZACA WIGMORE	C-1	7.00	13.423	35	0.13	56.9	7.48
1115	ZACA WIGMORE	C-1	6.80	13.423	59	0.13	56.9	6.09
1116	ZACA WIGMORE	C-1	6.80	13.423	91	0.13	56.9	5.09
1119	ZACA WIGMORE	D-1	14.40	16.003	5	0.12	56.9	14.04
1122	ZACA WIGMORE	D-1	9.70	16.003	35	0.12	56.9	8.61
1123	ZACA WIGMORE	D-1	6.30	16.003	59	0.12	56.9	6.90
1124	ZACA WIGMORE	D-1	5.90	16.003	91	0.12	56.9	5.68
1128	ZACA WIGMORE	E-1	11.80	12.994	5	0.16	56.9	11.56
1130	ZACA WIGMORE	E-1	10.60	12.994	20	0.16	56.9	8.91
1131	ZACA WIGMORE	E-1	10.20	12.994	35	0.16	56.9	7.44
1135	ZACA WIGMORE	F-1	12.20	14.899	5	0.19	56.9	13.27
1137	ZACA WIGMORE	F-1	9.50	14.899	20	0.19	56.9	10.20
1138	ZACA WIGMORE	F-1	8.60	14.899	35	0.19	56.9	8.48
1142	ZACA WIGMORE	G-1	11.40	11.684	5	0.19	56.9	10.47
1144	ZACA WIGMORE	G-1	10.40	11.684	20	0.19	56.9	8.19
1145	ZACA WIGMORE	G-1	9.10	11.684	35	0.19	56.9	6.90
1149	ZACA WIGMORE	H-1	9.70	11.410	5	0.17	56.9	10.20
1151	ZACA WIGMORE	H-1	8.00	11.410	20	0.17	56.9	7.96
1154	ZACA WIGMORE	H-1	6.80	11.410	59	0.17	56.9	5.56
1155	ZACA WIGMORE	H-1	6.80	11.410	91	0.17	56.9	4.72
1159	ZACA WIGMORE	J-1	10.80	11.200	5	0.13	56.9	9.95
1161	ZACA WIGMORE	J-1	10.80	11.200	20	0.13	56.9	7.68
1162	ZACA WIGMORE	J-1	10.20	11.200	35	0.13	56.9	6.45
1164	ZACA WIGMORE	J-1	8.90	11.200	59	0.13	56.9	5.33
1165	ZACA WIGMORE	J-1	8.90	11.200	91	0.13	56.9	4.53
1169	ZACA WIGMORE	B-1-1A	11.40	12.713	4	0.13	56.9	11.51
1171	ZACA WIGMORE	B-1-1A	9.90	12.713	19	0.13	56.9	8.72
1172	ZACA WIGMORE	B-1-1A	5.10	12.713	34	0.13	56.9	7.23
Line	**Test_Road**	**Mix_ID**	**VA (%)**	**Vaorig (%)**	**t (months)**	**Viscosity (Mega-Poises)**	**Maat (F)**	**Predicted VA**
1173	ZACA WIGMORE	B-1-1A	4.10	12.713	58	0.13	56.9	5.89
1207	ZACA WIGMORE	D-2-2	8.80	13.777	16	0.14	56.9	9.89
1208	ZACA WIGMORE	D-2-2	7.20	13.777	31	0.14	56.9	8.06
1209	ZACA WIGMORE	D-2-2	2.90	13.777	55	0.14	56.9	6.45
1210	ZACA WIGMORE	D-2-2	2.20	13.777	87	0.14	56.9	5.33
1215	ZACA WIGMORE	E-2-2	6.60	6.863	16	0.16	56.9	5.35
1216	ZACA WIGMORE	E-2-2	6.20	6.863	31	0.16	56.9	4.63

1217	ZACA WIGMORE	E-2-2	4.60	6.863	55	0.16	56.9	3.99
1223	ZACA WIGMORE	G-2-2	8.00	10.398	16	0.21	56.9	7.83
1224	ZACA WIGMORE	G-2-2	6.40	10.398	31	0.21	56.9	6.56
1225	ZACA WIGMORE	G-2-2	4.60	10.398	55	0.21	56.9	5.42
1231	ZACA WIGMORE	H-2-2	5.00	8.875	16	0.20	56.9	6.77
1232	ZACA WIGMORE	H-2-2	3.80	8.875	31	0.20	56.9	5.75
1233	ZACA WIGMORE	H-2-2	2.60	8.875	55	0.20	56.9	4.82
1234	ZACA WIGMORE	H-2-2	2.20	8.875	87	0.20	56.9	4.16
1239	ZACA WIGMORE	I-2-2(5.8)	7.10	9.6791	16	0.26	56.9	7.40
1240	ZACA WIGMORE	I-2-2(5.8)	5.80	9.6791	31	0.26	56.9	6.26
1241	ZACA WIGMORE	I-2-2(5.8)	4.30	9.6791	55	0.26	56.9	5.22
1242	ZACA WIGMORE	I-2-2(5.8)	3.40	9.6791	87	0.26	56.9	4.47
1247	ZACA WIGMORE	I-2-2(6.3)	4.70	11.892	16	0.26	56.9	8.93
1248	ZACA WIGMORE	I-2-2(6.3)	3.60	11.892	31	0.26	56.9	7.44
1249	ZACA WIGMORE	I-2-2(6.3)	2.90	11.892	55	0.26	56.9	6.09
1250	ZACA WIGMORE	I-2-2(6.3)	2.60	11.892	87	0.26	56.9	5.11
1834	MINNESOTA	P200/300	4.30	5.200	18	0.20	43.6	4.35
1835	MINNESOTA	P200/300	3.70	5.200	44	0.20	43.6	3.76
1836	MINNESOTA	P200/300	3.40	5.200	87	0.20	43.6	3.30
1901	BPR-WAS,DC	B-2	10.00	10.000	0	4.13	56.0	10.00
1903	BPR-WAS,DC	B-2	9.60	10.000	12	4.13	56.0	8.33
1904	BPR-WAS,DC	B-2	9.10	10.000	24	4.13	56.0	7.26
1905	BPR-WAS,DC	B-2	9.10	10.000	48	4.13	56.0	5.97
1906	BPR-WAS,DC	B-2	7.80	10.000	120	4.13	56.0	4.39
1907	BPR-WAS,DC	B-2	5.60	10.000	228	4.13	56.0	3.60
1908	BPR-WAS,DC	C-1	9.20	9.200	0	3.51	56.0	9.20
1910	BPR-WAS,DC	C-1	7.40	9.200	12	3.51	56.0	7.70
1911	BPR-WAS,DC	C-1	7.00	9.200	24	3.51	56.0	6.75
1912	BPR-WAS,DC	C-1	6.10	9.200	48	3.51	56.0	5.59
1913	BPR-WAS,DC	C-1	4.40	9.200	120	3.51	56.0	4.18
1914	BPR-WAS,DC	C-2	7.90	7.900	0	3.80	56.0	7.90
1916	BPR-WAS,DC	C-2	7.40	7.900	12	3.80	56.0	6.69
1917	BPR-WAS,DC	C-2	6.60	7.900	24	3.80	56.0	5.92
1918	BPR-WAS,DC	C-2	5.70	7.900	48	3.80	56.0	4.99
1919	BPR-WAS,DC	C-2	5.20	7.900	120	3.80	56.0	3.84
1920	BPR-WAS,DC	C-3	10.10	10.100	0	3.80	56.0	10.10
1923	BPR-WAS,DC	C-3	7.80	10.100	24	3.80	56.0	7.32
1924	BPR-WAS,DC	C-3	7.40	10.100	48	3.80	56.0	6.02
1925	BPR-WAS,DC	C-3	6.50	10.100	120	3.80	56.0	4.42
1926	BPR-WAS,DC	D-1	10.00	10.000	0	3.51	56.0	10.00
Line	**Test_Road**	**Mix_ID**	**VA (%)**	**Vaorig (%)**	**t (months)**	**Viscosity (Mega-Poises)**	**Maat (F)**	**Predicted VA**
1929	BPR-WAS,DC	D-1	8.20	10.000	24	3.51	56.0	7.26
1930	BPR-WAS,DC	D-1	7.30	10.000	48	3.51	56.0	5.97
1931	BPR-WAS,DC	D-1	6.90	10.000	120	3.51	56.0	4.39
1933	BPR-WAS,DC	D-2	7.90	7.900	0	3.65	56.0	7.90
1935	BPR-WAS,DC	D-2	6.10	7.900	12	3.65	56.0	6.69
1936	BPR-WAS,DC	D-2	5.70	7.900	24	3.65	56.0	5.92
1939	BPR-WAS,DC	D-2	2.60	7.900	228	3.65	56.0	3.27

ANNEX D2

NCAT Data Set

ANNEX D2-1

Raw Data as Received from NCAT

ALABAMA DATA

		Gmb			VTM		
PROJECT I.D.	Gmm	CONSTR.	3 MONTH	6 MONTH	CONSTR.	3 MONTH	6 MONTH
AL1							
1.1	2.549	2.264	2.391	2.477	11.2	6.2	2.8
1.2	2.549	2.298	2.399	2.423	9.9	5.9	4.9
1.3	2.549	2.281	2.395	2.455	10.5	6.0	3.7
2.1	2.566	2.333	2.393	2.429	9.1	6.7	5.3
2.2	2.566	2.283	2.348	2.400	11.0	8.5	6.5
2.3	2.566	2.278	2.359	2.422	11.2	8.1	5.6
3.1	2.548	2.282	2.386	2.445	10.4	6.3	4.0
3.2	2.548	2.256	2.361	2.403	11.4	7.3	5.7
3.3	2.548	2.271	2.401	2.405	10.9	5.7	5.6

		Gmb			VTM		
PROJECT I.D	Gmm	CONSTR.	3 MONTH	6 MONTH	CONSTR.	3 MONTH	6 MONTH
AL2							
1.1	2.466	2.110	2.188	2.221	14.4	11.3	10.0
1.2	2.466	2.099	2.188	2.230	14.9	11.3	9.6
1.3	2.466	2.108	2.170	2.214	14.5	12.0	10.2
2.1	2.455	2.176	2.221	2.241	11.3	9.5	8.7
2.2	2.455	2.184	2.230	2.230	11.0	9.1	9.1
2.3	2.455	2.169	2.219	2.245	11.6	9.6	8.5
3.1	2.460	2.155	2.223	2.245	12.4	9.6	8.7
3.2	2.460	2.178	2.263	2.294	11.4	8.0	6.7
3.3	2.460	2.179	2.304	2.304	11.4	6.3	6.3

		Gmb			VTM		
PROJECT I.D.	Gmm	CONSTR.	3 MONTH	6 MONTH	CONSTR.	3 MONTH	6 MONTH
AL3							
1.1	2.472	2.190	2.279	2.285	11.4	7.8	7.5
1.2	2.472	2.217	2.280	2.315	10.3	7.7	6.3
1.3	2.472	2.204	2.281	2.285	10.8	7.7	7.6
2.1	2.487	2.259	2.335	2.350	9.2	6.1	5.5
2.2	2.487	2.232	2.333	2.319	10.2	6.2	6.7
2.3	2.487	2.238	2.293	2.316	10.0	7.8	6.9

		Gmb			VTM		
PROJECT I.D	Gmm	CONSTR.	3 MONTH	6 MONTH	CONSTR.	3 MONTH	6 MONTH
AL4							
1.1	2.525	2.289	2.310	2.327	9.3	8.5	7.8
1.2	2.525	2.289	2.325	2.326	9.3	7.9	7.9
1.3	2.525	2.281	2.342	2.347	9.7	7.3	7.0
2.1	2.528	2.199	2.372	2.366	13.0	6.2	6.4
2.2	2.528	2.185	2.364	2.285	13.6	6.5	9.6
2.3	2.528	2.235	2.335	2.330	11.6	7.6	7.8
3.1	2.514	2.275	2.379	2.359	9.5	5.3	6.2
3.2	2.514	2.241	2.379	2.351	10.8	5.4	6.5
3.3	2.514	2.302	2.397	2.382	8.4	4.6	5.2

		Gmb			VTM		
PROJECT I.D.	Gmm	CONSTR.	3 MONTH	6 MONTH	CONSTR.	3 MONTH	6 MONTH
AL5							
1.1	2.487	2.295	2.362	2.354	7.7	5.0	5.4
1.2	2.487	2.295	2.344	2.347	7.7	5.7	5.6
1.3	2.487	2.220	2.308	2.324	10.7	7.2	6.6
2.1	2.493	2.274	2.318	2.330	8.8	7.0	6.5
2.2	2.493	2.265	2.337	2.332	9.2	6.3	6.5
2.3	2.493	2.265	2.325	2.336	9.1	6.7	6.3
3.1	2.493	2.277	2.363	2.363	8.7	5.2	5.2
3.2	2.493	2.222	2.296	2.330	10.9	7.9	6.5
3.3	2.493	2.226	2.324	2.308	10.7	6.8	7.4

		Gmb			VTM		
PROJECT I.D	Gmm	CONSTR.	3 MONTH	6 MONTH	CONSTR.	3 MONTH	6 MONTH
AL6							
1.1	2.548	2.359	2.372	N/A	7.4	6.9	N/A
1.2	2.548	2.366	2.379	N/A	7.2	6.6	N/A
1.3	2.548	2.291	2.340	N/A	10.1	8.2	N/A
2.1	2.531	2.333	2.362	N/A	7.8	6.6	N/A
2.2	2.531	2.342	2.346	N/A	7.4	7.3	N/A
2.3	2.531	2.294	2.377	N/A	9.3	6.1	N/A

PROJ. I.D.	JOB LOCATION	MIX I.D.
AL1	MOULTON	12.5mm NMS COARSE GRADED SUPRPAVE
AL2	BOAZ	12.5mm NMS COARSE GRADED SUPRPAVE
AL3	SELMA	12.5mm NMS COARSE GRADED SUPRPAVE
AL4	MONROEVILLE	12.5mm NMS COARSE GRADED SUPRPAVE
AL5	ENTERPRISE	12.5mm NMS COARSE GRADED SUPRPAVE
AL6	OPELIKA	9.5mm NMS COARSE GRADED SUPRPAVE

FLORIDA, UTAH, WISCONSIN, AND INDIANA DATA

		Gmb			VTM		
PROJECT I.D	Gmm	CONSTR.	3 MONTH	6 MONTH	CONSTR.	3 MONTH	6 MONTH
FL1							
1.1	2.450	2.233	2.317	2.317	8.9	5.4	5.4
1.2	2.450	2.287	2.334	2.332	6.6	4.8	4.8
1.3	2.450	2.277	2.311	2.327	7.1	5.7	5.0
2.1	2.450	2.258	2.346	2.330	7.8	4.2	4.9
2.2	2.450	2.226	2.300	2.313	9.2	6.1	5.6
2.3	2.450	2.274	2.344	2.340	7.2	4.3	4.5

		Gmb			VTM		
PROJECT I.D	Gmm	CONSTR.	3 MONTH	6 MONTH	CONSTR.	3 MONTH	6 MONTH
IN1							
1.1	2.465	2.200	N/A	N/A	10.7	N/A	N/A
1.2	2.465	2.233	N/A	N/A	9.4	N/A	N/A
1.3	2.465	2.221	N/A	N/A	9.9	N/A	N/A
2.1	2.469	2.259	N/A	N/A	8.5	N/A	N/A
2.2	2.469	2.235	N/A	N/A	9.5	N/A	N/A
2.3	2.469	2.267	N/A	N/A	8.2	N/A	N/A
3.1	2.471	2.262	N/A	N/A	8.4	N/A	N/A
3.2	2.471	2.321	N/A	N/A	6.1	N/A	N/A
3.3	2.471	2.282	N/A	N/A	7.6	N/A	N/A

		Gmb			VTM		
PROJECT I.D	Gmm	CONSTR.	3 MONTH	6 MONTH	CONSTR.	3 MONTH	6 MONTH
UT1							
1.1	2.470	2.270	2.331	N/A	8.1	5.6	N/A
1.2	2.470	2.287	2.339	N/A	7.4	5.3	N/A
1.3	2.470	2.246	2.314	N/A	9.1	6.3	N/A
2.1	2.458	2.310	2.310	N/A	6.0	6.0	N/A
2.2	2.458	2.313	2.319	N/A	5.9	5.6	N/A
2.3	2.458	2.270	2.323	N/A	7.7	5.5	N/A
3.1	2.465	2.200	2.211	N/A	9.9	10.3	N/A
3.2	2.465	2.200	2.300	N/A	9.9	6.7	N/A
3.3	2.465	2.247	2.297	N/A	8.8	6.8	N/A

		Gmb			VTM		
PROJECT I.D	Gmm	CONSTR.	3 MONTH	6 MONTH	CONSTR.	3 MONTH	6 MONTH
IN2							
1.1	2.684	2.471	N/A	N/A	7.9	N/A	N/A
1.2	2.684	2.368	N/A	N/A	11.8	N/A	N/A
1.3	2.684	2.395	N/A	N/A	10.8	N/A	N/A
2.1	2.673	2.423	N/A	N/A	9.4	N/A	N/A
2.2	2.673	2.475	N/A	N/A	7.4	N/A	N/A
2.3	2.673	2.472	N/A	N/A	7.5	N/A	N/A
3.1	2.698	2.496	N/A	N/A	7.5	N/A	N/A
3.2	2.698	2.519	N/A	N/A	6.6	N/A	N/A
3.3	2.698	2.470	N/A	N/A	8.5	N/A	N/A

		Gmb			VTM		
PROJECT I.D	Gmm	CONSTR.	3 MONTH	6 MONTH	CONSTR.	3 MONTH	6 MONTH
WI1							
1.1	2.563	2.302	N/A	N/A	10.2	N/A	N/A
1.2	2.563	2.320	N/A	N/A	9.5	N/A	N/A
1.3	2.563	2.338	N/A	N/A	8.8	N/A	N/A
2.1	2.559	2.408	N/A	N/A	5.9	N/A	N/A
2.2	2.559	2.394	N/A	N/A	6.5	N/A	N/A
2.3	2.559	2.367	N/A	N/A	7.5	N/A	N/A
3.1	2.546	2.351	N/A	N/A	7.7	N/A	N/A
3.2	2.546	2.326	N/A	N/A	8.7	N/A	N/A
3.3	2.546	2.339	N/A	N/A	8.1	N/A	N/A

PROJ. I.D.	JOB LOCATION	MIX I.D.
FL1	PENSACOLA	9.5 NMS Coarse Graded Superpave
UT1	SALT LAKE CITY	12.5 NMS Fine Graded Superpave
IN1	BROWNSBURG	
IN2	FORT WAYNE	
WI1	MILWAUKEE	12.5 NMS Coarse Graded Superpave

COLORADO DATA

		Gmb			VTM		
PROJECT I.D	Gmm	CONSTR.	3 MONTH	6 MONTH	CONSTR.	3 MONTH	6 MONTH
CO1							
1.1	2.451	2.250	2.325	N/A	8.2	5.1	N/A
1.2	2.451	2.236	2.306	N/A	8.7	5.9	N/A
1.3	2.451	2.238	2.313	N/A	8.7	5.6	N/A
2.1	2.436	2.341	2.381	N/A	3.9	2.3	N/A
2.2	2.436	2.316	2.370	N/A	4.9	2.7	N/A
2.3	2.436	2.280	2.345	N/A	6.4	3.8	N/A
3.1	2.451	2.329	2.388	N/A	5.0	2.5	N/A
3.2	2.451	2.330	2.370	N/A	4.9	3.3	N/A
3.3	2.451	2.324	2.390	N/A	5.2	2.5	N/A

		Gmb			VTM		
PROJECT I.D	Gmm	CONSTR.	3 MONTH	6 MONTH	CONSTR.	3 MONTH	6 MONTH
CO2							
1.1	2.428	2.336	2.395	N/A	3.8	1.4	N/A
1.2	2.428	2.299	2.362	N/A	5.3	2.7	N/A
1.3	2.428	2.304	2.360	N/A	5.1	2.8	N/A
2.1	2.436	2.326	2.375	N/A	4.5	2.5	N/A
2.2	2.436	2.320	2.349	N/A	4.8	3.6	N/A
2.3	2.436	2.302	2.356	N/A	5.5	3.3	N/A
3.1	2.449	2.295	2.335	N/A	6.3	4.7	N/A
3.2	2.449	2.320	2.353	N/A	5.3	3.9	N/A
3.3	2.449	2.318	2.355	N/A	5.4	3.8	N/A

		Gmb			VTM		
PROJECT I.D	Gmm	CONSTR.	3 MONTH	6 MONTH	CONSTR.	3 MONTH	6 MONTH
CO3							
1.1	2.435	2.283	2.302	N/A	6.3	5.5	N/A
1.2	2.435	2.257	2.280	N/A	7.3	6.4	N/A
1.3	2.435	2.250	2.279	N/A	7.6	6.4	N/A
2.1	2.435	2.276	2.326	N/A	6.5	4.5	N/A
2.2	2.435	2.287	2.330	N/A	6.1	4.3	N/A
2.3	2.435	2.280	2.286	N/A	6.4	6.1	N/A

		Gmb			VTM		
PROJECT I.D	Gmm	CONSTR.	3 MONTH	6 MONTH	CONSTR.	3 MONTH	6 MONTH
CO4							
1.1	2.501	2.335	2.337	N/A	6.6	6.6	N/A
1.2	2.501	2.343	2.334	N/A	6.3	6.7	N/A
1.3	2.501	2.367	2.363	N/A	5.4	5.5	N/A
2.1	2.497	2.332	2.346	N/A	6.6	6.0	N/A
2.2	2.497	2.337	2.292	N/A	6.4	8.2	N/A
2.3	2.497	2.362	2.323	N/A	5.4	7.0	N/A
3.1	2.510	2.338	2.336	N/A	6.9	6.9	N/A
3.2	2.510	2.351	2.351	N/A	6.3	6.3	N/A
3.3	2.510	2.331	2.332	N/A	7.1	7.1	N/A

		Gmb			VTM		
PROJECT I.D	Gmm	CONSTR.	3 MONTH	6 MONTH	CONSTR.	3 MONTH	6 MONTH
CO5							
1.1	2.451	2.289	2.335	N/A	6.6	4.7	N/A
1.2	2.451	2.249	2.308	N/A	8.2	5.8	N/A
1.3	2.451	2.272	2.323	N/A	7.3	5.2	N/A
2.1	2.462	2.244	2.281	N/A	8.9	7.3	N/A
2.2	2.462	2.247	2.289	N/A	8.7	7.0	N/A
2.3	2.462	2.253	2.292	N/A	8.5	6.9	N/A
3.1	2.462	2.238	2.290	N/A	9.1	7.0	N/A
3.2	2.462	2.239	2.292	N/A	9.0	6.9	N/A
3.3	2.462	2.245	2.293	N/A	8.8	6.8	N/A

PROJ. I.D.	JOB LOCATION	MIX I.D.
CO1	FRISCO	12.5mm NMS FINE GRADED SUPERPAVE
CO2	GLENWOOD SPRINGS #1	12.5mm NMS FINE GRADED SUPERPAVE
CO3	GRAND JUNCTION	12.5mm NMS FINE-COARSE GRADED SUPERPAVE
CO4	MEEKER	12.5mm NMS COARSE GRADED SUPERPAVE
CO5	GLENWOOD SPRINGS #2	12.5mm NMS FINE GRADED SUPERPAVE

KENTUCKY AND MICHIGAN DATA

		Gmb			VTM		
PROJECT I.D	Gmm	CONSTR.	3 MONTH	6 MONTH	CONSTR.	3 MONTH	6 MONTH
KY1							
1.1	2.480	2.125	N/A	N/A	14.3	N/A	N/A
1.2	2.480	2.158	N/A	N/A	13.0	N/A	N/A
1.3	2.480	2.166	N/A	N/A	12.7	N/A	N/A
2.1	2.453	2.025	N/A	N/A	17.4	N/A	N/A
2.2	2.453	2.125	N/A	N/A	13.4	N/A	N/A
2.3	2.453	2.059	N/A	N/A	16.1	N/A	N/A

		Gmb			VTM		
PROJECT I.D	Gmm	CONSTR.	3 MONTH	6 MONTH	CONSTR.	3 MONTH	6 MONTH
KY2							
1.1	2.488	2.286	N/A	N/A	8.1	N/A	N/A
1.2	2.488	2.288	N/A	N/A	8.1	N/A	N/A
1.3	2.488	2.292	N/A	N/A	7.9	N/A	N/A
2.1	2.468	2.292	N/A	N/A	7.1	N/A	N/A
2.2	2.468	2.280	N/A	N/A	7.6	N/A	N/A
2.3	2.468	2.272	N/A	N/A	8.0	N/A	N/A

		Gmb			VTM		
PROJECT I.D	Gmm	CONSTR.	3 MONTH	6 MONTH	CONSTR.	3 MONTH	6 MONTH
KY3							
1.1	2.484	2.285	N/A	N/A	8.0	N/A	N/A
1.2	2.484	2.247	N/A	N/A	9.5	N/A	N/A
1.3	2.484	2.327	N/A	N/A	6.3	N/A	N/A
2.1	2.481	2.274	N/A	N/A	8.3	N/A	N/A
2.2	2.481	2.317	N/A	N/A	6.6	N/A	N/A
2.3	2.481	2.238	N/A	N/A	9.8	N/A	N/A
3.1	2.486	2.330	N/A	N/A	6.3	N/A	N/A
3.2	2.486	2.342	N/A	N/A	5.8	N/A	N/A
3.3	2.486	2.332	N/A	N/A	6.2	N/A	N/A

		Gmb			VTM		
PROJECT I.D	Gmm	CONSTR.	3 MONTH	6 MONTH	CONSTR.	3 MONTH	6 MONTH
MI1							
1.1	2.447	2.263	N/A	N/A	7.5	N/A	N/A
1.2	2.447	2.272	N/A	N/A	7.1	N/A	N/A
1.3	2.447	2.256	N/A	N/A	7.8	N/A	N/A
2.1	2.440	2.275	N/A	N/A	6.7	N/A	N/A
2.2	2.440	2.311	N/A	N/A	5.3	N/A	N/A
2.3	2.440	2.244	N/A	N/A	8.0	N/A	N/A
3.1	2.458	2.247	N/A	N/A	8.6	N/A	N/A
3.2	2.458	2.257	N/A	N/A	8.2	N/A	N/A
3.3	2.458	2.256	N/A	N/A	8.2	N/A	N/A

		Gmb			VTM		
PROJECT I.D	Gmm	CONSTR.	3 MONTH	6 MONTH	CONSTR.	3 MONTH	6 MONTH
MI2							
1.1	2.468	2.288	N/A	N/A	7.3	N/A	N/A
1.2	2.468	2.336	N/A	N/A	5.4	N/A	N/A
1.3	2.468	2.282	N/A	N/A	7.5	N/A	N/A
2.1	2.467	2.291	N/A	N/A	7.1	N/A	N/A
2.2	2.467	2.297	N/A	N/A	6.9	N/A	N/A
2.3	2.467	2.278	N/A	N/A	7.6	N/A	N/A

		Gmb			VTM		
PROJECT I.D	Gmm	CONSTR.	3 MONTH	6 MONTH	CONSTR.	3 MONTH	6 MONTH
MI3							
1.1	2.478	2.263	N/A	N/A	8.7	N/A	N/A
1.2	2.478	2.272	N/A	N/A	8.3	N/A	N/A
1.3	2.478	2.271	N/A	N/A	8.3	N/A	N/A
2.1	2.472	2.294	N/A	N/A	7.2	N/A	N/A
2.2	2.472	2.215	N/A	N/A	10.4	N/A	N/A
2.3	2.472	2.253	N/A	N/A	8.9	N/A	N/A
3.1	2.497	2.255	N/A	N/A	9.7	N/A	N/A
3.2	2.497	2.300	N/A	N/A	7.9	N/A	N/A
3.3	2.497	2.282	N/A	N/A	8.6	N/A	N/A

PROJ. I.D.	JOB LOCATION	MIX I.D.
KY1	LEBENON	
KY2	OLIVE HILL	
KY3	FRANKFORT	
MI1	BROOKLYN	9.5 NMS FINE GRADED SUPERPAVE
MI2	LANSING	9.5 NMS FINE GRADED SUPERPAVE
MI3	DETROIT	12.5 NMS COARSE GRADED SUPERPAVE

ANNEX D2-2

Reduced NCAT Data as Used in the Analysis

PROJECT I.D.	Time	VA	MAAT	Viscosity
	(months)	(%)	(F)	(Mega-poises)
AL1-1	0	10.5	60.5	1.96
	3	6.0	60.5	1.96
	6	3.8	60.5	1.96
AL1-2	0	10.4	60.5	1.96
	3	7.8	60.5	1.96
	6	5.8	60.5	1.96
AL1-3	0	10.9	60.5	1.96
	3	6.4	60.5	1.96
	6	5.1	60.5	1.96
AL2-1	0	14.6	60.5	1.96
	3	11.5	60.5	1.96
	6	9.9	60.5	1.96
AL2-2	0	11.3	60.5	1.96
	3	9.4	60.5	1.96
	6	8.8	60.5	1.96
AL2-3	0	11.7	60.5	1.96
	3	8.0	60.5	1.96
	6	7.2	60.5	1.96
AL3-1	0	10.8	64.5	3.83
	3	7.7	64.5	3.83
	6	7.1	64.5	3.83
AL3-2	0	9.8	64.5	3.83
	3	6.7	64.5	3.83
	6	6.4	64.5	3.83
AL4-1	0	9.4	66.3	1.96
	3	7.9	66.3	1.96
	6	7.6	66.3	1.96
AL5-1	0	8.7	65	1.96
	3	6.0	65	1.96
	6	5.9	65	1.96
AL5-2	0	9.0	65	1.96
	3	6.7	65	1.96
	6	6.4	65	1.96
AL5-3	0	10.1	65	1.96
	3	6.6	65	1.96
	6	6.4	65	1.96
AL6-1	0	8.2	62.5	1.96
	3	7.2	62.5	1.96

PROJECT I.D.	Time	VA	MAAT	Viscosity
	(months)	(%)	(F)	(Mega-poises)

AL6-2	0	8.2	62.5	1.96
	3	6.7	62.5	1.96
CO1-1	0	8.5	44.5	0.42
	3	5.5	44.5	0.42
CO1-2	0	5.1	44.5	0.42
	3	2.9	44.5	0.42
CO1-3	0	5.0	44.5	0.42
	3	2.8	44.5	0.42
CO2-1	0	4.7	42.5	0.77
	3	2.3	42.5	0.77
CO2-2	0	4.9	42.5	0.77
	3	3.1	42.5	0.77
CO2-3	0	5.7	42.5	0.77
	3	4.1	42.5	0.77
CO3-1	0	7.1	53.2	2.15
	3	6.1	53.2	2.15
CO3-2	0	6.3	53.2	2.15
	3	5.0	53.2	2.15
CO4-3	0	6.8	45.7	0.77
	3	6.8	45.7	0.77
CO5-1	0	7.4	42.5	0.77
	3	5.2	42.5	0.77
CO5-2	0	8.7	42.5	0.77
	3	7.1	42.5	0.77
CO5-3	0	9.0	42.5	0.77
	3	6.9	42.5	0.77
FL1-1	0	7.5	67.7	2.27
	3	5.3	67.7	2.27
	6	5.1	67.7	2.27
FL1-2	0	8.1	67.7	2.27
	3	4.9	67.7	2.27
	6	5.0	67.7	2.27
UT1-1	0	8.2	52	0.40
	3	5.7	52	0.40
UT1-2	0	6.5	52	0.40
	3	5.7	52	0.40
UT1-3	0	9.5	52	0.40
	3	7.9	52	0.40

ANNEX- E

Correlation of CBR Values with Soil Index Properties

NCHRP 1-37 A

Development of the 2002 Guide for the Design of New and Rehabilitated Pavement Structures

Inter Team Technical Report

Correlation of CBR Values With Soil Index Properties

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November 2001

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CBR Correlations with Soil Index Properties

Study Objective

The objective of this study was to develop general correlations that describe the relationship between Soil Index Properties and the California Bearing Ratio (CBR) and Resilient Modulus (M_R) of unbound materials such as base, subbase, and subgrade layers in pavement systems. The correlations developed are intended for use in the 2002 Design Guide methodology. Once relationships were developed to predict CBR values, the use of $M_R = 2555\ CBR^{0.64}$ was used to correlate properties directly to estimates of M_R.

Sources of Information

The sources of information used to correlate CBR with soil index properties are:

1. Typical CBR ranges for the Unified Soil Classification System (USCS) material classification (Table 1).
2. Grain Size Distribution ranges for materials defined with the USCS. Given the requirements of the USCS, each USCS symbol implies certain limits on the given size distribution.
3. Atterberg Limits for the USCS materials. Likewise, each USCS symbol implies certain limits on the Atterberg Limits, particularly when the fact that most soils plot near the "A-line" is employed.
4. Grain Size Distribution ranges for materials defined by AASHTO Classifications A-1-a, A-1-b, and A-3 materials.

Typical CBR ranges for the USCS materials were extracted from *Principles of Pavement Design*, (Yoder & Witczak, 1975). The values are shown in the 12th column of Table 1. Three additional CBR values for the AASHTO classification materials were extracted from a slightly modified version of the *Guidelines for Use of HMA Overlays to Rehabilitate PCC Pavements* (NAPA Information Series 117, 1994). This modified graphical correlation of CBR, R-values, USCS, and AASHTO classification is shown in Figure 1. In addition, Tables 2 and 3 summarize the typical CBR and M_R ranges, and in-situ (typical) M_R value for each USCS and AASHTO classification symbol.

The grain size distribution information was used to define typical ranges for D_{60} values and the Percentage Passing #200 sieve (P_{200}) for the USCS materials. These properties were chosen to correlate with CBR for simplicity, as they will always be required as input parameters in the 2002 Design Guide.

Typical ranges for the Atterberg Limits were estimated in order to get the Plasticity Index (*PI*). As with the D_{60} and the P_{200} properties, the *PI* of the soil is always required as an input parameter in the Design Guide.

The values of D_{60}, P_{200}, and *PI* were the index properties chosen for correlation. In addition, for materials with a $PI > 0$, a weighted Plasticity Index, termed *wPI* was used:

$$wPI = \text{Passing \#200} \cdot \text{Plasticity Index} = P_{200} \cdot PI \quad \text{.....(1)}$$

with P_{200} used as a decimal and *PI* used in % form.

Table 4 shows typical ranges of D_{60}, P_{200}, *PI* and *wPI* for the USCS and AASHTO materials. These values were obtained by checking the Plasticity chart and Grain Size distribution curves, based on the classification criteria, to obtain ranges.

Methodology

The materials were divided into two groups:

a) Coarse materials, clean, typically non-plastic such as GW, GP, SW, and SP soils for which $wPI = 0$; and

b) Soils which contain more than 12% fines and exhibit some plasticity, such as GM, GC, SM, SC, ML, MH, CL, and CH, for which $wPI > 0$.

For coarse, clean soils ($wPI = 0$), it was decided to correlate the CBR value with the *Diameter 60* (D_{60}) from the grain size distribution curves. Figure 2 shows the data obtained from Tables 1

and 4 for non-plastic soils. Three additional data points were used based on the AASHTO classification system corresponding to A-1-a, A-1-b, and A-3 soils. These data points were obtained from Figure 1 and are indicated by the legend for Figure 2. The best-fitted equation to the data shown in Figure 2 is the following:

$$CBR = 28.09\ (D_{60})^{0.358} \quad \text{..... (2)}$$

where: D_{60} = Diameter at 60% passing from the Grain Size Distribution – mm

Equation (2) is limited to D_{60} values greater than 0.01 mm and less than 30 mm. For D_{60} less than 0.01 mm, the recommended value of *CBR* is 5. For D_{60} greater than 30 mm, the recommended value of CBR is 95. This relationship is depicted in Figure 2, along with the goodness of the fit parameters.

For the second group (plastic materials), for which $wPI > 0$, the index properties chosen to correlate with the CBR values are the Passing #200 sieve (P_{200}) and the Plasticity Index (*PI*). These properties are combined into a parameter called *wPI*, defined by Equation (1).

Figure 3 shows the data obtained from Tables 1 and 4 for plastic materials ($wPI > 0$), along with the correlation and the goodness of fit. The correlation is represented by Equation (3), as follows:

$$CBR = \frac{75}{1 + 0.728(wPI)} \quad \text{.....(3)}$$

Table 5 shows the calculated CBR based on Equations (2) and (3) for the different materials. Table 5 can either be included as a pop-up screen in the 2002 Design Guide software or simply presented in the User's Manual for the software, as a reference for the user.

Validation

As a preliminary validation of the correlations developed and depicted in Figures 2 and 3, the CBR values resulting from these correlations were compared to the ranges of CBR values recommended for materials defined by the USCS classification system in Figure 1 and Table 2. It is important to note that the CBR ranges recommended in Figure 1 for the USCS materials

were not used as a data source to develop the CBR correlations in this report. Therefore, it is a valid source for validation of the results obtained.

Table 6 shows the CBR values calculated by the correlations and the CBR ranges recommended in Figure 1 and Table 2. All of the CBR calculated values fall inside the range recommended, and therefore the correlations may be viewed as being quite reliable and consistent between all of the hierarchical sources of data used in the analysis.

Relationship between In-situ M_R and M_R at Optimum Conditions

The correlations developed above are based on typical CBR values measured at field (in-situ) conditions. For Level 3 analysis in the 2002 Design Guide, the user has the option to input either CBR values or estimated M_R values at optimum conditions. Therefore, a relationship must be developed between the estimated in-situ properties and the properties at optimum conditions.

The in-situ M_R can be estimated by the following relationship:

$$M_R = 2555(CBR)^{0.64} \quad \text{.....(4)}$$

In order to convert in-situ M_R values to M_R at optimum conditions (M_{Ropt}), a factor that accounts for the strength change by going from in-situ to optimum conditions is shown in Figure 4. The factor is the following:

$$Factor = 2.11 - 2.78 \cdot 10^{-5}\left(M_{R\ insitu}\right) \quad \text{.....(5)}$$

therefore,

$$M_{Ropt} = \left[2.11 - 2.78 \cdot 10^{-5}\left(M_{R\ insitu}\right)\right] M_{R\,insitu} \quad \text{.....(6)}$$

Tables 7 and 8 show the M_{Ropt} values calculated from equation (6) for USCS and AASHTO classification materials, respectively. As for the CBR values, Tables 7 and 8 can either be

included as pop-up screens in the 2002 Design Guide software or simply presented in the User's Manual for the software, as a reference for the user.

Summary

1. The correlations shown above were derived primarily by selecting specific values (from recommended ranges of values) of *CBR*, *wPI*, and D_{60}.

2. These correlations were originally intended to get M_{Ropt} for frozen materials, so that F_{env} could be computed (within the EICM Module) for frozen materials. Given that M_{Rfrz} has very little effect on deformation, not much precision in M_R for frozen layers is needed.

3. Caution should be exercised when these correlations are used to obtain an estimate of M_{Ropt} for materials other than frozen layers, because a very limited database was used to develop the correlations.

4. As the database relating D_{60}, *wPI*, and CBR grows, it may be possible to improve these correlations. It may also be possible eventually to derive even better correlations between D_{60} and M_{Ropt} and *wPI* and M_{Ropt} as direct correlations.

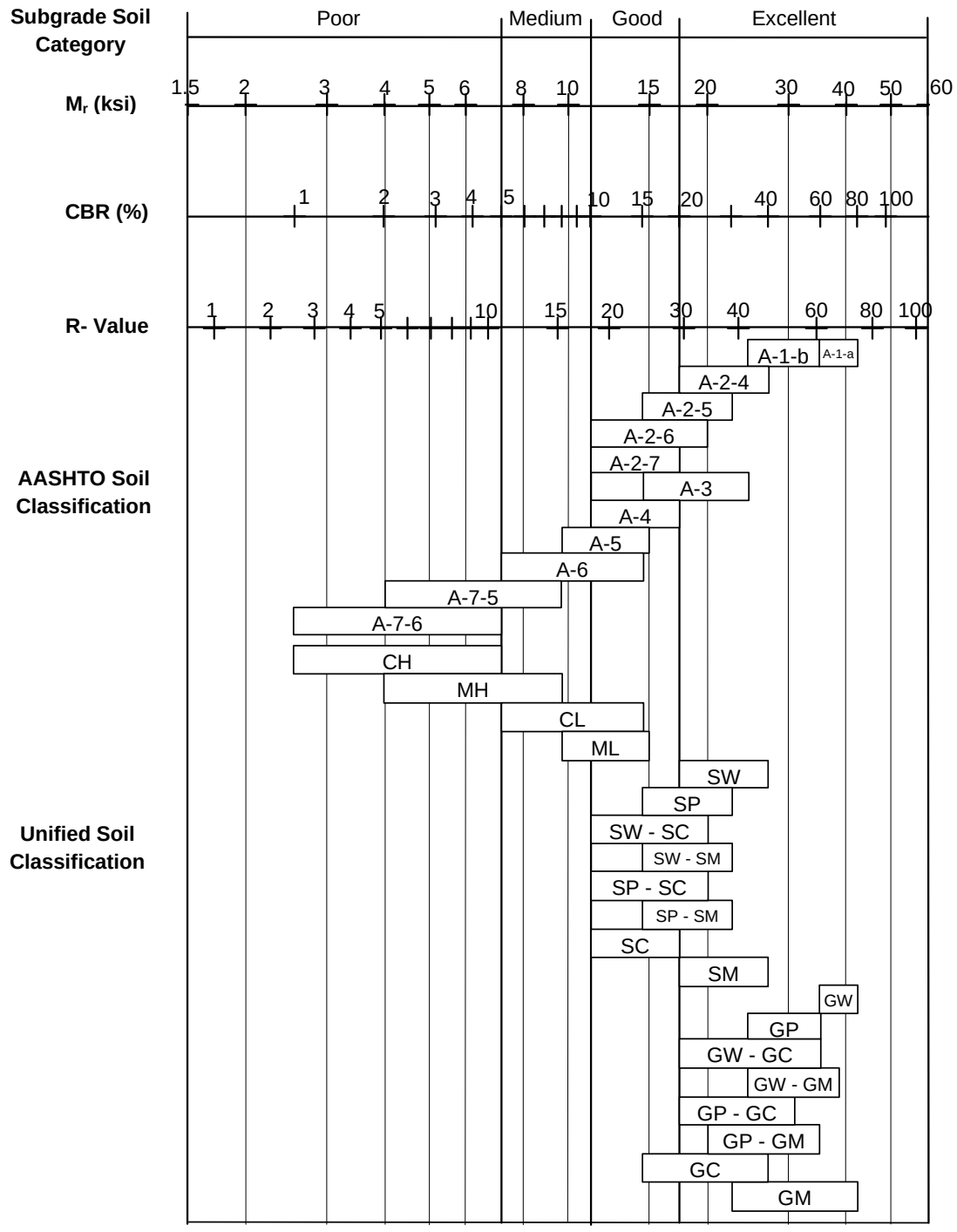

Figure 1. Typical In-situ Resilient Modulus Correlations to Empirical Soil Properties and Classification Categories.

(Modified from NAPA Information Series 117, "Guidelines for Use of HMA Overlays to Rehabilitate PCC Pavements", 1994)

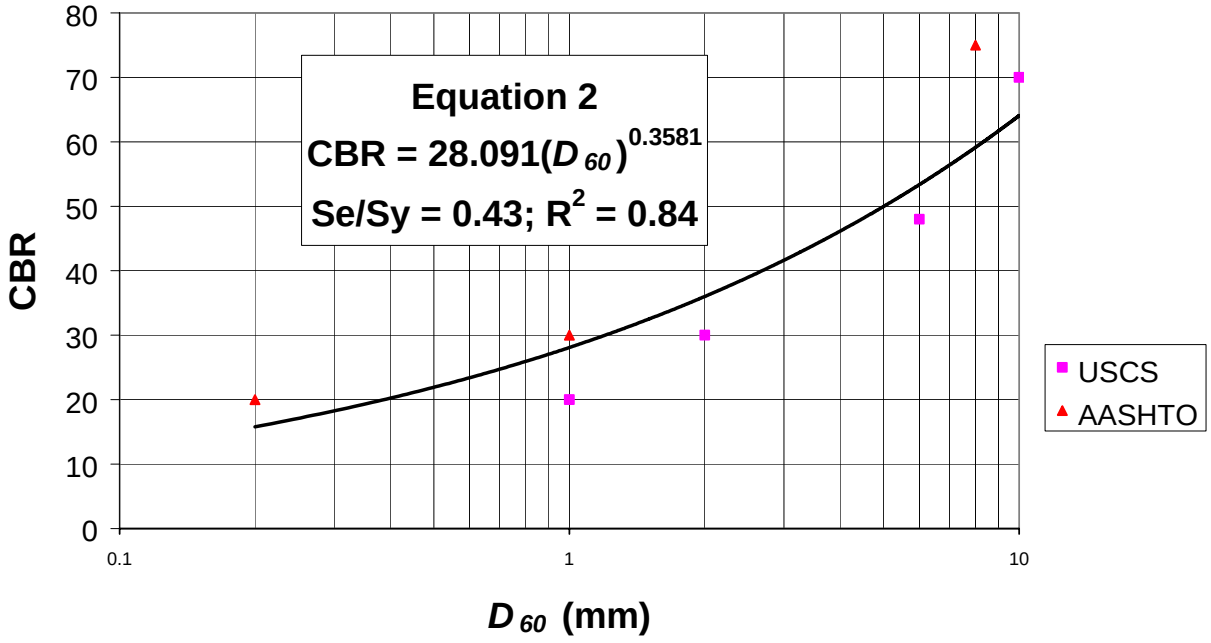

Figure 2. CBR Correlations for Coarse-Grained Materials

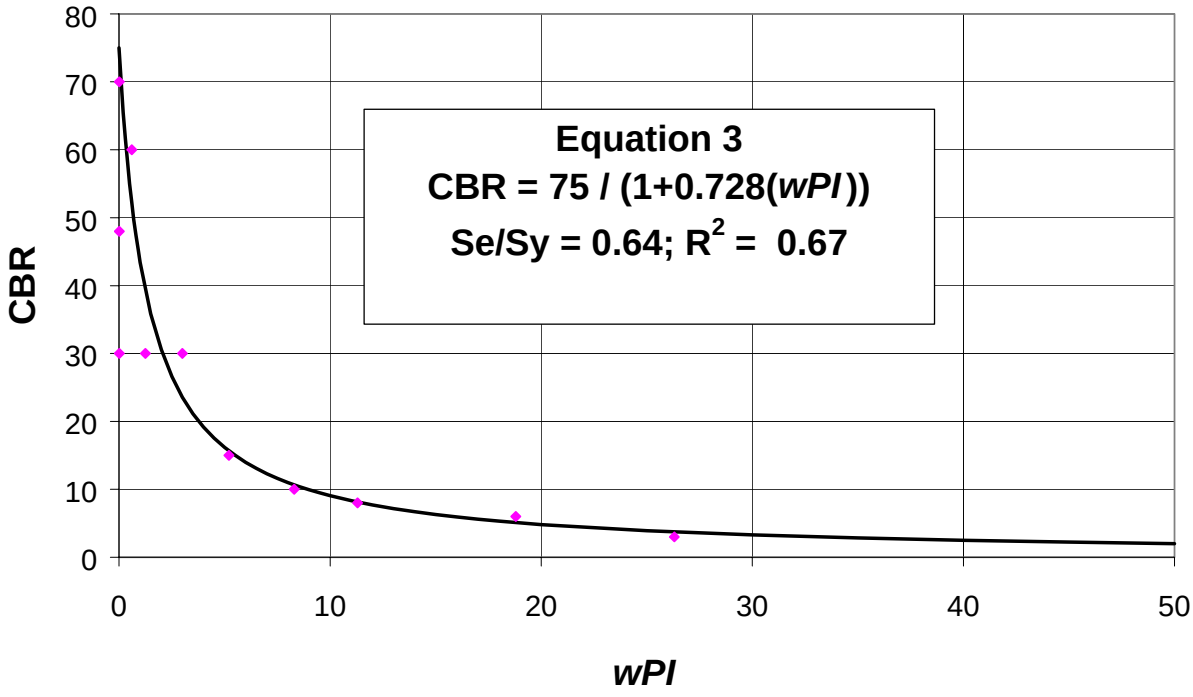

Figure 3. CBR Correlation for Plastic Materials

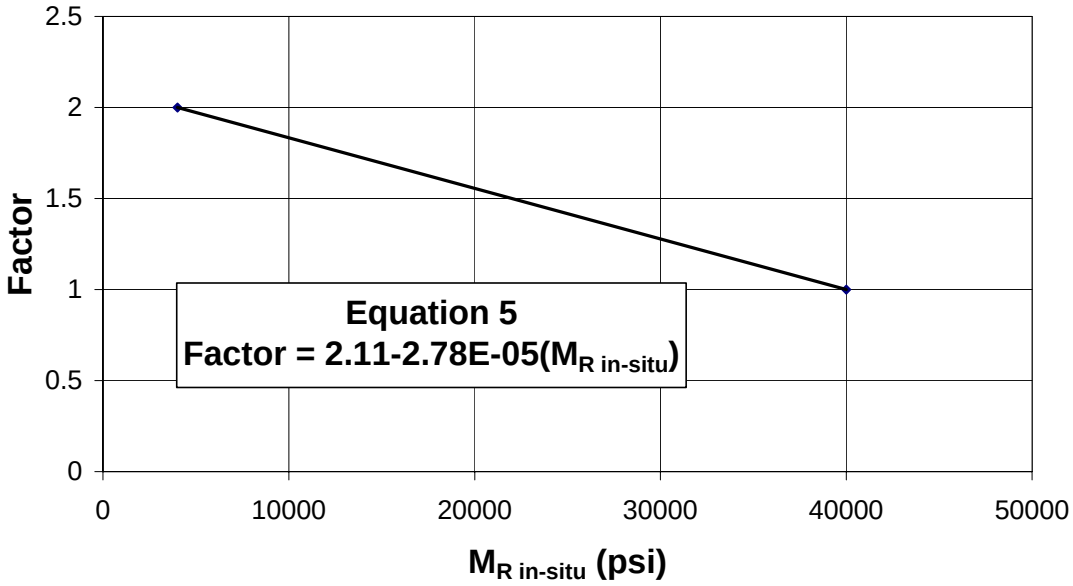

Figure 4. Factor To Convert In-situ Resilient Modulus to Optimum Resilient Modulus Condition

Table 1. CBR Values for Soils by the Unified Soil Classification System (USCS) (Yoder & Witczak, "Principles of Pavement Design", 1975)

Major Division		Letter	Name	Value as Foundation When Not Subject to Frost Action	Value as Base Directly under Wearing Surface	Potential Frost Action	Compressi-bility and Expansion	Drainage Characteristics	Compaction Equipment	Unit Dry Weight (pcf)	Field CBR	Subgrade Modulus k (pci)
1	2	3	4	5	6	7	8	9	10	11	12	13
Coarse-grained soils	Gravel and gravelly soils	GW	Gravel or sandy gravel, well graded	Excellent	Good	None to very slight	Almost none	Excellent	Crawler-type tractor, rubber-tired equipment, steel-wheeled roller	125-140	60-80	300 or more
		GP	Gravel or sandy gravel, poorly graded	Good to excellent	Poor to fair	None to very slight	Almost none	Excellent	Crawler-type tractor, rubber-tired equipment, steel-wheeled roller	120-130	35-60	300 or more
		GU	Gravel or sandy gravel, uniformly graded	Good	Poor	None to very slight	Almost none	Excellent	Crawler-type tractor, rubber-tired equipment	115-125	25-50	300 or more
		GM	Silty gravel or silty sandy gravel	Good to excellent	Fair to good	Slight to medium	Very slight	Fair to poor	Rubber-tired equipment, sheepsfoot roller, close control of moisture	130-145	40-80	300 or more
		GC	Clayey gravel or clayey sandy gravel	Good	Poor	Slight to medium	Slight	Poor to practically impervious	Rubber-tired equipment, sheepsfoot roller	120-140	20-40	200-300
	Sand and sandy soils	SW	Sand or gravelly sand, well graded	Good	Poor	None to very slight	Almost none	Excellent	Crawler-type tractor, rubber-tired equipment	110-130	20-40	200-300
		SP	Sand or gravelly sand, poorly graded	Fair to good	Poor to not suitable	None to very slight	Almost none	Excellent	Crawler-type tractor, rubber-tired equipment	105-120	15-25	200-300
		SU	Sand or gravelly sand, uniformly graded	Fair to good	Not suitable	None to very slight	Almost none	Excellent	Crawler-type tractor, rubber-tired equipment	100-115	10-20	200-300
		SM	Silty sand or silty gravelly sand	Good	Poor	Slight to high	Very slight	Fair to poor	Rubber-tired equipment, sheepsfoot roller, close control of moisture	120-135	20-40	200-300
		SC	Clayey sand or clayey gravelly sand	Fair to good	Not suitable	Slight to high	Slight to medium	Poor to practically impervious	Rubber-tired equipment, sheepsfoot roller	105-130	10-20	200-300
Fine-grained soils	Low compressibility LL < 50	ML	Silts, sandy silts, gravelly silts, or diatomaceous soils	Fair to poor	Not suitable	Medium to very high	Slight to medium	Fair to poor	Rubber-tired equipment, sheepsfoot roller, close control of moisture	100-125	5-15	100-200
		CL	Lean clays, sandy clays, or gravelly clays	Fair to poor	Not suitable	Medium to high	Medium	Practically impervious	Rubber-tired equipment, sheepsfoot roller	100-125	5-15	100-200
		OL	Organic silts or lean organic clays	Poor	Not suitable	Medium to high	Medium to high	Poor	Rubber-tired equipment, sheepsfoot roller	90-105	4-8	100-200
	High Compressibility LL > 50	MH	Micaceous clays or diatomaceous soils	Poor	Not suitable	Medium to very high	High	Fair to poor	Rubber-tired equipment, sheepsfoot roller	80-100	4-8	100-200
		CH	Fat clays	Poor to very poor	Not suitable	Medium	High	Practically impervious	Rubber-tired equipment, sheepsfoot roller	90-110	3-5	50-100
		OH	Fat organic clays	Poor to very poor	Not suitable	Medium	High	Practically impervious	Rubber-tired equipment, sheepsfoot roller	80-105	3-5	50-100
Peat and other fibrous organic soils		P_t	Peat, humus, and other	Not suitable	Not suitable	Slight	Very high	Fair to poor	Compaction not practical			

Table 2. Typical CBR and In-situ M_R Values for USCS Classification Materials from Figure 1

USCS Symbol	Typical CBR Range	In-situ M_R Range (ksi)	Typical In-situ M_R (ksi)
CH	1 – 5	2.5 – 7	4
MH	2 – 8	4 – 9.5	6
CL	5 – 15	7 – 14	9
ML	8 – 16	9 – 15	11
SW	20 – 40	17 – 28	21
SP	15 – 30	14 – 22	17
SW-SC	10 – 25	12 – 20	15
SW-SM	15 – 30	14 – 22	17
SP-SC	10 – 25	12 – 20	15
SP-SM	15 – 30	14 – 22	17
SC	10 – 20	12 – 17	14
SM	20 – 40	17 – 28	21
GW	60 – 80	35 – 42	38
GP	35 – 60	25 – 35	29
GW-GC	20 – 60	17 – 35	24
GW-GM	35 – 70	25 – 38	30
GP-GC	20 – 50	17 – 32	23
GP-GM	25 – 60	20 – 35	26
GC	15 – 40	14 – 28	20
GM	30 – 80	22 – 42	30

Table 3. Typical CBR and In-situ M_R Values for AASHTO Classification Materials from Figure 1

AAHSTO Symbol	Typical CBR Range	M_R Range (ksi)	Typical In-situ M_R (ksi)
A-7-6	1 – 5	2.5 – 7	4
A-7-5	2 – 8	4 – 9.5	6
A-6	5 – 15	7 – 14	9
A-5	8 – 16	9 – 15	11
A-4	10 – 20	12 – 18	14
A-3	15 – 35	14 – 25	18
A-2-7	10 – 20	12 – 17	14
A-2-6	10 – 25	12 – 20	15
A-2-5	15 – 30	14 – 22	17
A-2-4	20 – 40	17 – 28	21
A-1-b	35 – 60	25 – 35	29

A-1-a	60 – 80	30 – 42	38

Table 4. Index Properties for Materials Classified by USCS and AASHTO Classification Systems used to Develop Correlations

Symbol	D_{60} range (mm)	D_{60} used (mm)	PI range	*PI* used	P_{200} range (%)	P_{200} used (%)	Calc. *wPI*	*CBR* range from Table *1*	*CBR* used
A-1-a	> 2	8	0 – 6	0	0 – 15	5	0	60 – 80	75
A-1-b	0.45 – 2	1	0 – 6	0	0 – 25	5	0	30 – 60	30
A-3	0.074 – 0.4	0.2	0	0	0 – 10	5	0	15 – 35	20
GW	8 – 20	10	0	0	0 – 5	3	0	60 – 80	70
GP	6 – 15	6	0	0	0 – 5	3	0	35 – 60	48
GM	-	-	0 - 6	4	12 - 20	15	0.6	40 – 80	60
GC	-	-	7 – 20	13	12 - 35	23	3	20 – 40	30
SW	1 – 10	2	0	0	0 - 5	3	0	20 – 40	30
SP	0.07 - 6	1	0	0	0 - 5	3	0	15 – 25	20
SM	-	-	0 - 8	5	12 – 40	25	1.3	20 – 40	30
SC	-	-	7 – 20	14	12 – 49	37	5.2	10 - 20	15
ML	-	-	< 20	11	51 – 95	75	8.3	5 – 15	10
CL	-	-	7 – 22	15	51 – 95	75	11.3	5 – 15	8
MH	-	-	15 – 40	25	51 - 95	75	18.8	4 – 8	5
CH	-	-	22 – 50	35	51 - 95	75	26.3	3 – 5	3

Table 5. Calculated CBR values from Equations (2) and (3)

USCS Symbol	D_{60} used (mm)	*PI* used	P_{200} used (%)	Calculated *wPI*	Calculated *CBR*
GW	10	0	3	0	64.1
GP	6	0	3	0	53.3
GM	-	4	15	0.6	52.2
GC	-	13	23	3	19.5
SW	2	0	3	0	36.0
SP	1	0	3	0	28.1
SM	-	5	25	1.3	39.3
SC	-	14	37	5.2	15.7
ML	-	11	75	8.3	10.7
CL	-	15	75	11.3	7.7
MH	-	25	75	18.8	5.1
CH	-	35	75	26.3	3.5

Table 6. Calculated CBR values from Equations (2) and (3) Compared to the Recommended Ranges of CBR Values from Figure 1

USCS Symbol	Calculated CBR from Correlations	Recommended CBR Ranges from Figure 1
GW	64.1	60 – 80
GP	53.3	35 – 60
GM	52.2	30 – 80
GC	19.5	15 – 40
SW	36.0	20 – 40
SP	28.1	15 – 30
SM	39.3	20 – 40
SC	15.7	10 – 20
ML	10.7	8 – 16
CL	7.7	5 – 15
MH	5.1	2 – 8
CH	3.5	1 – 5

Table 7. Estimated Resilient Modulus based on Unified Soil Classification (USCS)

USCS Classification	Modulus at Optimum (ksi)	
	Range	Default Value
CH	5 - 13.5	8.0
MH	8 - 17.5	11.5
CL	13.5 - 24	17.0
ML	17 - 25.5	20.0
SW	28 - 37.5	32.0
SP	24 - 33	28.0
SW – SC	21.5 - 31	25.5
SW – SM	24 - 33	28.0
SP – SC	21.5 - 31	25.5
SP – SM	24 - 33	28.0
SC	21.5 - 28	24.0
SM	28- 37.5	32.0
GW	39.5 - 42	41.0
GP	35.5 - 40	38.0
GW – GC	28 - 40	34.5
GW – GM	35.5 - 40.5	38.5
GP – GC	28 - 39	34.0
GP – GM	31 - 40	36.0
GC	24 - 37.5	31.0
GM	33 - 42	38.5

Table 8. Estimated Resilient Modulus based on AASHTO Soil Classification

AASHTO Soil Classification	Modulus at Optimum (ksi)	
	Range	Default Value
A-7-6	5 - 13.5	8
A-7-5	8 - 17.5	12
A-6	13.5 - 24	17
A-5	17 - 25.5	20
A-4	21.5 - 29	24
A-3	24 - 35.5	29
A-2-7	21.5 - 28	24
A-2-6	21.5 - 31	26
A-2-5	24 - 33	28
A-2-4	28 - 37.5	32
A-1-b	35.5 - 40	38
A-1-a	38.5 - 42	40

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Guide for Mechanistic-Empirical Design
OF NEW AND REHABILITATED PAVEMENT STRUCTURES

FINAL DOCUMENT

APPENDIX EE-2:
INPUT DATA FOR THE CALIBRATION AND VALIDATION OF THE 2002 DESIGN GUIDE FOR REHABILITATED PAVEMENT SECTIONS WITH HMA OVERLAYS

NCHRP

Prepared for
National Cooperative Highway Research Program
Transportation Research Board
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Disclaimer

This is the final draft as submitted by the research agency. The opinions and conclusions expressed or implied in this report are those of the research agency. They are not necessarily those of the Transportation Research Board, the National Research Council, the Federal Highway Administration, AASHTO, or the individual States participating in the National Cooperative Highway Research program.

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Research into the subject area covered in this Appendix was conducted at ASU and Fugro-BRE, Inc. The authors of this Appendix are Dr. M.W. Witczak, Dr. C.E. Zapata, and Mr. P. Konareddy. Mr. Harold Von Quintus provided assistance in assembling some of the inputs.

Foreword

The information provided in this appendix overviews and lists all the data required for calibration of performance models for pavements overlaid with HMA layers including pavement data, climatic information, material characterization data, and distress data. The traffic data is provided in an electronic format (attached with the Design Guide CDs). Also, in this appendix, the assumptions made for the missing variable and the basis on which these assumptions were made are explained.

This appendix is the second in a series of two volumes on calibration sections for new constructed flexible pavements. The other volume is:

Appendix EE-1: Input Data for the Calibration And Validation of the 2002 Design Guide for New Constructed Flexible Pavement Sections

General Table of Content

Appendix EE-2

Input Data for the Calibration and Validation of the 2002 Design Guide for the Rehabilitated Pavement Sections with HMA Overlays

INTRODUCTION

This appendix includes the pavement data, climatic information, material characterization data and distress values for overlaid flexible pavement sections used for the calibration of the design of rehabilitated flexible pavements. The data was extracted from the LTPP database.

The information provided in this section covered all the input required to run the design guide software and simulate the same condition the pavement sections were exposed to. The actual traffic data was used for the simulation runs. However, the traffic data is provided in an electronic format (attached with the Design Guide CDs). Also, in this appendix the assumptions made for the missing variables and the basis on which these assumptions were made are explained.

BACKGROUND

The input data and sources of information needed for the calibration and validation of the Design Guide distress prediction models for rehabilitated pavements structures are presented in this report. The data shown corresponds to the input needed in order to calibrate the Level 3 analysis of the Design Guide. The information presented was divided into three different categories, depending on the type of rehabilitation pavement option to be considered, as follows:

1. HMA overlay over existing AC pavement data is presented in Appendix A.
2. HMA overlay over existing fractured slab data is presented in Appendix B.
3. HMA overlay over existing jointed plain concrete (JPCP) pavement data is reported in Appendix C.

Sections from the Long Term Pavement Performance (LTPP) database were used for this purpose. The distribution of the sections is shown in Figure 1.

HMA OVERLAY OVER EXISTING AC PAVEMENT DATA

Data from forty-nine sections from the GPS-6B and SPS-5 projects of the LTPP program was gathered for the calibration and validation of the HMA overlay over existing AC structures. The following is a summary of the tables and their components provided in the Appendix A of this report. The tables contain a complete list of input data and distress data extracted from the LTPP database or, in some cases, from different sources when the information was not available.

- **Table A-1 – Analysis Conditions**
  - State Code
  - SHRP Identification Number
  - State
  - Project Type
  - Base/Subgrade Construction Completion Date

  - Asphalt Construction Completion Date
  - Traffic Opening Date
  - Rehab Date
  - Design Period

- **Table A-2 – Pavement Lane Properties**
  - Lane Width
  - Pavement Slope
  - Initial IRI
  - Thermal Conductivity
  - Heat Capacity
  - Surface Short Wave Absorptivity

- **Table A-3 – Environmental/Climatic**
  - Latitude (degrees and minutes)
  - Longitude (degrees and minutes)
  - Elevation
  - Groundwater Table Depth
  - Source of Information

- **Table A-4a – Original Pavement Structure**
  - Number of Layers
  - Layer Number
  - Layer Type
  - Representative Thickness
  - Description
  - Comments

- **Table A-4b –Pavement Structure after Rehabilitation**
  - Number of Layers
  - Layer Number
  - Layer Type
  - Representative Thickness
  - Description
  - Comments

- **Table A-5 – Aggregate Gradation for Asphalt Mix**
  - Layer Number
  - Layer Type
  - Percentage Retained ¾" Sieve
  - Percentage Retained 3/8" Sieve
  - Percentage Retained #4 Sieve
  - Percentage Passing #200 Sieve
  - Source of Information

- **Table A-6 – Effective Binder Content by Volume at Time of Construction**
  - Layer Number
  - Binder Content by Weight, *Pb*
  - Estimated Original Air Voids
  - Specific Gravity of the Binder, *Gb*
  - Estimated Bulk Specific Gravity of the Mix, *Gmb*
  - Maximum Theoretical Specific Gravity of the Mix, *Gmm*
  - Bulk Specific Gravity of the Aggregate, *Gsb*
  - Effective Specific Gravity of the Aggregate, *Gse*
  - Estimated Effective Binder Content by Volume at Time of Construction, *Vbe*
  - Sources of Information

- **Table A-7 – Original Air Voids at Time of Construction and Total Unit Weight**
  - Layer Number
  - Air Voids at Age = t
  - Date Test was Completed
  - Age t
  - Mean Annual Air Temperature, *Maat*
  - Original Air Voids
  - Source of Information of Original Air Voids
  - Estimated Original Air Voids
  - Total Unit Weight

- **Table A-8 – Binder Data**
  - Layer Number
  - Viscosity Grade
  - Penetration Grade
  - Penetration at 77F
  - Viscosity at 140F
  - Comments

- **Table A-9a - Unbound Materials Data**
  - Layer Number
  - Layer Type
  - Liquid Limit, *LL*
  - Plastic Limit, *PL*
  - Plasticity Index, *PI*
  - Source of Atterberg Limits Information
  - Percent Passing #200 Sieve
  - Percent Passing #4 Sieve
  - Diameter D_{60}

- **Table A-9b - Unbound Materials Classification**
  - Layer Number

- Layer Type
- AASHTO Soil Classification
- Unified Soil Classification System (USCS) Classification

- **Table A-9c - Unbound Materials Gradation**
  - Layer Number
  - Layer Type
  - Percent Passing 3" Sieve
  - Percent Passing 2" Sieve
  - Percent Passing 1 1/2" Sieve
  - Percent Passing 1" Sieve
  - Percent Passing 3/4" Sieve
  - Percent Passing 1/2" Sieve
  - Percent Passing 3/8" Sieve
  - Percent Passing #4 Sieve
  - Percent Passing #10 Sieve
  - Percent Passing #40 Sieve
  - Percent Passing #80 Sieve
  - Percent Passing #200 Sieve
  - Percent Passing 0.02 mm
  - Percent Passing 0.002 mm
  - Percent Passing 0.001 mm
  - Source of Information

The following tables contain the measured distress information needed to calibrate the results obtained from the analysis:

- **Table A-10 – Distress Data – Rutting**
  - Survey Date
  - Rehab Date
  - Maximum displacement between reference wire line and pavement surface in left lane half, LLH Mean Depth, in inches
  - Maximum displacement between reference wire line and pavement surface in right lane half, RLH Mean Depth, in inches
  - Maximum value of LLH Mean Depth or RLH Mean Depth, in inches
  - Average displacement between reference wire line and pavement surface between left lane half and right lane half data (Average Rutting), in inches

- **Table A-11 – Distress Data – Alligator Cracking**
  - Survey Date
  - Rehab Date
  - Area of low severity alligator cracking, in ft^2
  - Area of medium severity alligator cracking, in ft^2
  - Area of high severity alligator cracking, in ft^2
  - Total Sum of Cracking, in ft^2

- **Table A-12 – Distress Data - Longitudinal Cracking in the Wheel Path**
  - Survey Date
  - Rehab Date
  - Length of low severity longitudinal cracking in the wheel path, in ft
  - Length of medium severity longitudinal cracking in the wheel path, in ft
  - Length of high severity longitudinal cracking in the wheel path, in ft
  - Total Sum of Cracking, in ft^2

- **Table A-13 – Distress Data - Thermal Cracking**
  - Survey Date
  - Rehab Date
  - Length of low severity transverse cracking in the wheel path, in ft
  - Length of medium severity transverse cracking in the wheel path, in ft
  - Length of high severity transverse cracking in the wheel path, in ft
  - Weighted average, in ft

HMA OVERLAY OVER EXISTING FRACTURED SLAB DATA

Data from three sections from the SPS-6 project of the LTPP program was gathered for the calibration and validation of the HMA overlay over existing fractured slab structures. The following is a summary of the tables and their components provided in the Appendix B of this report. The tables contain a complete list of input data and distress data extracted from the LTPP database or, in some cases, from different sources when the information was not available.

- **Table B-1 – Analysis Conditions**
  - State Code
  - SHRP Identification Number
  - State
  - LTPP Project Type
  - Base/Subgrade Construction Completion Date
  - Asphalt Construction Completion Date
  - Traffic Opening Date
  - Rehab Date
  - Design Period

- **Table B-2 – Pavement Lane Properties**
  - Lane Width
  - Pavement Slope
  - Thermal Conductivity
  - Heat Capacity
  - Surface Short Wave Absorptivity

- **Table B-3 – Environmental/Climatic**
  - Latitude (degrees and minutes)
  - Longitude (degrees and minutes)

- Elevation
- Groundwater Table Depth
- Source of Information

- **Table B-4 – Original Pavement Structure**
  - Construction Number
  - Number of Layers
  - Layer Number
  - Layer Type
  - Representative Thickness
  - Source of Information

- **Table B-5 –Pavement Structure after Rehabilitation**
  - Construction Number
  - Number of Layers
  - Layer Number
  - Layer Type
  - Representative Thickness
  - Comments

- **Table B-6a – Aggregate Gradation for Overlays**
  - Layer Number
  - Construction Number
  - Layer Type
  - Percentage Retained ¾" Sieve
  - Percentage Retained 3/8" Sieve
  - Percentage Retained #4 Sieve
  - Percentage Passing #200 Sieve

- **Table B-6b – Original Air Voids at Time of Construction and Total Unit Weight**
  - Layer Number
  - Air Voids at Age = t
  - Date Test was Completed
  - Age t
  - Design Air Voids
  - Air Voids as Placed
  - Mean Annual Air Temperature, *Maat*
  - Original Viscosity at 77F
  - Original Air Voids from LTPP Database
  - Estimated Original Air Voids
  - Total Unit Weight
  -
- **Table B-6c – Binder Grade**
  - Layer Number
  - Construction Number

  - Viscosity Grade
  - Penetration Grade
- Penetration at 77F
- Viscosity at 77F
- Estimated Viscosity at 77F
- Viscosity at 140F

- **Table B-7 – Effective Binder Content by Volume at Time of Construction**
  - Layer Number
  - Binder Content by Weight, *Pb*
  - Estimated Original Air Voids, *Va*
  - Specific Gravity of the Binder, *Gb*
  - Estimated Bulk Specific Gravity of the Mix, *Gmb*
  - Maximum Theoretical Specific Gravity of the Mix, *Gmm*
  - Bulk Specific Gravity of the Aggregate, *Gsb*
  - Effective Specific Gravity of the Aggregate, *Gse*
  - Estimated Effective Binder Content by Volume at Time of Construction, *Vbe*
  - Sources of Information

- **Table B-8 – PCC Data**
  - Construction Number
  - Layer Number
  - Unit Weight
  - Date Test was Completed
  - PCC Breakage Width
  - PCC Breakage Length
  - Modulus of Fracture, E_{fs}
  - Elastic Modulus
  - Modulus of Rupture

- **Table B-9 - Unbound Materials Data**
  - Layer Type
  - Layer Number
  - Liquid Limit, *LL*
  - Plastic Limit, *PL*
  - Plasticity Index, *PI*
  - Source of Atterberg Limits Information
  - Percent Passing #200 Sieve
  - Percent Passing #4 Sieve
  - Diameter D_{60}
  - Percent Passing 3" Sieve
  - Percent Passing 2" Sieve
  - Percent Passing 1 1/2" Sieve
  - Percent Passing 1" Sieve
  - Percent Passing 3/4" Sieve

- Percent Passing 1/2" Sieve
- Percent Passing 3/8" Sieve
- Percent Passing #4 Sieve
- Percent Passing #10 Sieve
- Percent Passing #40 Sieve
- Percent Passing #80 Sieve
- Percent Passing #200 Sieve
- AASHTO Soil Classification
- Unified Soil Classification System (USCS) Classification

The following tables contain the measured distress information needed to calibrate the results obtained from the analysis:

- **Table B-10 – Distress Data – Rutting**
  - Survey Date
  - Rehab Date
  - Maximum displacement between reference wire line and pavement surface in left lane half, LLH Mean Depth, in inches
  - Maximum displacement between reference wire line and pavement surface in right lane half, RLH Mean Depth, in inches
  - Maximum value of LLH Mean Depth or RLH Mean Depth, in inches
  - Average displacement between reference wire line and pavement surface between left lane half and right lane half data (Average Rutting), in inches

- **Table B-11 – Distress Data – Alligator Cracking**
  - Survey Date
  - Rehab Date
  - Area of low severity alligator cracking, in m^2
  - Area of medium severity alligator cracking, in m^2
  - Area of high severity alligator cracking, in m^2
  - Total Sum of Cracking, in ft^2

- **Table B-12 – Distress Data - Longitudinal Cracking in the Wheel Path**
  - Survey Date
  - Rehab Date
  - Length of low severity longitudinal cracking in the wheel path, in ft
  - Length of medium severity longitudinal cracking in the wheel path, in ft
  - Length of high severity longitudinal cracking in the wheel path, in ft
  - Total Sum of Cracking, in ft

- **Table B-13 – Distress Data - Thermal Cracking (Transverse Cracking)**
  - Survey Date
  - Rehab Date
  - Length of low severity transverse cracking in the wheel path, in ft
  - Length of medium severity transverse cracking in the wheel path, in ft
  - Length of high severity transverse cracking in the wheel path, in ft

HMA OVERLAY OVER EXISTING JOINTED PLAIN CONCRETE PAVEMENT (JPCP) SLAB DATA

Data from seven sections from the GPS-7B and SPS-6 projects of the LTPP program was gathered for the calibration and validation of the HMA overlay over existing JPCP structures. The following is a summary of the tables and their components provided in the Appendix C of this report. The tables contain a complete list of input data and distress data extracted from the LTPP database or, in some cases, from different sources when the information was not available.

- **Table C-1a – Analysis Conditions**
  - State
  - LTPP Project Type
  - Base/Subgrade Construction Completion Date
  - Original Asphalt Construction Completion Date
  - Traffic Opening Date
  - Rehab Date

- **Table C-1b – Rehabilitation Event**
  - Construction Number
  - Event
  - Source of Information

- **Table C-2 – Asphalt Overlay Lane Properties**
  - Lane Width
  - Pavement Slope
  - Initial IRI
  - Thermal Conductivity
  - Heat Capacity
  - Surface Short Wave Absorptivity

- **Table C-3 – Environmental/Climatic**
  - Latitude (degrees and minutes)
  - Longitude (degrees and minutes)
  - Elevation
  - Groundwater Table Depth
  - Source of Information

- **Table C-4 –Pavement Structure**
  - Construction Number
  - Layer Number
  - Layer Type
  - Representative Thickness
  - Description
  - Comments

- **Table C-5 – Aggregate Gradation for Overlays**
  - Layer Number
  - Construction Number
  - Layer Type
  - Percentage Retained ¾" Sieve
  - Percentage Retained 3/8" Sieve
  - Percentage Retained #4 Sieve
  - Percentage Passing #200 Sieve

- **Table C-6 – Original Air Voids at Time of Construction and Total Unit Weight**
  - Layer Number
  - Air Voids at Age = t
  - Age t
  - Mean Annual Air Temperature, *Maat*
  - Penetration at 77F
  - Original Viscosity at 77F
  - Estimated Original Air Voids
  - Total Unit Weight
  -
- **Table C-7 – Binder Grade**
  - Layer Number
  - Construction Number
  - Viscosity Grade
  - Penetration Grade
  - Penetration at 77F
  - Viscosity at 140F
  - Viscosity at 275F

- **Table C-8 – Effective Binder Content by Volume at Time of Construction**
  - Layer Number
  - Binder Content by Weight, *Pb*
  - Estimated Original Air Voids, *Va*
  - Specific Gravity of the Binder, *Gb*
  - Estimated Bulk Specific Gravity of the Mix, *Gmb*
  - Maximum Theoretical Specific Gravity of the Mix, *Gmm*
  - Bulk Specific Gravity of the Aggregate, *Gsb*
  - Effective Specific Gravity of the Aggregate, *Gse*
  - Estimated Effective Binder Content by Volume at Time of Construction, *Vbe*

- **Table C-8 – General, Thermal, and Mix PCC Properties**
  - Layer Number
  - Layer Type
  - Unit Weight

    - Poisson's Ratio
    - Coefficient of Thermal Expansion
  - Thermal Conductivity
  - Heat Capacity
  - Cement Type
  - Cement Content
  - Water/Cement Ratio
  - Aggregate Type

- **Table C-10 – Strength PCC Properties**
  - Layer Number
  - Layer Type
  - Modulus of Rupture
  - Compressive Strength
  - Elastic Modulus
  - Tensile Strength

- **Table C-11 - Unbound Materials Data**
  - Layer Type
  - Layer Number
  - Liquid Limit, *LL*
  - Plastic Limit, *PL*
  - Plasticity Index, *PI*
  - Percent Passing #200 Sieve
  - Percent Passing #4 Sieve
  - Diameter D_{60}
  - AASHTO Soil Classification

- **Table C-12 - Unbound Materials Gradation**
  - Layer Number
  - Layer Type
  - Percent Passing 3" Sieve
  - Percent Passing 2" Sieve
  - Percent Passing 1 1/2" Sieve
  - Percent Passing 1" Sieve
  - Percent Passing 3/4" Sieve
  - Percent Passing 1/2" Sieve
  - Percent Passing 3/8" Sieve
  - Percent Passing #4 Sieve
  - Percent Passing #10 Sieve
  - Percent Passing #40 Sieve
  - Percent Passing #80 Sieve
  - Percent Passing #200 Sieve

The following tables contain the measured distress information needed to calibrate the results obtained from the analysis:

- **Table C-13 – Distress Data – Rutting**
  - Survey Date
  - Rehab Date
  - Construction Number
  - Maximum displacement between reference wire line and pavement surface in left lane half, LLH Mean Depth, in inches
  - Maximum displacement between reference wire line and pavement surface in right lane half, RLH Mean Depth, in inches
  - Maximum value of LLH Mean Depth or RLH Mean Depth, in inches

- **Table C-14 – Distress Data – Alligator Cracking**
  - Survey Date
  - Rehab Date
  - Construction Number
  - Area of low severity alligator cracking, in ft^2
  - Area of medium severity alligator cracking, in ft^2
  - Area of high severity alligator cracking, in ft^2
  - Total sum of alligator cracking, in ft^2

- **Table C-15 – Distress Data - Longitudinal Cracking in the Wheel Path**
  - Survey Date
  - Rehab Date
  - Construction Number
  - Length of low severity longitudinal cracking in the wheel path, in ft
  - Length of medium severity longitudinal cracking in the wheel path, in ft
  - Length of high severity longitudinal cracking in the wheel path, in ft
  - Total sum of alligator cracking, in ft

- **Table C-16 – Distress Data - Thermal Cracking (Transverse Cracking)**
  - Survey Date
  - Rehab Date
  - Construction Number
  - Length of low severity transverse cracking in the wheel path, in ft
  - Length of medium severity transverse cracking in the wheel path, in ft
  - Length of high severity transverse cracking in the wheel path, in ft
  - Weighted Average in ft

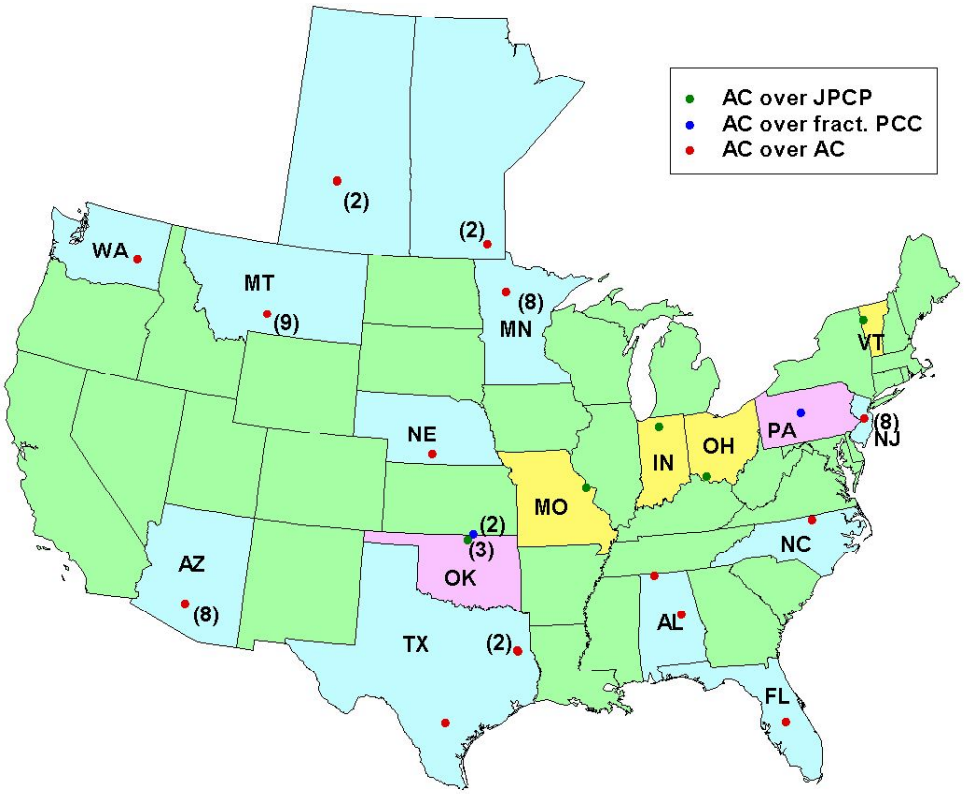

Figure 1. LTPP Sections Used for Calibration and Validation of the 2002 Design Guide Distress Models for Rehabilitated Pavement Structures

COMMENTS ON COLLECTED DATA TO INPUT INTO THE DESIGN GUIDE SOFTWARE

Most of the information shown on the tables was extracted from the LTPP database and provided by Fugro-BRE. However, some of the elements needed as input data and presented in the aforementioned tables were not provided by Fugro-BRE. In these cases, the database was revisited. When no information was found after rechecking the database, the data was obtained from different sources such as the U.S. Geological Survey and Soil Conservation Service reports. Some of the values were reasonably assumed in order to complete the data set needed to run the Design Guide software for the Level 3 analysis.

This section is intended to describe either the sources or the assumptions needed to complete the data set for those parameters for which it was not possible to get the complete information from the LTPP database. It also gives a short description or a brief explanation of the terms and parameters shown in the tables of the Appendices.

The explanation that follows is linked to the parameters shown in Appendix A for the data used in the distress calibration of the HMA overlay over AC. However, most of the parameters are common for the HMA overlay over fractured slab and HMA overlay over JPCP pavements data shown in Appendices B and C, and no further explanation is needed. Further explanation can be also found for those parameters from Appendices B and C that are not common to the ones shown in Appendix A.

Table A-1 – Analysis Conditions

State Code
It is a numerical code for a state or province, usually arranged in alphabetic order. Codes are consistent with federal information processing standards.

SHRP Identification Number
Test section identification number assigned by the LTTP Program. This number must be combined with the State Code to be unique.

State
Name of the state represented by the State Code.

LTPP Project
Data was collected from either the General Pavement Studies (GPS), which comprises existing pavements as originally constructed or after the first overlay, or from the Specific Pavement Studies (SPS), which were designed to meet LTPP objectives that the GPS experiments could not completely meet.

Base/Subbase Construction Completion Date
This information was not found in the LTPP database in most of the cases. It was assumed to be 2 months prior to the Asphalt Construction Completion date.

Asphalt Construction Completion Date
This is the date when traffic starts to move on the pavement. It also marks the completion of the construction.

Traffic Opening Date
Date when pavement was first opened to traffic. It was assumed to be the same as the asphalt construction completion date in cases where the data was not found.

Rehab Date
Date on which rehabilitation work is completed, and traffic is opened to the public.

Design Period
The design period was chosen based on the time the traffic data was available in the database. For the rehabilitation pavement analysis, the design period begins from the rehab date. In most of the cases, traffic data was available until 1999.

Table A-2 – Pavement Lane Properties

Pavement Slope
A value of 1.5% was assumed for all of the sections.

Initial International Roughness Index (IRI)
A value of 63 in/mile was assumed for all of the sections.

Thermal Conductivity
Reasonable values of HMA thermal conductivity range from 0.44 to 0.81 BTU/hr-ft-^{o}F. A default value of 0.67 BTU/hr-ft-^{o}F was assumed for all of the sections.

Heat Capacity
Reasonable values of HMA heat capacity range from 0.22 to 0.40 BTU/lb-^{o}F. A default value of 0.22 BTU/hr-ft-^{o}F was assumed for all of the sections.

Surface Short Wave Absorptivity
Reasonable values of surface short wave absorptivity for weathered asphalt (gray) range from 0.80 to 0.90. A default value of 0.85 was assumed for all of the sections.

Table A-3 - Environmental/Climatic Input

Latitude and Longitude
When inputting latitude and longitude into the 2002 Design Guide, the format needed is *degrees.minutes*. The latitude and longitude are used in conjunction with the elevation of the site to identify the location of the nearest weather station.

Elevation
This is the elevation of weather station above the mean sea level.

Groundwater Table Depth
If the boring log did not show information on groundwater table depth, this value was set up at the bottom of the borehole, which was considered the most conservative assumption. Information not found on the LTPP database was mainly extracted from the U.S. Geological Survey website, from the report presented by Harold Von Quintus on March 2001 - Tables B-1, B-2, and B-3 (Appendix B) [1], and from Soil Conservation Service reports and maps. Additional data was gathered from communication with the state DOTs and regional information. The source of information of the groundwater table data for the calibration and validation of the rehabilitated pavement sections is shown in the last column of Table A-3. A summary of the data collected from the U.S. Geological Survey is presented in Appendix D.

Table A-4a – Original Pavement Structure

Number of Layers
The number of layers data was obtained from the database. In several cases, the surface asphalt layer thickness was reported to be less than 1 inch. Furthermore, no information was generally found for these layers. Due to software limitations, the Design Guide cannot handle asphalt layers of less than 1 inch in thickness. For the aforementioned reasons, sections for which the surface layer was reported to be less than 1 inch, this layer was combined with the layer immediately beneath it.

Generally the subgrade was reported to be an uncompacted layer. Therefore, the top 12 inches of the subgrade was assumed to be compacted material. This compacted "sublayer" is not included in the Number of Layers column shown in Table A-4a. The *Number of Layers* column does not include the bedrock or rigid layer, if such information was available.

Depth to Bedrock or Depth to a Rigid Layer
Table A-4a shows the source of information from which the bedrock depth was attained. In most of the cases, records of depth to bedrock were not found in the LTPP database. In order to complete this information, the following sources were used:

- Report presented by Harold Von Quintus on March 2001 with data from the Soil Conservation Service reports and maps[2].
- State DOTs records (Appendix C)
- LTPP boring log information and comments – Table TST_SAMPLE_LOG

[1] Witczak, M.W., & Zapata, C.E. (2002). Input Data for the Calibration and Validation of the 2002 Design Guide for New Constructed Flexible Pavement Sections. *Development of the 2002 Guide for the Design of New and Rehabilitated Pavement Structures –Technical Report.* National Cooperative Highway Research Program (NCHRP). Project 1-37A. – Appendix B

[2] Witczak, M.W., & Zapata, C.E. (2002). Input Data for the Calibration and Validation of the 2002 Design Guide for New Constructed Flexible Pavement Sections. *Development of the 2002 Guide for the Design of New and Rehabilitated Pavement Structures –Technical Report.* National Cooperative Highway Research Program (NCHRP). Project 1-37A. – Appendix B

Table A-4b –Pavement Structure after Rehabilitation

Milling Information
Milled out information is provided under Table A-4b. The Design Guide needs this data to run the program.

Table A-5 - Aggregate Gradation for Asphalt Mix

Data that was not provided by Fugro BRE was gathered from the LTPP database (Tables TST_AG04 and RHB_ACO_AGGR_PROP). If data was not available from the LTPP database, the ASU research team assumed suitable data. The Design Guide requires the following aggregate gradation for AC mixes: Percentage retained on ¾"sieve, 3/8" sieve, #4 sieve, and percentage passing #200 sieve.

Table A-6 - Effective Binder Content by Volume at Time of Construction

The effective binder content by volume at the time of construction is not available in the LTPP database. To obtain values of effective binder, the following information was gathered:

- Binder content by weight (*Pb*) from LTPP Table TST_AC04
- An estimated value for the original air voids from Table A-7 of this report.
- Specific gravity of the binder (*Gb*) from LTPP Table TST_AC03
- An estimated bulk specific gravity of the mix (*Gmb*) at time of construction
- Maximum theoretical specific gravity of the mix (*Gmm*) from either the LTPP Table TST_AC03 or the INVENTORY
- Combined bulk specific gravity of the aggregate (*Gsb*) from LTPP Table INV_PMA

The *Gmb* value at the time of construction was not available in the LTPP database. Therefore, this value was calculated from the Maximum Theoretical Specific Gravity of the Mix (*Gmm*) and the Original Air Voids (VA_{orig}) as follows:

$$Gmb = Gmm\left(1 - \frac{VAorig}{100}\right) \quad \text{.....(1)}$$

With this information, the Effective Specific Gravity of the Aggregate (*Gse*) was calculated as follows:

$$Gse = \frac{100 - Pb}{\frac{100}{Gmm} - \frac{Pb}{Gb}} \quad \text{.....(2)}$$

and the Effective Binder Content by Volume (*Vbe*):

$$Vbe = Gmb\left[\frac{Pb}{Gb} - (100 - Pb)\frac{(Gse - Gsb)}{Gse \cdot Gsb}\right] \quad \text{..... (3)}$$

Table A-7 - Original Air Voids at Time of Construction and Total Unit Weight

During the review of the data, it was observed that the information on the original air voids extracted from the INVENTORY tables for the GPS and the SPS sections might be in error. It was then decided to estimate the original air voids at the time of construction between 6 to 9% for the sections with suspicious data.

Table A-8 - Binder Grade

For Level 3 analysis, the Design Guide software requires as input either the viscosity grade or the penetration grade. In cases where the binder grade was missing, the Penetration at 77 ^{o}F and the Viscosity at 140 ^{o}F were used to infer the value. The viscosity and penetration data was obtained from INV_PMA_ASPHALT table from LTPP database. If no data was available, then a suitable penetration grade was assumed.

Table A-9a - Unbound Materials Data

The following data is summarized in Table A-9a:

- Layer Number
- Layer Type
- Liquid Limit, *LL*
- Plastic Limit, *PL*
- Plasticity Index, *PI*
- Percent Passing #200 Sieve
- Percent Passing #4 Sieve
- Diameter D_{60}, in mm

Liquid Limit and Plastic Limit
The Liquid and Plastic Limits (Atterberg Limits) are not needed as input parameters in the Design Guide software. However, they must be obtained in order to classify the granular unbound materials. For the SPS sections with missing information, the Atterberg Limits were assumed to be the same as the ones for the nearest SPS section with available data.

Plasticity Index
The Plasticity Index is the difference between the Liquid Limit and the Plastic Limit.

Percent Passing #200 and Percent Passing #4

For the SPS sections with missing information, the gradation was assumed to be the same as the one found for the nearest SPS section with available data.

Diameter D_{60}

Information on diameter D_{60} is not available in the LTPP Database. Values were obtained individually from the Grain Size Distribution information provided in Table A-9c.

The Design Guide software has a lower boundary for Diameter D_{60} values of 0.07 mm. In cases where the D_{60} of the material is lower than 0.07 mm, it will be approximated to the minimum required.

Table A-9b - Unbound Materials Classification

The following data is summarized in Table A-9b:

- AASHTO Soil Classification
- Unified Soil Classification System (USCS) Classification

The unbound materials classification is needed for Level 3 analysis to estimate the resilient modulus at optimum conditions. The resilient modulus at optimum conditions was obtained by relationships developed between soil index properties and the California Bearing Ratio (CBR). Once the relationships were developed to predict CBR values, the following correlation was used to relate properties directly to estimates of modulus, M_R:

$$M_R = 2555 \cdot CBR^{0.64} \quad \text{.....(4)}$$

Tables 1 and 2 present the estimated modulus based on the soil classification system. Detailed analysis and correlations are presented in Witczak et al., 2001[1].

Table A-9c - Unbound Materials Gradation

The entire grain size distribution or gradation of the unbound materials is not required directly by the software of the 2002 Design Guide. However, it is required to obtain the Diameter D_{60} and the soil classification.

[1] Witczak, M.W., Houston, W.N., & Zapata, C.E. (2001). Correlation of CBR Values with Soil Index Properties. *Development of the 2002 Guide for the Design of New and Rehabilitated Pavement Structures – Technical Report.* National Cooperative Highway Research Program (NCHRP). Project 1-37A.

Table 1. Estimated Resilient Modulus based on Unified Soil Classification (USCS)

USCS Classification	Modulus at Optimum (ksi)	
	Range	Default Value
CH	5 - 13.5	8.0
MH	8 - 17.5	11.5
CL	13.5 - 24	17.0
ML	17 - 25.5	20.0
SW	28 - 37.5	32.0
SP	24 - 33	28.0
SW – SC	21.5 - 31	25.5
SW – SM	24 - 33	28.0
SP – SC	21.5 - 31	25.5
SP – SM	24 - 33	28.0
SC	21.5 - 28	24.0
SM	28- 37.5	32.0
GW	39.5 - 42	41.0
GP	35.5 - 40	38.0
GW – GC	28 - 40	34.5
GW – GM	35.5 - 40.5	38.5
GP – GC	28 - 39	34.0
GP – GM	31 - 40	36.0
GC	24 - 37.5	31.0
GM	33 - 42	38.5

Table 2. Estimated Resilient Modulus based on AASHTO Soil Classification

AASHTO Soil Classification	Modulus at Optimum (ksi)	
	Range	Default Value
A-7-6	5 - 13.5	8
A-7-5	8 - 17.5	12
A-6	13.5 - 24	17
A-5	17 - 25.5	20
A-4	21.5 - 29	24
A-3	24 - 35.5	29
A-2-7	21.5 - 28	24
A-2-6	21.5 - 31	26
A-2-5	24 - 33	28
A-2-4	28 - 37.5	32
A-1-b	35.5 - 40	38
A-1-a	38.5 - 42	40

Distress Potential

Prediction of distresses as a function of time is needed for the calculation of IRI values for the 2002 Design Guide. The distress values needed in the IRI predictive equation for rehabilitated pavement analysis includes: fatigue cracking, rutting, transverse cracking, longitudinal cracking, sealed longitudinal cracking outside the wheel path, patching, and potholes. Distresses such as fatigue cracking, rutting, longitudinal cracking in the wheel path, and transverse cracking are determined by use of transfer functions. However, distresses such as sealed longitudinal cracking outside the wheel path, patching, and potholes lack of transfer functions and therefore, predicting values are not available.

In order to have an estimate of these distresses at different distress potential (*DP*) levels, the LTPP database was used to establish relationships as a function of time[1]. The following tables show the distress values assumed and the standard deviation of the results.

Sealed Longitudinal Cracks Outside of the Wheel Path, LC_{NWP}
Medium and high severity longitudinal cracks outside the wheel path area for HMA overlay:

"*DP*" Level	LC_{NWP} (m/km)	Standard Error (Se)
High	4.0	251.7
Med	8.85	164.0
Low	13.7	17.3
None	35	0.0

Patches, P
Area of medium and high severity patches as a percentage of the total lane area for HMA overlay:

"*DP*" Level	P (%)	Standard Error (Se)
High	3.3	0.14
Med	3.9	0.05
Low	4.5	0.30
None	8.0	0.0

[1] Witczak, M.W., Mirza, M.W., & Zapata, C.E. (2002). Estimation of Distress Quantities for Smoothness Models for HMA-Surface Pavements. *Development of the 2002 Guide for the Design of New and Rehabilitated Pavement Structures –Technical Report.* National Cooperative Highway Research Program (NCHRP). Project 1-37A.

Potholes, PH

Potholes as a percentage of total lane area for HMA overlay:

"*DP*" Level	PH (%)	Standard Error (Se)
High	4.1	0.02
Med	6.3	0.01
Low	8.5	0.01
None	20.0	0.0

MEASURED DISTRESS DATA TO COMPARE WITH ESTIMATED RESULTS FROM THE DESIGN GUIDE SOFTWARE

The following tables contain the measured distress information needed to calibrate the results obtained from the rehab analysis:

Table A-10 – Distress Data – Rutting

The following data is summarized in Table A-10:

- Survey Date
- Rehab Date
- Maximum displacement between reference wire line and pavement surface in left lane half, *LLH Mean Depth*, in inches
- Maximum displacement between reference wire line and pavement surface in right lane half, *RLH Mean Depth*, in inches
- Maximum Mean Depth which is the maximum value of *LLH Mean Depth* or *RLH Mean Depth*, in inches
- Average displacement between left lane half and right lane half data, in inches

The average displacement between the left and the right lanes was used to calibrate the 2002 Design Guide rutting model. In those cases where no information was provided for both lanes, the maximum displacement between the left and right lanes was considered for the calibration.

Table A-11 – Distress Data – Alligator Cracking

The following data is summarized in Table A-11:

- Survey Date
- Rehab Date

- Area of low severity alligator cracking, in ft^2
- Area of medium severity alligator cracking, in ft^2
- Area of high severity alligator cracking, in ft^2
- Weighted average, in ft^2

The data shown in bold in Table A-11 corresponds to the distress information before rehabilitation was performed in the test section.

Table A-12 – Distress Data - Longitudinal Cracking in the Wheel Path

The following data is summarized in Table A-12:

- Survey Date
- Rehab Date
- Length of low severity longitudinal cracking in the wheel path, in ft
- Length of medium severity longitudinal cracking in the wheel path, in ft
- Length of high severity longitudinal cracking in the wheel path, in ft
- Weighted average, in ft

The data shown in bold in Table A-12 corresponds to the distress information before rehabilitation was performed in the test section.

Table A-13 – Distress Data - Thermal Cracking (Transverse Cracking)

The following data is summarized in Table A-13:

- Survey Date
- Rehab Date
- Length of low severity transverse cracking in the wheel path, in ft
- Length of medium severity transverse cracking in the wheel path, in ft
- Length of high severity transverse cracking in the wheel path, in ft
- Weighted average, in ft

Weighed Average
The weighted average was calculated as follows:

$$Weighted\ Average = \frac{Low\_severity + 3Medium\_severity + 5High\_severity}{9} \quad ...(5)$$

The data shown in bold in Table A-13 corresponds to the distress information before rehabilitation was performed in the test section.

COMMENTS ON COLLECTED DATA TO INPUT INTO THE DESIGN GUIDE SOFTWARE TO CALIBRATE HMA OVERLAY OVER FRACTURED SLAB DISTRESS MODELS

The explanation that follows is linked to the parameters shown in Appendix B for the data used in the distress calibration of the HMA overlay over fractured slab pavements. However, most of the parameters are common with the HMA overlay over AC pavements data shown above and no further explanation is needed.

Table B-4 – Original Pavement Structure

Construction Number
The Construction number is the event number used in the LTPP database to relate changes in pavement structure with other time dependent data elements. This field is set to 1 when a test section is initially accepted into LTPP and is incremented with each change to the layer structure.

Table B-6b - Original Air Voids at Time of Construction and Total Unit Weight

The air voids at time of construction was extracted from the LTPP database by Fugro-BRE and was transferred to the ASU research team. During the review of the data, it was observed that the information on the original air voids extracted from the LTPP database might be in error (See columns *Design Air Voids* and *Air Voids as Placed*). It was then decided to carry out the computation of these values based on available information.

The data collected to calculate the original air voids was the following:

- Air Voids at Age = t
- Date test was completed to determine the age of the pavement (Age = t)
- Mean Annual Air Temperature, *Maat*
- Original Viscosity at 77 ^{o}F

For a detailed explanation of how the air voids at time of construction was estimated from the aforementioned data, refer to the Inter Team Technical report by Witczak et al. (2001)[1].

Original Viscosity at 77 ^{o}F
Information on the original viscosity at 77 ^{o}F was not available for the SPS sections in the LTPP database. In those cases, the viscosity value was inferred from the A and VTS values based on the binder grade provided for the layer. The following equation was used for this purpose:

$$\log\log\eta = A + VTS\log T_R \quad \text{.....(6)}$$

[1] Witczak, M.W., Zapata, C.E., & Mirza, M.W. (2001). Estimating Original Air Voids of GPS-LTPP Sections. *Development of the 2002 Guide for the Design of New and Rehabilitated Pavement Structures – Technical Report.* National Cooperative Highway Research Program (NCHRP). Project 1-37A.

where:

η = Viscosity, cPoises
T_R = Temperature in Rankine
A, VTS = Regression parameters as function of binder grade

Table B-8 – PCC Data

PCC Breakage Width and Length
This is the slab fracture size needed to determine the modulus of fractured slab (E_{fs}) for Level 3 analysis.

Modulus of Fractured Slab (E_{fs})
For Level 3 analysis, the E_{fs} is a function of the fracture method used. The following values are recommended and used in the calibration of the HMA overlay over fractured slab:

Type of Fracture	Efs (ksi)
Rubbilization	150
Crack and Seat	
12 inch crack spacing	200
24 inch crack spacing	250
36 inch crack spacing	300

Modulus of Rupture
No data was available in the LTPP database for modulus of rupture. A value of 650 psi was assumed for all sections.

COMMENTS ON COLLECTED DATA TO INPUT INTO THE DESIGN GUIDE SOFTWARE TO CALIBRATE HMA OVERLAY OVER JPCP DISTRESS MODELS

The explanation that follows is linked to the parameters shown in Appendix C for the data used in the distress calibration of the HMA overlay over JPCP analysis. However, most of the parameters are common with the HMA overlay over AC pavements data shown above and no further explanation is needed.

Table C-9 – General, Thermal, and Mix PCC Properties

Coefficient of Thermal Expansion
A default value of 6E-6 mm/mm/^{o}F was assumed for sections with no data available in the LTPP database.

Thermal Conductivity

Reasonable values of thermal conductivity range from 0.2 to 2.0 BTU/hr-ft-^{o}F. A default value of 1.25 BTU/hr-ft-^{o}F was assumed for all of the sections.

Heat Capacity

Reasonable values of heat capacity range from 0.1 to 0.5 BTU/lb-^{o}F. A default value of 0.28 BTU/hr-ft-^{o}F was assumed for all of the sections.

Cement Type

Type I cement was assumed for those sections with no information available in the LTPP database.

Water/Cement Ratio

A water/cement ratio of 0.42 was assumed for those sections with no information available in the LTPP database.

Aggregate Type

Limestone was assumed for those sections with no information available in the LTPP database.

JPCP Design Features

The following parameters are needed for the HMA overlay over JPCP pavement analysis but no data was found in the LTPP database. The brief explanation presented herein should help the user to make a decision of which values to use when dealing with this analysis.

Joint Spacing

The joint spacing is a critical JPCP design factor that affects structural and functional performance of JPCP, as well as construction and maintenance cost. The stresses in JPCP increase rapidly with increasing joint spacing. To a lesser degree, joint faulting also increases with increasing joint spacing. Joint spacing must be selected within the context of design features such as slab thickness, slab width, PCC materials properties, base type, and subgrade stiffness. A particular joint spacing may be adequate for a given set of design features, but inadequate for another. The interaction between slab thickness and joint spacing is shown in Figure 2.

In general, a short joint spacing (e.g., 15 ft) is recommended; however, there is no need to make joint spacing less than 12 ft, since the lane width is 12 ft. If random joint spacing is used, the average joint spacing may be used for the evaluation of faulting performance, but for transverse cracking the long and short panels should be evaluated separately. For example, if 12-13-19-18 ft joint spacing pattern is used, the 12- and 13-ft panels should grouped and analyzed using 13 ft joint spacing, and the 18- and 19-ft panels should be grouped and analyzed using 19 ft joint spacing. The average cracking from the two designs is the expected cracking in the random jointed section. The Design Guide

software uses the average joint spacing for faulting analysis and the maximum joint spacing for cracking analysis when random joint spacing is entered.

Dowel Diameter and Dowel Spacing

For doweled pavements, dowel diameter and dowel spacing are critical design inputs. The larger the dowel diameter, the lower the concrete bearing stress and joint faulting. JPCP joint faulting is highly sensitive to dowel diameter. The sensitivity of JPCP joint faulting to dowel diameter is shown in Figure 3. Dowel spacing is simply the spacing between dowels. Typical dowel spacing is 12 inches.

Sealant Type

Sealant type is an input to the empirical model used to predict spalling. Spalling is used in smoothness predictions, but it is not considered directly as a measure of performance in this Guide. The sealant options are Liquid, Silicone, and Preformed.

Edge Support

Tied PCC shoulders and widened slabs can significantly improve JPCP performance by reducing critical deflections and stresses. The shoulder type also affects the amount of moisture infiltration into the pavement structure. The effects of moisture infiltration are considered in the determination of seasonal moduli values of unbound layers. The structural effects of the edge support features are directly considered in the design process, as illustrated in Figure 4 for cracking and Figure 5 for faulting. The inputs for these design features are as follows:

- Tied PCC Shoulder – for tied concrete shoulders the long-term load transfer efficiency (LTE) between the lane and shoulder must be provided. The LTE is defined as the ratio of deflections of the unloaded and loaded slabs. The higher the LTE, the greater the support provided by the shoulder to reduce critical responses of the mainline slabs. Typical long-term deflection LTE are:
  - 50 to 70 percent for monolithically constructed tied PCC shoulder.
  - 30 to 50 percent for separately constructed tied PCC shoulder.

  Untied shoulders do not provide significant support; therefore, a low LTE value should be used (e.g., 10 % due to the support from extended base course).
- Widened Slab – widened slabs improve JPCP performance by effectively moving the mean wheelpath well away from the pavement edges where the critical loadings occur. The design input for widened slab is the slab width.

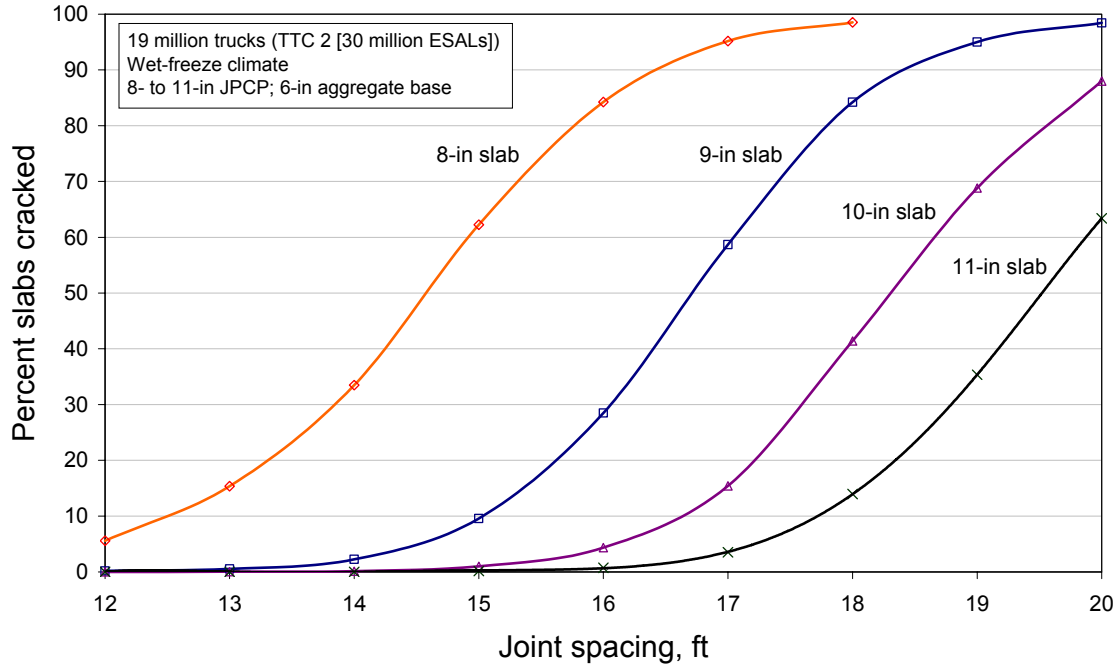

Figure 2. Sensitivity of JPCP Transverse Cracking to Slab Thickness and Joint Spacing.

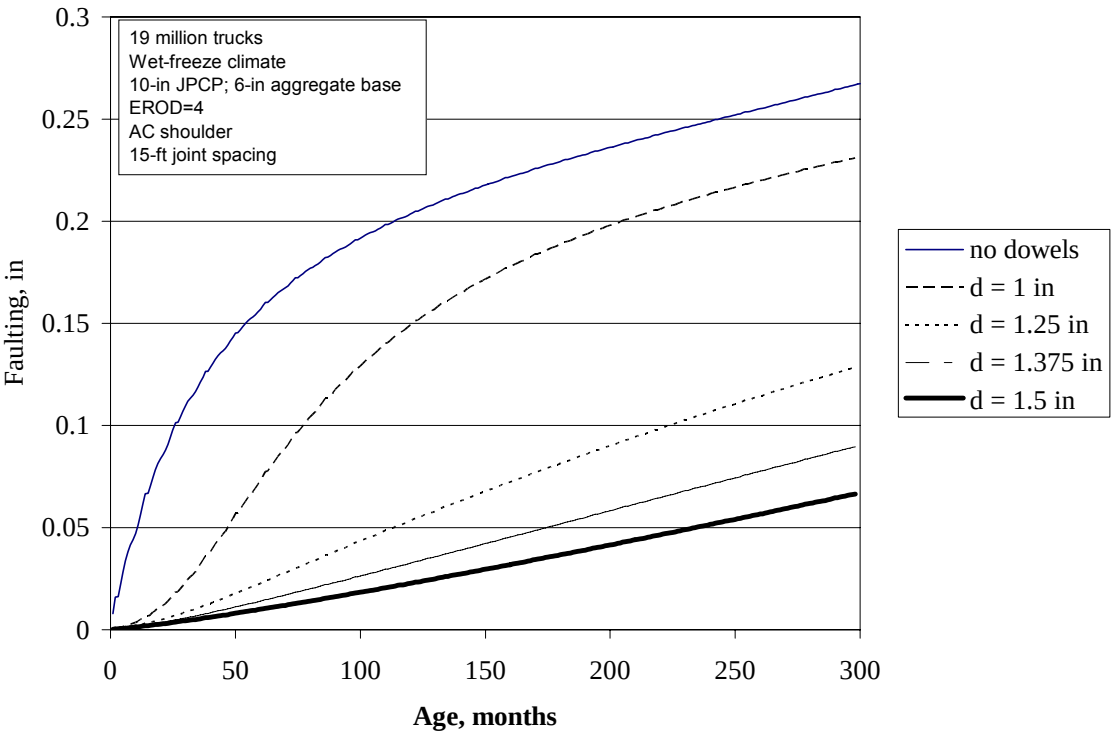

Figure 3. Sensitivity of JPCP Joint Faulting to Dowel Diameter.

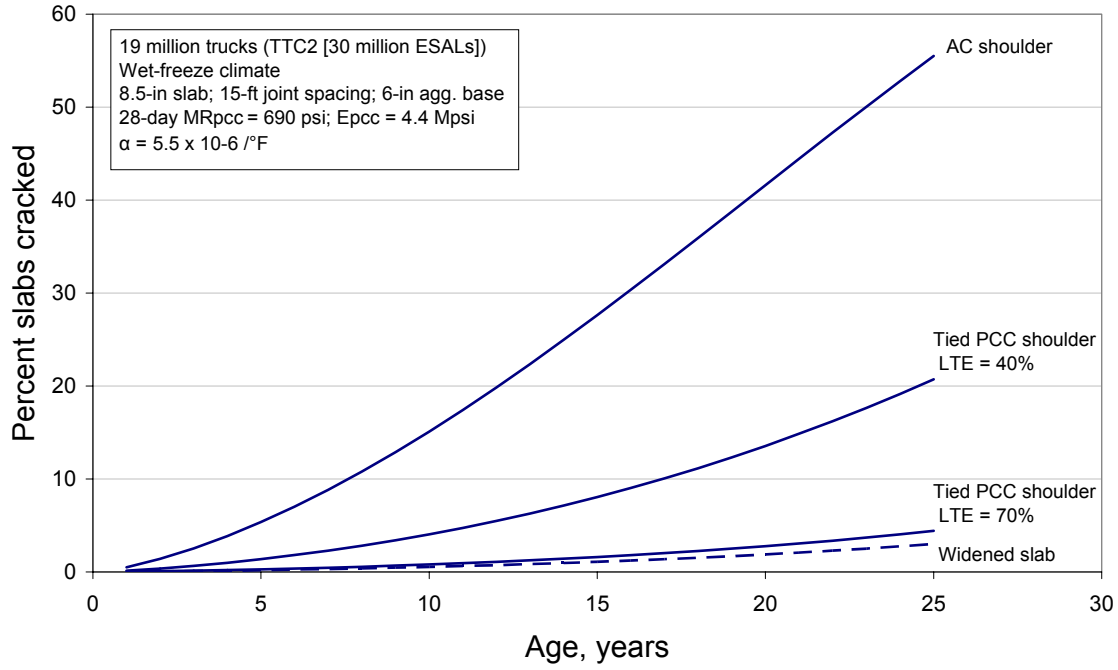

Figure 4. Effects of Edge Support on JPCP Transverse Cracking

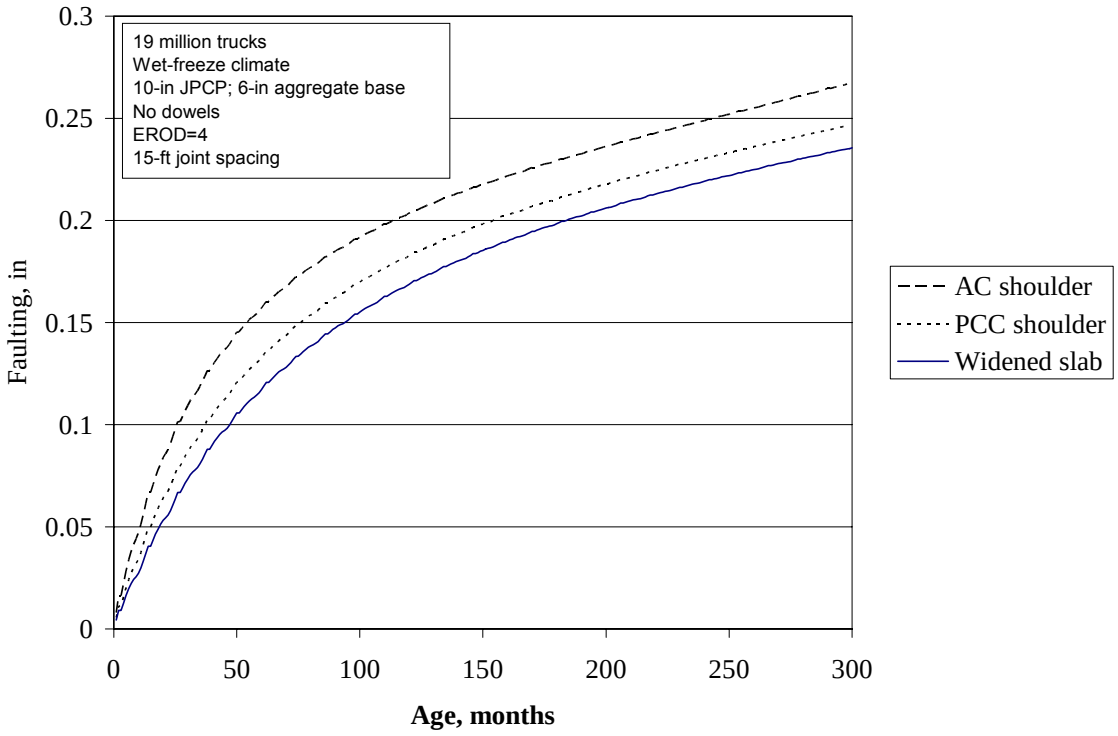

Figure 5. Effects of Edge Support on Non-Doweled JPCP Transverse Joint Faulting

Base Erodibility

The potential for base or subbase erosion (layer directly beneath the PCC layer) has a significant impact on the initiation and propagation of pavement distress. Different base types are classified based on long-term erodibility behavior as follows:

- Class A – Extremely erosion resistant materials.
- Class B – Very erosion resistant materials.
- Class C – Erosion resistant materials.
- Class D – Fairly erodible materials.
- Class E – Very erodible materials.

PCC-Base Interface

The interface between a stabilized base and PCC slab is modeled either completely bonded or unbonded for JPCP design. The structural contribution of a stabilized base is significant, if the base is fully bonded to the slab. Stabilized bases (especially asphalt-stabilized bases) are often bonded to the slab, and the deflection testing conducted at slab interior typically shows a bonded response. However, the effects of environmental and traffic loading tend to weaken this bond over time around the edges, and the bonded-interface assumption over the entire design period may be unconservative.

The JPCP design procedure includes the modeling of the changes in the interface bond condition over time. This is accomplished by specifying the pavement age at which the debonding occurs. Up to the debonding age, the slab-base interface is assumed fully bonded; after the debonding age, the interface is assumed fully unbonded. The design input is the pavement age at debonding, in months. In general, specifying the debonding age greater than 5 years (60 months) is not recommended and was not used in calibration.

APPENDIX A

Input Data for the Calibration and Validation of the 2002 Design Guide for HMA Overlay over AC Rehabilitated Pavement Sections

Table A-1 Analysis Conditions

Section	State Code	SHRP ID	State	LTPP Project	Base/Subgrade Construction Completion Date[1]	Asphalt Construction Completion Date	Traffic Opening Date[2]	Rehab Date	Design Period (years)
014127	1	4127	Alabama	GPS-6B	06/01/74	08/01/74	08/01/74	04/03/89	10
014129	1	4129	Alabama	GPS-6B	04/01/76	06/01/76	06/01/76	06/01/89	10
124135	12	4135	Florida	GPS-6B	12/01/70	02/01/71	02/01/71	05/01/94	5
316700	31	6700	Nebraska	GPS-6B	10/01/75	01/01/76	01/01/76	10/22/88	11
371802	37	1802	North Carolina	GPS-6B	08/01/85	10/01/85	10/01/85	05/01/96	3
481093	48	1093	Texas	GPS-6B	04/01/80	06/01/80	06/01/80	09/15/88	11
481113	48	1113	Texas	GPS-6B	10/01/85	01/01/86	01/01/86	08/02/92	7
481116	48	1116	Texas	GPS-6B	05/01/87	07/01/87	07/01/87	10/18/90	9
531005	53	1005	Washington	GPS-6B	06/01/79	08/01/73	08/01/73	07/01/89	10
836450	83	6450	Manitoba	GPS-6B	07/01/71	09/01/71	09/01/71	09/13/89	10
836451	83	6451	Manitoba	GPS-6B	07/01/71	09/01/71	09/01/71	09/13/89	10
906410	90	6410	Saskatchewan	GPS-6B	05/01/68	07/01/68	07/01/68	10/01/89	10
906412	90	6412	Saskatchewan	GPS-6B	05/01/68	07/01/68	07/01/68	10/01/89	10
040502	4	0502	Arizona	SPS-5	06/01/68	08/01/68	08/01/68	05/08/90	9
040503	4	0503	Arizona	SPS-5	06/01/68	08/01/68	08/01/68	05/03/90	9
040504	4	0504	Arizona	SPS-5	06/01/68	08/01/68	08/01/68	05/24/90	9
040505	4	0505	Arizona	SPS-5	06/01/68	08/01/68	08/01/68	05/24/90	9
040506	4	0506	Arizona	SPS-5	06/01/68	08/01/68	08/01/68	05/24/90	9
040507	4	0507	Arizona	SPS-5	06/01/68	08/01/68	08/01/68	05/24/90	9
040508	4	0508	Arizona	SPS-5	06/01/68	08/01/68	08/01/68	05/08/90	9
040509	4	0509	Arizona	SPS-5	06/01/68	08/01/68	08/01/68	05/08/90	9
270502	27	0502	Minnesota	SPS-5	05/01/69	07/01/69	07/01/69	09/15/90	9
270503	27	0503	Minnesota	SPS-5	05/01/69	07/01/69	07/01/69	09/15/90	9
270504	27	0504	Minnesota	SPS-5	05/01/69	07/01/69	07/01/69	09/15/90	9
270505	27	0505	Minnesota	SPS-5	05/01/69	07/01/69	07/01/69	09/15/90	9
270506	27	0506	Minnesota	SPS-5	05/01/69	07/01/69	07/01/69	09/15/90	9
270507	27	0507	Minnesota	SPS-5	05/01/69	07/01/69	07/01/69	09/15/90	9
270508	27	0508	Minnesota	SPS-5	05/01/69	07/01/69	07/01/69	09/15/90	9
270509	27	0509	Minnesota	SPS-5	05/01/69	07/01/69	07/01/69	09/15/90	9
300502	30	0502	Montana	SPS-5	07/01/82	09/01/82	09/01/82	09/12/91	8
300503	30	0503	Montana	SPS-5	07/01/82	09/01/82	09/01/82	09/12/91	8
300504	30	0504	Montana	SPS-5	07/01/82	09/01/82	09/01/82	09/11/91	8
300505	30	0505	Montana	SPS-5	07/01/82	09/01/82	09/01/82	09/11/91	8
300506	30	0506	Montana	SPS-5	07/01/82	09/01/82	09/01/82	09/11/91	8
300507	30	0507	Montana	SPS-5	07/01/82	09/01/82	09/01/82	09/11/91	8
300508	30	0508	Montana	SPS-5	07/01/82	09/01/82	09/01/82	09/12/91	8
300509	30	0509	Montana	SPS-5	07/01/82	09/01/82	09/01/82	09/12/91	8
307066	30	7066	Montana	SPS-5	07/01/82	09/01/82	09/01/82	09/13/91	8
340502	34	0502	New Jersey	SPS-5	06/01/72	08/01/72	08/01/72	08/19/92	7
340503	34	0503	New Jersey	SPS-5	06/01/72	08/01/72	08/01/72	08/13/92	7
340504	34	0504	New Jersey	SPS-5	06/01/72	08/01/72	08/01/72	08/21/92	7
340505	34	0505	New Jersey	SPS-5	06/01/72	08/01/72	08/01/72	08/21/92	7
340506	34	0506	New Jersey	SPS-5	06/01/72	08/01/72	08/01/72	08/20/92	7
340507	34	0507	New Jersey	SPS-5	06/01/72	08/01/72	08/01/72	08/13/92	7
340508	34	0508	New Jersey	SPS-5	06/01/72	08/01/72	08/01/72	08/13/92	7
340509	34	0509	New Jersey	SPS-5	06/01/72	08/01/72	08/01/72	08/20/92	7

[1]Base/Subbase Completion Date = 2 months prior to Asphalt Construction Completion Date.

[2]Traffic Opening Date = Asphalt Construction Completion Date.

Table A-2 Pavement Lane Properties

Section	Project Type	Lane Width (ft)	Pavement Slope (%)	Initial IRI (in/mile)	Thermal Conductivity (BTU/hr-ft-oF)	Heat Capacity (BTU/lb-oF)	Surface Short Wave Absorptivity
014127	GPS-6B	12	1.5	63	0.67	0.22	0.85
014129	GPS-6B	12	1.5	63	0.67	0.22	0.85
124135	GPS-6B	12	1.5	63	0.67	0.22	0.85
316700	GPS-6B	12	1.5	63	0.67	0.22	0.85
371802	GPS-6B	12	1.5	63	0.67	0.22	0.85
481093	GPS-6B	12	1.5	63	0.67	0.22	0.85
481113	GPS-6B	12	1.5	63	0.67	0.22	0.85
481116	GPS-6B	12	1.5	63	0.67	0.22	0.85
531005	GPS-6B	12	1.5	63	0.67	0.22	0.85
836450	GPS-6B	12	1.5	63	0.67	0.22	0.85
836451	GPS-6B	12	1.5	63	0.67	0.22	0.85
906410	GPS-6B	12	1.5	63	0.67	0.22	0.85
906412	GPS-6B	12	1.5	63	0.67	0.22	0.85
040502	SPS-5	12	1.5	63	0.67	0.22	0.85
040503	SPS-5	12	1.5	63	0.67	0.22	0.85
040504	SPS-5	12	1.5	63	0.67	0.22	0.85
040505	SPS-5	12	1.5	63	0.67	0.22	0.85
040506	SPS-5	12	1.5	63	0.67	0.22	0.85
040507	SPS-5	12	1.5	63	0.67	0.22	0.85
040508	SPS-5	12	1.5	63	0.67	0.22	0.85
040509	SPS-5	12	1.5	63	0.67	0.22	0.85
270502	SPS-5	12	1.5	63	0.67	0.22	0.85
270503	SPS-5	12	1.5	63	0.67	0.22	0.85
270504	SPS-5	12	1.5	63	0.67	0.22	0.85
270505	SPS-5	12	1.5	63	0.67	0.22	0.85
270506	SPS-5	12	1.5	63	0.67	0.22	0.85
270507	SPS-5	12	1.5	63	0.67	0.22	0.85
270508	SPS-5	12	1.5	63	0.67	0.22	0.85
270509	SPS-5	12	1.5	63	0.67	0.22	0.85
300502	SPS-5	12	1.5	63	0.67	0.22	0.85
300503	SPS-5	12	1.5	63	0.67	0.22	0.85
300504	SPS-5	12	1.5	63	0.67	0.22	0.85
300505	SPS-5	12	1.5	63	0.67	0.22	0.85
300506	SPS-5	12	1.5	63	0.67	0.22	0.85
300507	SPS-5	12	1.5	63	0.67	0.22	0.85
300508	SPS-5	12	1.5	63	0.67	0.22	0.85
300509	SPS-5	12	1.5	63	0.67	0.22	0.85
307066	SPS-5	12	1.5	63	0.67	0.22	0.85
340502	SPS-5	12	1.5	63	0.67	0.22	0.85
340503	SPS-5	12	1.5	63	0.67	0.22	0.85
340504	SPS-5	12	1.5	63	0.67	0.22	0.85
340505	SPS-5	12	1.5	63	0.67	0.22	0.85
340506	SPS-5	12	1.5	63	0.67	0.22	0.85
340507	SPS-5	12	1.5	63	0.67	0.22	0.85
340508	SPS-5	12	1.5	63	0.67	0.22	0.85
340509	SPS-5	12	1.5	63	0.67	0.22	0.85

Table A-3 Environmental / Climatic Properties

Section	Project Type	Latitude N. (Deg)	(min)	Longitude W. (Deg)	(min)	Elevation (ft)	GWT Depth[1] (ft)	Source of Information
014127	GPS-6B	34	50	87	22	658	31	USGS: water.usgs.gov/nwis/gwlevels
014129	GPS-6B	33	3	86	9	737	33	USGS: water.usgs.gov/nwis/gwlevels
040502	SPS-5	32	50	112	0	1071	700	USGS: water.usgs.gov/nwis/gwlevels
040503	SPS-5	32	50	112	0	1071	700	USGS: water.usgs.gov/nwis/gwlevels
040504	SPS-5	32	50	112	0	1071	700	USGS: water.usgs.gov/nwis/gwlevels
040505	SPS-5	32	50	112	0	1071	700	USGS: water.usgs.gov/nwis/gwlevels
040506	SPS-5	32	50	112	0	1071	700	USGS: water.usgs.gov/nwis/gwlevels
040507	SPS-5	32	50	112	0	1071	700	USGS: water.usgs.gov/nwis/gwlevels
040508	SPS-5	32	50	112	0	1071	700	USGS: water.usgs.gov/nwis/gwlevels
040509	SPS-5	32	50	112	0	1071	700	USGS: water.usgs.gov/nwis/gwlevels
124135	GPS-6B	27	52	81	35	130	15	TST_SAMPLE_LOG; DOT Communication
270502	SPS-5	47	31	95	8	1350	32	USGS: water.usgs.gov/nwis/gwlevels
270503	SPS-5	47	31	95	8	1350	32	USGS: water.usgs.gov/nwis/gwlevels
270504	SPS-5	47	31	95	8	1350	32	USGS: water.usgs.gov/nwis/gwlevels
270505	SPS-5	47	31	95	8	1350	32	USGS: water.usgs.gov/nwis/gwlevels
270506	SPS-5	47	31	95	8	1350	32	USGS: water.usgs.gov/nwis/gwlevels
270507	SPS-5	47	31	95	8	1350	32	USGS: water.usgs.gov/nwis/gwlevels
270508	SPS-5	47	31	95	8	1350	32	USGS: water.usgs.gov/nwis/gwlevels
270509	SPS-5	47	31	95	8	1350	32	USGS: water.usgs.gov/nwis/gwlevels
300502	SPS-5	45	49	110	0	4072	70	USGS: water.usgs.gov/nwis/gwlevels
300503	SPS-5	45	49	110	0	4072	70	USGS: water.usgs.gov/nwis/gwlevels
300504	SPS-5	45	49	110	0	4072	70	USGS: water.usgs.gov/nwis/gwlevels
300505	SPS-5	45	49	110	0	4072	70	USGS: water.usgs.gov/nwis/gwlevels
300506	SPS-5	45	49	110	0	4072	70	USGS: water.usgs.gov/nwis/gwlevels
300507	SPS-5	45	49	110	0	4072	70	USGS: water.usgs.gov/nwis/gwlevels
300508	SPS-5	45	49	110	0	4072	70	USGS: water.usgs.gov/nwis/gwlevels
300509	SPS-5	45	49	110	0	4072	70	USGS: water.usgs.gov/nwis/gwlevels
307066	SPS-5	45	49	110	0	4072	70	USGS: water.usgs.gov/nwis/gwlevels
316700	GPS-6B	40	24	99	26	2363	215	USGS: water.usgs.gov/nwis/gwlevels
340502	SPS-5	40	11	74	31	130	8.2	USGS: water.usgs.gov/nwis/gwlevels
340503	SPS-5	40	11	74	31	130	8.2	USGS: water.usgs.gov/nwis/gwlevels
340504	SPS-5	40	11	74	31	130	8.2	USGS: water.usgs.gov/nwis/gwlevels
340505	SPS-5	40	11	74	31	130	8.2	USGS: water.usgs.gov/nwis/gwlevels
340506	SPS-5	40	11	74	31	130	8.2	USGS: water.usgs.gov/nwis/gwlevels
340507	SPS-5	40	11	74	31	130	8.2	USGS: water.usgs.gov/nwis/gwlevels
340508	SPS-5	40	11	74	31	130	8.2	USGS: water.usgs.gov/nwis/gwlevels
340509	SPS-5	40	11	74	31	130	8.2	USGS: water.usgs.gov/nwis/gwlevels
371802	GPS-6B	36	19	78	31	500	21	USGS; > 20 ft: Harold Von Quintus report
481093	GPS-6B	28	47	98	18	249	3.5	TST_SAMPLE_LOG (Wet)
481113	GPS-6B	31	57	94	42	445	7	> 84": Soil Conservation Service reports-H. Von Quintus
481116	GPS-6B	31	54	94	41	406	7	> 84": Soil Conservation Service reports-H. Von Quintus
531005	GPS-6B	47	6	118	38	1830	352	USGS: water.usgs.gov/nwis/gwlevels
836450	GPS-6B	49	40	96	18	958	1.7	TST_SAMPLE_LOG (Wet)
836451	GPS-6B	49	40	96	19	958	1.7	TST_SAMPLE_LOG (Wet)
906410	GPS-6B	52	3	106	36	1680	85	Assumed from Regional Information
906412	GPS-6B	52	4	106	37	1678	85	Assumed from Regional Information

[1] From pavemente surface

Table A-4a Original Pavement Structure

Section	Project Type	No. of Layers	Layer Number	Layer Type[1]	Thickness (in)	Description	Depth to Bedrock
014127	GPS-6B	5	1	SS		Subgrade	BR > 20 ft
			2	GB	7.4	Base Layer	(Soil Conservation Service report - HVQ)
			3	AC	4.5	Binder Course	
			4	AC	2.8	Binder Course	
			5	AC	1	Original Surface Layer	
014129	GPS-6B	5	1	SS		Subgrade	BR > 20 ft
			2	GS	6	Subbase Layer	(Soil Conservation Service report - HVQ)
			3	GB	12.6	Base Layer	
			4	AC	2.2	Binder Course	
			5	AC	0.8	Original Surface Layer	
124135	GPS-6B	4	1	SS		Subgrade	BR > 17 ft (TST_SAMPLE_LOG; rock refusal)
			2	GS	12	Subbase Layer	Infinite (Soil Conservation Service report - HVQ)
			3	GB	3.3	Base Layer	
			4	AC	1.4	Original Surface Layer	
316700	GPS-6B	3	1	SS		Subgrade	BR = Infinite
			2	AC	3	Binder Course	(Soil Conservation Service report - HVQ)
			3	AC	2.4	Original Surface Layer	
371802	GPS-6B	4	1	SS		Subgrade	BR = Infinite (Harold Von Quintus report)
			2	GB	8.2	Base Layer	BR = 2.5 ft (TST_SAMPLE_LOG - rock refusal)
			3	AC	2.2	Binder Course	
			4	AC	2.2	Original Surface Layer	
481093	GPS-6B	4	1	SS		Subgrade	BR = 20 ft
			2	GB	17	Base Layer	(Soil Conservation Service report - HVQ)
			3	AC	2.4	Original Surface Layer	
			4	AC	0.5	Seal Coat	
481113	GPS-6B	4	1	SS		Subgrade	BR = 50 ft ; soft shale
			2	GB	11.5	Base Layer	(Soil Conservation Service report - HVQ)
			3	AC	0.7	Seal Coat	
			4	AC	0.8	Original Surface Layer	
481116	GPS-6B	4	1	SS		Subgrade	BR = 50 ft ; soft shale
			2	GB	10.9	Base Layer	(Soil Conservation Service report - HVQ)
			3	AC	0.5	Seal coat	
			4	AC	1	Original Surface Layer	
531005	GPS-6B	5	1	SS		Subgrade	BR = 4 ft (TST_SAMPLE_LOG - refusal)
			2	GS	6.5	Subbase Layer	BR = 50 ft
			3	GB	3	Base Layer	(Soil Conservation Service report - HVQ)
			4	AC	5.9	Binder Course	
			5	AC	3.6	Original Surface Layer	
836450	GPS-6B	5	1	SS		Subgrade	BR= Infinite (Assumed)
			2	GS	4.2	Subbase Layer	
			3	GB	4.5	Base Layer	TST_LO5B
			4	AC	2.2	Binder Course	
			5	AC	2	Original Surface Layer	
836451	GPS-6B	6	1	SS		Subgrade	BR= Infinite (Assumed)
			2	GS	3.7	Subbase Layer	
			3	GB	7.2	Base Layer	
			4	AC	2.1	Binder Course	
			5	AC	1.8	Original Surface Layer	
			6	AC	0.2	Seal Coat	
906410	GPS-6B	5	1	SS		Subgrade	BR= Infinite (Assumed)
			2	GS	4.2	Subbase Layer	
			3	GB	5.2	Base Layer	
			4	AC	3	Binder Course	
			5	AC	1.6	Original Surface Layer	
906412	GPS-6B	5	1	SS		Subgrade	BR= Infinite (Assumed)
			2	GS	4.8	Subbase Layer	
			3	GB	5	Base Layer	
			4	AC	2.9	Binder Course	
			5	AC	1.5	Original Surface Layer	

Table A-4a (Cont'd) Original Pavement Structure

Section	Project Type	No. of Layers	Layer Number	Layer Type[1]	Thickness (in)	Description	Depth to Bedrock
040502	SPS-5	4	1	SS		Subgrade	BR > 50 ft
			2	GB	14.7	Base Layer	(Soil Conservation Service report - HVQ)
			3	AC	4.2	Original Surface Layer	
			4	AC	0.9	Friction Course	
040503	SPS-5	4	1	SS		Subgrade	BR > 50 ft
			2	GB	16.6	Base Layer	(Soil Conservation Service report - HVQ)
			3	AC	4.2	Original Surface Layer	
			4	AC	0.8	Friction Course	
040504	SPS-5	4	1	SS		Subgrade	BR > 50 ft
			2	GB	17.6	Base Layer	(Soil Conservation Service report - HVQ)
			3	AC	4.2	Original Surface Layer	
			4	AC	0.7	Friction Course	
040505	SPS-5	4	1	SS		Subgrade	BR > 50 ft
			2	GB	12.8	Base Layer	(Soil Conservation Service report - HVQ)
			3	AC	4.1	Original Surface Layer	
			4	AC	0.9	Friction Course	
040506	SPS-5	4	1	SS		Subgrade	BR > 50 ft
			2	GB	12.8	Base Layer	(Soil Conservation Service report - HVQ)
			3	AC	4	Original Surface Layer	
			4	AC	0.9	Friction Course	
040507	SPS-5	4	1	SS		Subgrade	BR = 3 ft (TST_SAMPLE_LOG - rock refusal)
			2	GB	20.7	Base Layer	BR > 50 ft
			3	AC	4.3	Original Surface Layer	(Soil Conservation Service report - HVQ)
			4	AC	0.7	Friction Course	
040508	SPS-5	4	1	SS		Subgrade	BR > 50 ft
			2	GB	15	Base Layer	(Soil Conservation Service report - HVQ)
			3	AC	4.7	Original Surface Layer	
			4	AC	0.7	Friction Course	
040509	SPS-5	4	1	SS		Subgrade	BR > 50 ft
			2	GB	14.8	Base Layer	(Soil Conservation Service report - HVQ)
			3	AC	4.7	Original Surface Layer	
			4	AC	0.7	Friction Course	
270502	SPS-5	5	1	SS		Subgrade	BR = 20 ft
			2	GS	12.8	Subbase Layer	(Soil Conservation Service report - HVQ)
			3	GB	5	Base Layer	
			4	AC	5.4	Binder Course	
			5	AC	1.5	Original Surface Layer	
270503	SPS-5	5	1	SS		Subgrade	BR = 20 ft
			2	GS	12.8	Subbase Layer	(Soil Conservation Service report - HVQ)
			3	GB	5	Base Layer	
			4	AC	5.4	Binder Course	
			5	AC	1.1	Original Surface Layer	
270504	SPS-5	5	1	SS		Subgrade	BR = 20 ft
			2	GS	12	Subbase Layer	(Soil Conservation Service report - HVQ)
			3	GB	5.2	Base Layer	
			4	AC	5.2	Binder Course	
			5	AC	1.5	Original Surface Layer	
270505	SPS-5	5	1	SS		Subgrade	BR = 20 ft
			2	GS	12.6	Subbase Layer	(Soil Conservation Service report - HVQ)
			3	GB	4.7	Base Layer	
			4	AC	5.6	Binder Course	
			5	AC	1.1	Original Surface Layer	
270506	SPS-5	5	1	SS		Subgrade	BR = 20 ft
			2	GS	12.5	Subbase Layer	(Soil Conservation Service report - HVQ)
			3	GB	5	Base Layer	
			4	AC	5.9	Binder Course	
			5	AC	1.5	Original Surface Layer	
270507	SPS-5	5	1	SS		Subgrade	BR = 20 ft
			2	GS	12.6	Subbase Layer	(Soil Conservation Service report - HVQ)
			3	GB	5.2	Base Layer	
			4	AC	5.8	Binder Course	
			5	AC	1.1	Original Surface Layer	

Table A-4a (Cont'd) Original Pavement Structure

Section	Project Type	No. of Layers	Layer Number	Layer Type[1]	Thickness (in)	Description	Depth to Bedrock
270508	SPS-5	5	1	SS		Subgrade	BR = 20 ft
			2	GS	12.4	Subbase Layer	(Soil Conservation Service report - HVQ)
			3	GB	5.1	Base Layer	
			4	AC	4.6	Binder Course	
			5	AC	1.5	Original Surface Layer	
270509	SPS-5	5	1	SS		Subgrade	BR = 20 ft
			2	GS	12.6	Subbase Layer	(Soil Conservation Service report - HVQ)
			3	GB	5	Base Layer	
			4	AC	6	Binder Course	
			5	AC	1.5	Original Surface Layer	
300502	SPS-5	5	1	SS		Subgrade	BR = 20 ft
			2	GS	14.4	Subbase Layer	(Soil Conservation Service report - HVQ)
			3	GB	2.8	Base Layer	
			4	AC	4.4	Original Surface Layer	
			5	AC	0.7	Friction Course	
300503	SPS-5	5	1	SS		Subgrade	BR = 20 ft
			2	GS	14.5	Subbase Layer	(Soil Conservation Service report - HVQ)
			3	GB	4.3	Base Layer	
			4	AC	4.7	Original Surface Layer	
			5	AC	0.6	Friction Course	
300504	SPS-5	5	1	SS		Subgrade	BR = 20 ft
			2	GS	15.6	Subbase Layer	(Soil Conservation Service report - HVQ)
			3	GB	3.5	Base Layer	
			4	AC	5.1	Original Surface Layer	
			5	AC	0.7	Friction Course	
300505	SPS-5	5	1	SS		Subgrade	BR = 20 ft
			2	GS	15.3	Subbase Layer	(Soil Conservation Service report - HVQ)
			3	GB	2.8	Base Layer	
			4	AC	4.8	Original Surface Layer	
			5	AC	0.6	Friction Course	
300506	SPS-5	5	1	SS		Subgrade	BR = 20 ft
			2	GS	15.3	Subbase Layer	(Soil Conservation Service report - HVQ)
			3	GB	2.8	Base Layer	
			4	AC	4.7	Original Surface Layer	
			5	AC	0.6	Friction Course	
300507	SPS-5	5	1	SS	234	Subgrade	BR = 19.5 ft. (TST_HOLE_LOG - refusal)
			2	GS	15.6	Subbase Layer	BR = 21.9 ft
			3	GB	3.5	Base Layer	
			4	AC	4.4	Original Surface Layer	
			5	AC	0.7	Friction Course	
300508	SPS-5	5	1	SS		Subgrade	BR = 20 ft
			2	GS	14.8	Subbase Layer	(Soil Conservation Service report - HVQ)
			3	GB	4.3	Base Layer	
			4	AC	4.4	Original Surface Layer	
			5	AC	0.6	Friction Course	
300509	SPS-5	5	1	SS		Subgrade	BR = 20 ft
			2	GS	15	Subbase Layer	(Soil Conservation Service report - HVQ)
			3	GB	3.8	Base Layer	
			4	AC	4.7	Original Surface Layer	
			5	AC	0.6	Friction Course	
307066	GPS-6B	5	1	SS		Subgrade	BR = 20 ft
			2	GS	15.9	Subbase Layer	(Soil Conservation Service report - HVQ)
			3	GB	3	Base Layer	
			4	AC	4.9	Original Surface Layer	
			5	AC	0.5	Friction course	
340502	SPS-5	5	1	SS		Subgrade	BR = 40 ft. to Infinite
			2	GS	41	Subbase Layer	(Soil Conservation Service report - HVQ)
			3	GB	10.4	Base Layer	
			4	AC	6.2	Binder Course	
			5	AC	2.7	Original Surface Layer	

Table A-4a (Cont'd) Original Pavement Structure

Section	Project Type	No. of Layers	Layer Number	Layer Type[1]	Thickness (in)	Description	Depth to Bedrock
340503	SPS-5	6	1	SS		Subgrade	BR = 40 ft. to Infinite
			2	GS	15	Subbase Layer	(Soil Conservation Service report - HVQ)
			3	GS	4	Subbase Layer	
			4	GB	11.3	Base Layer	
			5	AC	6	Binder Course	
			6	AC	3	Original Surface Layer	
340504	SPS-5	6	1	SS		Subgrade	BR = 40 ft. to Infinite
			2	GS	17	Subbase Layer	(Soil Conservation Service report - HVQ)
			3	GS	4	Subbase Layer	
			4	GB	10.7	Base Layer	
			5	AC	5.5	Binder Course	
			6	AC	3	Original Surface Layer	
340505	SPS-5	6	1	SS		Subgrade	BR = 40 ft. to Infinite
			2	GS	16	Subbase Layer	(Soil Conservation Service report - HVQ)
			3	GS	4	Subbase Layer	
			4	GB	10	Base Layer	
			5	AC	6	Binder Course	
			6	AC	3	Original Surface Layer	
340506	SPS-5	4	1	SS		Subgrade	BR = 40 ft. to Infinite
			2	GB	10	Base Layer	(Soil Conservation Service report - HVQ)
			3	AC	6.5	Binder Course	
			4	AC	3	Original Surface Layer	
340507	SPS-5	5	1	SS		Subgrade	BR = 40 ft. to Infinite
			2	GS	54	Subbase Layer	(Soil Conservation Service report - HVQ)
			3	GB	10	Base Layer	
			4	AC	5.4	Binder Course	
			5	AC	3	Original Surface Layer	
340508	SPS-5	6	1	SS		Subgrade	BR = 40 ft. to Infinite
			2	GS	18	Subbase Layer	(Soil Conservation Service report - HVQ)
			3	GS	4	Subbase Layer	
			4	GB	11.3	Base Layer	
			5	AC	6.1	Binder Course	
			6	AC	3	Original Surface Layer	
340509	SPS-5	6	1	SS		Subgrade	BR = 40 ft. to Infinite
			2	GS	18	Subbase Layer	(Soil Conservation Service report - HVQ)
			3	GS	4	Subbase Layer	
			4	GB	11.3	Base Layer	
			5	AC	6.3	Binder Course	
			6	AC	3.2	Original Surface Layer	

[1] SS = Subgrade; GS = Granular Subbase; GB = Granular Base Course; AC = Asphalt Concrete

Table A-4b Pavement Structure after Rehabilitation

Section	Project Type	No. of Layers	Layer Number	Layer Type	Representative Thickness (in)	Description	Milling Information
014127	GPS-6B	7	1	SS		Subgrade	
			2	GB	7.4	Base Layer	
			3	AC	4.5	Binder Course	No milled out
			4	AC	2.8	Binder Course	
			5	AC	1	Original Surface Layer	
			6	AC	0.4	Seal Coat	Combine with Layer 7
			7	AC	1.3	Overlay	
014129	GPS-6B	6	1	SS		Subgrade	
			2	GS	6	Subbase Layer	
			3	GB	12.6	Base Layer	No milled out
			4	AC	2.2	Binder Course	
			5	AC	0.8	Original Surface Layer	
			6	AC	1.5	Overlay	
124135	GPS-6B	7	1	SS		Subgrade	
			2	GS	12	Subbase Layer	
			3	GB	3.3	Base Layer	No milled out
			4	AC	1.4	Original Surface Layer	
			5	AC	1.5	Binder Course	
			6	AC	3.4	Overlay	
			7	AC	0.4	Overlay	
316700	GPS-6B	4	1	SS		Subgrade	
			2	AC	3	Binder Course	
			3	AC	2.4	Original Surface Layer	No milled out
			4	AC	3.9	Overlay	
371802	GPS-6B	5	1	SS		Subgrade	
			2	GB	8.2	Base Layer	
			3	AC	2.3	Binder Course	No milled out
			4	AC	2.2	Original Surface Layer	
			5	AC	0.9	Overlay	
481093	GPS-6B	6	1	SS		Subgrade	
			2	GB	17	Base Layer	
			3	AC	2.4	Original Surface Layer	No milled out
			4	AC	0.5	Seal Coat	
			5	AC	0.6	Seal Coat	
			6	AC	1.9	Overlay	
481113	GPS-6B	7	1	SS		Subgrade	
			2	GB	11.5	Base Layer	
			3	AC	0.7	Seal Coat	No milled out
			4	AC	0.8	Original Surface Layer	
			5	AC	0.5	Seal Coat	
			6	AC	2.2	Binder Course	
			7	AC	1.2	Overlay	
481116	GPS-6B	5	1	SS		Subgrade	
			2	GB	10.9	Base Layer	
			3	AC	0.5	Interlayer	No milled out
			4	AC	1	Original Surface Layer	
			5	AC	1.7	Overlay	
			6	AC	2	Overlay	
531005	GPS-6B	6	1	SS		Subgrade	
			2	GS	6.5	Subbase Layer	
			3	GB	3	Base Layer	
			4	AC	5.9	Binder Course	No milled out
			5	AC	3.6	Original Surface Layer	
			6	AC	2.3	Overlay	
836450	GPS-6B	7	1	SS		Subgrade	
			2	GS	4.2	Subbase Layer	No milled out
			3	GB	4.5	Base Layer	
			4	AC	2.2	Binder Course	
			5	AC	2	Original Surface Layer	
			6	AC	0.2	Seal Coat	
			7	AC	5.9	Overlay	

Table A-4b (Cont'd) Pavement Structure after Rehabilitation

Section	Project Type	No. of Layers	Layer Number	Layer Type	Representative Thickness (in)	Description	Milling Information
836451	GPS-6B	7	1	SS		Subgrade	
			2	GS	3.7	Subbase Layer	No milled out
			3	GB	7.2	Base Layer	
			4	AC	2.1	Binder Course	
			5	AC	1.8	Original Surface Layer	
			6	AC	0.2	Seal Coat	
			7	AC	2.6	Overlay	
906410	GPS-6B	6	1	SS		Subgrade	
			2	GS	4.2	Subbase Layer	No milled out
			3	GB	5.2	Base Layer	
			4	AC	3	Binder Course	
			5	AC	1.6	Original Surface Layer	
			6	AC	2.2	Overlay	
906412	GPS-6B	6	1	SS		Subgrade	
			2	GS	4.8	Subbase Layer	No milled out
			3	GB	5	Base Layer	
			4	AC	2.9	Binder Course	
			5	AC	1.5	Original Surface Layer	
			6	AC	4	Overlay	
040502	SPS-5	5	1	SS		Subgrade	
			2	GB	14.7	Base Layer	
			3	AC	4.2	Original Surface Layer	0.9 in.milled out
			4	AC	0	Friction Course	
			5	AC	2.7	Overlay	
040503	SPS-5	5	1	SS		Subgrade	
			2	GB	16.6	Base Layer	
			3	AC	4.2	Original Surface Layer	0.8 in. milled out
			4	AC	0	Friction Course	
			5	AC	4.7	Overlay	
040504	SPS-5	5	1	SS		Subgrade	
			2	GB	17.6	Base Layer	
			3	AC	4.2	Original Surface Layer	0.7 in. Milled out
			4	AC	0	Friction Course	
			5	AC	4.8	Overlay	
040505	SPS-5	5	1	SS		Subgrade	
			2	GB	12.8	Base Layer	
			3	AC	4.1	Original Surface Layer	0.9 in. milledout
			4	AC	0	Friction Course	
			5	AC	2.8	Overlay	
040506	SPS-5	6	1	SS		Subgrade	
			2	GB	12.8	Base Layer	
			3	AC	3	Original Surface Layer	0.9 in.milled out
			4	AC	0	Friction Course	
			5	AC	2.8	Binder Course	
			6	AC	2.4	Overlay	
040507	SPS-5	6	1	SS		Subgrade	
			2	GB	20.7	Base Layer	
			3	AC	2.4	Original Surface Layer	
			4	AC	0	Friction Course	2.6 in. milled out
			5	AC	2.7	Binder Course	
			6	AC	4.1	Overlay	
040508	SPS-5	6	1	SS		Subgrade	
			2	GB	15	Base Layer	
			3	AC	2.7	Original Surface Layer	2.7 in. milled out
			4	AC	0	Friction Course	
			5	AC	2.4	Binder Course	
			6	AC	4.1	Overlay	
040509	SPS-5	6	1	SS		Subgrade	
			2	GB	14.8	Base Layer	
			3	AC	2.6	Original Surface Layer	2.8 in. milled out
			4	AC	0	Friction Course	
			5	AC	2.6	Binder Course	
			6	AC	1.3	Overlay	

Table A-4b (Cont'd) Pavement Structure after Rehabilitation

Section	Project Type	No. of Layers	Layer Number	Layer Type	Representative Thickness (in)	Description	Milling Information
270502	SPS-5	6	1	SS		Subgrade	
			2	GS	12.8	Subbase Layer	
			3	GB	5	Base Layer	No milled out
			4	AC	5.4	Binder Course	
			5	AC	1.5	Original Surface Layer	
			6	AC	2.4	Overlay	
270503	SPS-5	7	1	SS		Subgrade	
			2	GS	12.8	Subbase Layer	
			3	GB	5	Base Layer	No milled out
			4	AC	5.4	Binder Course	
			5	AC	1.1	Original Surface Layer	
			6	AC	3.1	Binder Course	
			7	AC	1.5	Overlay	
270504	SPS-5	7	1	SS		Subgrade	
			2	GS	12	Subbase Layer	
			3	GB	5.2	Base Layer	No milled out
			4	AC	5.2	Binder Course	
			5	AC	1.5	Original Surface Layer	
			6	AC	3.1	Binder Course	
			7	AC	1.5	Overlay	
270505	SPS-5	6	1	SS		Subgrade	
			2	GS	12.6	Subbase Layer	
			3	GB	4.7	Base Layer	No milled out
			4	AC	5.6	Binder Course	
			5	AC	1.1	Original Surface Layer	
			6	AC	1.9	Overlay	
270506	SPS-5	6	1	SS		Subgrade	
			2	GS	12.5	Subbase Layer	
			3	GB	5	Base Layer	0.5 in. milled out
			4	AC	5.4	Binder Course	
			5	AC	0	Original Surface Layer	
			6	AC	1.8	Overlay	
270507	SPS-5	7	1	SS		Subgrade	
			2	GS	12.6	Subbase Layer	
			3	GB	5.2	Base Layer	0.7 in. milled out
			4	AC	5.1	Binder Course	
			5	AC	0	Original Surface Layer	
			6	AC	4.1	Binder Course	
			7	AC	1.5	Overlay	
270508	SPS-5	7	1	SS		Subgrade	
			2	GS	12.4	Subbase Layer	
			3	GB	5.1	Base Layer	0.5 in. milled out
			4	AC	4.1	Binder Course	
			5	AC	0	Original Surface Layer	
			6	AC	2.7	Binder Course	
			7	AC	1.5	Overlay	
270509	SPS-5	6	1	SS		Subgrade	
			2	GS	12.6	Subbase Layer	
			3	GB	5	Base Layer	2 in. milled out
			4	AC	5.5	Binder Course	
			5	AC	0	Original Surface Layer	
			6	AC	1.5	Overlay	
300502	SPS-5	6	1	SS		Subgrade	
			2	GS	14.4	Subbase Layer	
			3	GB	2.8	Base Layer	0.8 in. milled out
			4	AC	4.3	Original Surface Layer	
			5	AC	0	Friction Course	
			6	AC	2.6	Overlay	

Table A-4b (Cont'd) Pavement Structure after Rehabilitation

Section	Project Type	No. of Layers	Layer Number	Layer Type	Representative Thickness (in)	Description	Milling Information
300503	SPS-5	6	1	SS		Subgrade	
			2	GS	14.5	Subbase Layer	
			3	GB	4.2	Base Layer	1.1 in. milled out
			4	AC	4.2	Original Surface Layer	
			5	AC	0	Friction Course	
			6	AC	4.6	Overlay	
300504	SPS-5	6	1	SS		Subgrade	
			2	GS	15.6	Subbase Layer	
			3	GB	3.5	Base Layer	1.4 in. milled out
			4	AC	4.4	Original Surface Layer	
			5	AC	0	Friction Course	
			6	AC	5.6	Overlay	
300505	SPS-5	6	1	SS		Subgrade	
			2	GS	15.3	Subbase Layer	
			3	GB	2.8	Base Layer	0.6 in. milled out
			4	AC	4.8	Original Surface Layer	
			5	AC	0	Friction Course	
			6	AC	2	Overlay	
300506	SPS-5	7	1	SS		Subgrade	
			2	GS	15.3	Subbase Layer	
			3	GB	2.8	Base Layer	2.7 in. milled out
			4	AC	2.6	Original Surface Layer	
			5	AC	0	Friction Course	
			6	AC	2.1	Binder Course	
			7	AC	2.1	Overlay	
300507	SPS-5	7	1	SS	234	Subgrade	
			2	GS	15.6	Subbase Layer	
			3	GB	3.5	Base Layer	2.8 in. milled out
			4	AC	2.3	Original Surface Layer	
			5	AC	0	Friction Course	
			6	AC	2.3	Binder Course	
			7	AC	4.9	Overlay	
300508	SPS-5	7	1	SS		Subgrade	
			2	GS	14.7	Subbase Layer	
			3	GB	4.2	Base Layer	2.8 in. milled out
			4	AC	2.2	Original Surface Layer	
			5	AC	0	Friction Course	
			6	AC	2.1	Binder Course	
			7	AC	5	Overlay	
300509	SPS-5	7	1	SS		Subgrade	
			2	GS	15	Subbase Layer	
			3	GB	3.8	Base Layer	2.6 in. milled out
			4	AC	2.7	Original Surface Layer	
			5	AC	0	Friction Course	
			6	AC	2.1	Binder Course	
			7	AC	2.4	Overlay	
307066	GPS-6B	6	1	SS		Subgrade	
			2	GS	15.9	Subbase Layer	
			3	GB	3	Base Layer	0.5 in. milled out
			4	AC	4.9	Original Surface Layer	
			5	AC	0	Friction Course	
			6	AC	1.7	Overlay	
340502	SPS-5	6	1	SS		Subgrade	
			2	GS	41	Subbase Layer	
			3	GB	10.4	Base Layer	No milled out
			4	AC	6.2	Binder Course	
			5	AC	2.7	Original Surface Layer	
			6	AC	1.9	Overlay	

Table A-4b (Cont'd) Pavement Structure after Rehabilitation

Section	Project Type	No. of Layers	Layer Number	Layer Type	Representative Thickness (in)	Description	Milling Information
340503	SPS-5	7	1	SS		Subgrade	
			2	GS	18	Subbase Layer	
			3	GS	4	Subbase Layer	No milled out
			4	GB	11.3	Base Layer	
			5	AC	6	Binder Course	
			6	AC	3	Original Surface Layer	
			7	AC	3	Binder Course	
			8	AC	1.7	Overlay	
340504	SPS-5	8	1	SS		Subgrade	
			2	GS	17	Subbase Layer	
			3	GS	4	Subbase Layer	No milled out
			4	GB	10.7	Base Layer	
			5	AC	5.5	Binder Course	
			6	AC	3	Original Surface Layer	
			7	AC	2.9	Binder Course	
			8	AC	1.8	Overlay	
340505	SPS-5	7	1	SS		Subgrade	
			2	GS	16	Subbase Layer	
			3	GS	4	Subbase Layer	No milled out
			4	GB	10	Base Layer	
			5	AC	6	Binder Course	
			6	AC	3	Original Surface Layer	
			7	AC	1.8	Overlay	
340506	SPS-5	6	1	SS		Subgrade	
			2	GB	10	Base Layer	
			3	AC	6.5	Binder Course	2 in. milled out
			4	AC	1	Original Surface Layer	
			5	AC	2.2	Binder Course	
			6	AC	2	Overlay	
340507	SPS-5	8	1	SS		Subgrade	
			2	GS	54	Subbase Layer	
			3	GB	10	Base Layer	2 in. milled out
			4	AC	5.4	Binder Course	
			5	AC	1	Original Surface Layer	
			6	AC	3	Binder Course	
			7	AC	2.9	Binder Course	
			8	AC	1.9	Overlay	
340508	SPS-5	9	1	SS		Subgrade	
			2	GS	18	Subbase Layer	
			3	GS	4	Subbase Layer	2 in. milled out
			4	GB	11.3	Base Layer	
			5	AC	6.1	Binder Course	
			6	AC	1	Original Surface Layer	
			7	AC	2.7	Binder Course	
			8	AC	3.3	Binder Course	
			9	AC	1.8	Overlay	
340509	SPS-5	8	1	SS		Subgrade	
			2	GS	18	Subbase Layer	
			3	GS	4	Subbase Layer	2 in. milled out
			4	GB	11.3	Base Layer	
			5	AC	6.3	Binder Course	
			6	AC	1.2	Original Surface Layer	
			7	AC	2.5	Binder Course	
			8	AC	1.8	Overlay	

Table A-5 Aggregate Gradation for Asphalt Mixtures

Section	Project Type	Layer Number	Layer Type	% Retained 3/4" Sieve	% Retained 3/8" Sieve	%Retained #4 Sieve	% Passing #200 Sieve	Source of Information
014127	GPS-6B	3	AC	19.00	45.00	61.50	6.10	
		4	AC	17.00	48.50	62.50	7.40	
		5	AC	18.00	50.00	64.00	6.80	TST_AG04
		6	AC	0.00	11.00	39.00	5.00	Assumed
		7	AC	0.00	11.00	39.00	5.00	Harold VonQuintus
014129	GPS-6B	4	AC	15.00	31.00	47.50	7.30	
		5	AC	15.00	31.00	47.50	7.30	TST_AG04
		6	AC	0.00	19.50	41.00	6.35	
124135	GPS-6B	4	AC	0.00	0.00	31.00	4.60	TST_AG04
		5	AC	0.00	9.00	37.00	3.00	RHB_ACO_AGGR_PROP
		6	AC	0.00	4.00	31.00	3.00	RHB_ACO_AGGR_PROP
		7	AC	0.00	4.00	31.00	3.00	Assumed
316700	GPS-6B	2	AC	0.00	7.00	28.50	8.15	
		3	AC	0.50	6.00	25.50	8.70	
		4	AC	1.00	10.00	31.00	6.15	
371802	GPS-6B	3	AC	5.00	34.00	49.00	5.00	
		4	AC	0.00	3.00	20.00	7.50	
		5	AC	0.00	5.00	22.00	5.60	
481093	GPS-6B	3	AC	0.00	5.50	36.50	7.05	
		4	AC	0.00	3.00	35.00	4.00	Assumed
		5	AC	0.00	3.00	35.00	4.00	Assumed
		6	AC	0.00	3.00	35.00	4.00	
481113	GPS-6B	3	AC	0.00	27.50	46.50	4.40	Assumed
		4	AC	0.00	27.50	46.50	4.40	
		5	AC	0.00	22.00	47.00	2.00	Assumed
		6	AC	0.00	22.00	47.00	2.00	
		7	AC	0.00	24.00	42.00	3.00	
481116	GPS-6B	3	AC	0.00	7.00	39.00	5.00	Assumed
		4	AC	0.00	7.00	39.00	5.00	
		5	AC	0.00	27.00	50.00	3.00	
		6	AC	0.00	6.00	39.00	5.00	
531005	GPS-6B	4	AC	1.50	26.00	47.50	5.80	
		5	AC	0.00	14.50	40.50	7.00	
		6	AC	0.00	14.00	41.50	6.60	
836450	GPS-6B	4	AC	0.50	19.00	39.00	5.85	
		5	AC	0.00	19.00	39.00	4.65	
		6	AC	0.00	16.00	32.00	3.00	
		7	AC	0.00	20.50	39.00	5.80	
836451	GPS-6B	4	AC	0.00	17.00	39.00	6.70	
		5	AC	0.00	14.00	38.00	5.00	
		6	AC	0.00	16.00	35.00	6.40	Assumed
		7	AC	0.00	16.00	35.00	6.40	
906410	GPS-6B	4	AC	0.00	18.50	36.00	7.55	
		5	AC	0.00	15.00	36.50	8.25	
		6	AC	0.00	19.50	40.50	6.45	
906412	GPS-6B	4	AC	0.00	18.00	35.00	8.00	% retained 3/8" estimated
		5	AC	0.00	18.00	35.00	6.00	% retained 3/8" estimated
		6	AC	0.00	26.00	42.00	7.00	% retained 3/8" estimated
040502	SPS-5	3	AC	4.00	28.00	42.00	4.20	TST_AG04
		4	AC	4.00	28.00	42.00	4.20	Assumed
		5	AC	1.67	18.33	36.00	6.20	
040503	SPS-5	3	AC	5.00	25.20	47.00	5.04	% retained #4 estimated
		4	AC	5.00	25.20	47.00	5.04	Assumed
		5	AC	1.67	18.33	36.00	6.20	
040504	SPS-5	3	AC	5.00	25.20	47.00	5.04	% retained #4 estimated
		4	AC	5.00	25.20	47.00	5.04	Assumed
		5	AC	0.00	22.00	42.00	2.90	RHB_ACO_AGGR_PROP
040505	SPS-5	3	AC	5.00	26.00	43.00	4.90	
		4	AC	5.00	26.00	43.00	4.90	Assumed
		5	AC	0.00	22.67	43.00	5.20	

Table A-5 (Cont'd) Aggregate Gradation for Asphalt Mixtures

Section	Project Type	Layer Number	Layer Type	% Retained 3/4" Sieve	% Retained 3/8" Sieve	%Retained #4 Sieve	% Passing #200 Sieve	Source of Information
040506	SPS-5	3	AC	5.00	25.20	47.00	5.04	
		4	AC	5.00	25.20	47.00	5.04	Assumed
		5	AC	0.00	22.00	42.00	2.90	
		6	AC	0.00	22.00	42.00	2.90	
040507	SPS-5	3	AC	8.00	34.00	48.00	4.40	
		4	AC	8.00	34.00	48.00	4.40	Assumed
		5	AC	0.00	22.00	42.00	2.90	
		6	AC	0.00	22.00	42.00	2.90	
040508	SPS-5	3	AC	5.00	25.20	47.00	5.04	
		4	AC	5.00	25.20	47.00	5.04	Assumed
		5	AC	0.00	20.00	42.00	3.60	
		6	AC	1.67	18.33	42.00	6.20	
040509	SPS-5	3	AC	3.00	18.00	73.00	6.60	
		4	AC	3.00	18.00	73.00	6.60	Assumed
		5	AC	0.00	20.00	42.00	3.60	
		6	AC	1.67	18.33	42.00	6.20	
270502	SPS-5	4	AC	0.00	28.00	50.00	4.00	Harold Von Quintus
		5	AC	0.00	20.00	32.00	6.00	Harold Von Quintus
		6	AC	0.00	22.00	50.00	5.00	% retained #4 estimated
270503	SPS-5	4	AC	0.00	28.00	50.00	4.00	Harold Von Quintus
		5	AC	0.00	20.00	32.00	6.00	Harold Von Quintus
		6	AC	0.00	22.00	50.00	5.00	Assumed
		7	AC	0.00	22.00	50.00	5.00	% retained #4 estimated
270504	SPS-5	4	AC	0.00	28.00	50.00	4.00	Harold Von Quintus
		5	AC	0.00	20.00	32.00	6.00	Harold Von Quintus
		6	AC	0.00	22.00	50.00	5.00	Assumed
		7	AC	0.00	22.00	50.00	5.00	% retained #4 estimated
270505	SPS-5	4	AC	0.00	28.00	50.00	4.00	Harold Von Quintus
		5	AC	0.00	20.00	32.00	6.00	Harold Von Quintus
		6	AC	0.00	22.00	50.00	5.00	% retained #4 estimated
270506	SPS-5	4	AC	0.00	28.00	50.00	4.00	Harold Von Quintus
		5	AC	0.00	20.00	32.00	6.00	Harold Von Quintus
		6	AC	0.00	22.00	50.00	5.00	% retained #4 estimated
270507	SPS-5	4	AC	0.00	28.00	50.00	4.00	Harold Von Quintus
		5	AC	0.00	20.00	32.00	6.00	Harold Von Quintus
		6	AC	0.00	22.00	50.00	5.00	Assumed
		7	AC	0.00	22.00	50.00	5.00	% retained #4 estimated
270508	SPS-5	4	AC	0.00	28.00	50.00	4.00	Harold Von Quintus
		5	AC	0.00	20.00	32.00	6.00	Harold Von Quintus
		6	AC	0.00	22.00	50.00	5.00	Assumed
		7	AC	0.00	22.00	50.00	5.00	% retained #4 estimated
270509	SPS-5	4	AC	0.00	28.00	50.00	4.00	Harold Von Quintus
		5	AC	0.00	20.00	32.00	6.00	Harold Von Quintus
		6	AC	0.00	22.00	50.00	5.00	% retained #4 estimated
300502	SPS-5	4	AC	0.00	11.00	35.00	9.15	
		5	AC	0.00	29.00	48.00	7.00	INV_GRADATION
		6	AC	0.00	26.33	49.30	7.83	
300503	SPS-5	4	AC	0.00	11.00	35.00	9.15	
		5	AC	0.00	29.00	48.00	7.00	
		6	AC	0.00	26.33	49.30	7.83	
300504	SPS-5	4	AC	0.00	11.00	35.00	9.15	
		5	AC	0.00	29.00	48.00	7.00	
		6	AC	0.00	24.33	49.30	8.27	
300505	SPS-5	4	AC	0.00	11.00	35.00	9.15	
		5	AC	0.00	29.00	48.00	7.00	
		6	AC	0.00	24.33	45.00	8.27	
300506	SPS-5	4	AC	0.00	11.00	35.00	9.15	
		5	AC	0.00	29.00	48.00	7.00	
		6	AC	0.00	24.00	45.00	8.30	
		7	AC	0.00	24.33	45.00	8.27	

Table A-5 (Cont'd) Aggregate Gradation for Asphalt Mixtures

Section	Project Type	Layer Number	Layer Type	% Retained 3/4" Sieve	% Retained 3/8" Sieve	%Retained #4 Sieve	% Passing #200 Sieve	Source of Information
300507	SPS-5	4	AC	0.00	11.00	35.00	9.15	
		5	AC	0.00	29.00	48.00	7.00	
		6	AC	0.00	24.00	45.00	8.30	
		7	AC	0.00	24.33	45.00	8.27	
300508	SPS-5	4	AC	0.00	13.00	42.00	5.10	TST_AG04
		5	AC	0.00	29.00	48.00	7.00	
		6	AC	0.00	26.00	45.00	7.80	
		7	AC	0.00	26.33	45.00	7.83	
300509	SPS-5	4	AC	0.00	13.00	42.00	5.10	TST_AG04
		5	AC	0.00	29.00	48.00	7.00	
		6	AC	0.00	26.00	45.00	7.80	
		7	AC	0.00	26.33	45.00	7.83	
307066	SPS-5	4	AC	0.00	21.00	38.00	8.40	
		5	AC	0.00	24.00	44.00	7.95	Assumed
		6	AC	0.00	24.00	44.00	7.95	
340502	SPS-5	4	AC	22.00	46.00	58.00	5.00	
		5	AC	0.00	1.00	31.00	7.00	
		6	AC	1.33	18.00	46.70	6.93	
340503	SPS-5	5	AC	22.00	46.00	58.00	5.00	
		6	AC	0.00	1.00	31.00	7.00	
		7	AC	6.50	30.83	48.50	6.78	
		8	AC	1.33	18.00	46.70	6.93	
340504	SPS-5	5	AC	22.00	46.00	58.00	5.00	
		6	AC	0.00	1.00	31.00	7.00	
		7	AC	5.00	28.33	45.30	5.93	
		8	AC	0.67	12.67	39.30	6.50	
340505	SPS-5	5	AC	22.00	46.00	58.00	5.00	
		6	AC	0.00	1.00	31.00	7.00	
		7	AC	0.67	12.67	39.30	6.50	
340506	SPS-5	3	AC	22.00	46.00	58.00	5.00	
		4	AC	0.00	1.00	31.00	7.00	
		5	AC	5.00	28.33	45.30	5.93	
		6	AC	0.67	12.67	39.30	6.50	
340507	SPS-5	4	AC	22.00	46.00	58.00	5.00	
		5	AC	0.00	1.00	31.00	7.00	
		6	AC	5.00	28.33	45.30	5.93	Assumed
		7	AC	5.00	28.33	45.30	5.93	
		8	AC	0.67	12.67	39.30	6.50	
340508	SPS-5	5	AC	22.00	46.00	58.00	5.00	
		6	AC	0.00	1.00	31.00	7.00	
		7	AC	6.50	30.83	48.50	6.78	Assumed
		8	AC	6.50	30.83	48.50	6.78	
		9	AC	1.33	18.00	46.70	6.93	
340509	SPS-5	5	AC	22.00	46.00	58.00	5.00	
		6	AC	0.00	1.00	31.00	7.00	
		7	AC	6.50	30.83	48.50	6.78	
		8	AC	1.33	18.00	46.70	6.93	

Table A-6 Effective Binder Content

Section	Layer Number	Pb (%)	Est. Va Original (%)[1]	Gb	Est. Gmb	Gmm	Gsb	Gse	Est. Vbe	Vbe	Sources of Information
014127	3	4.30	8.00	1.03	2.29	2.488	2.750	2.66	12.36		INV_PMA_ASPHALT
	4	4.20	7.00	1.03	2.30	2.474	2.750	2.64	12.85		TST_AC04; INV_PMA_ASPHALT
	5	4.20	8.00	1.03	2.28	2.474	2.700	2.64	11.24		Assumed; INV_PMA_ASPHALT
	6	4.20	8.00	1.03	2.28	2.474	2.700	2.64	11.24		
	7	4.20	8.00	1.03	2.28	2.474	2.700	2.64	11.24		Pb, Gsb assumed
014129	4	4.15	8.53	1.03	2.33	2.549	2.750	2.72	10.22	3.90	INV_PMA_ORIG_MIX; INV_PMA
	5	6.70	7.00	1.03	2.24	2.410	2.670	2.67	14.68	6.70	INV_PMA_ORIG_MIX;INV_PMA
	6	5.10	6.19	1.03	2.35	2.507	2.700	2.72	11.16		Gsb assumed
124135	4	6.80	7.40	1.02	2.16	2.329	2.456	2.57	10.76	4.20	INV_PMA_ORIG_MIX; TST_AC04; INV_PMA
	5	4.60	8.00	1.02	2.14	2.329	2.472	2.48	9.31		TST_AC03; TST_AC04;RHB_ACO_AGGR_PROP
	6	6.30	8.00	1.02	2.17	2.354	2.472	2.58	9.91		TST_AC03; TST_AC04; Gsb assumed
	7	6.30	8.00	1.02	2.17	2.354	2.472	2.58	9.91		Pb, Gmm, Gsb assumed
316700	2	4.50	7.00	1.01	2.24	2.412	2.640	2.58	11.86		TST_AC04;INV_PMA
	3	4.90	7.00	1.01	2.23	2.403	2.640	2.59	12.50		Gsb assumed
	4	4.75	8.00	1.01	2.23	2.421	2.640	2.60	11.64	5.10	RHB_ACO_MIX_PROP; TST_AC04; Gsb assumed
371802	3	4.80	7.70	1.01	2.27	2.460	2.660	2.65	11.04	4.80	INV_PMA_ORIG_MIX; TST_AC04; INV_PMA
	4	6.03	8.70	1.01	2.25	2.467	2.660	2.72	11.73	6.40	INV_PMA_ORIG_MIX; TST_AC04; INV_PMA
	5	6.60	8.10	1.02	2.23	2.423	2.640	2.68	13.12	6.40	RHB_ACO_MIX_PROP; RHB_ACO_AGGR_PROP
481093	3	6.75	8.01	1.03	2.01	2.180	2.300	2.37	10.68	5.80	INV_PMA_ORIG_MIX; Gsb assumed
	4	5.40	6.70	1.03	2.24	2.406	2.626	2.60	12.43		
	5	5.40	6.70	1.03	2.24	2.406	2.626	2.60	12.43		
	6	5.40	6.70	1.03	2.24	2.406	2.626	2.61	12.43	5.50	RHB_ACO_MIX_PROP; RHB_ACO_AGGR_PMA
481113	3	7.30	8.46	1.03	2.33	2.540	2.578	2.87	7.93		
	4	7.30	8.46	1.03	2.33	2.540	2.578	2.87	7.93		INV_PMA
	5	3.45	8.46	1.03	2.20	2.400	2.578	2.52	9.26		Gmm assumed
	6	3.70	6.60	1.03	2.24	2.400	2.623	2.53	11.10		RHB_ACO_AGGR_PROP; Gmm assumed
	7	4.00	6.70	1.03	2.24	2.400	2.623	2.54	11.35		RHB_ACO_AGGR_PROP; Gmm assumed
481116	3	5.70	8.00	1.03	2.28	2.475	2.617	2.70	9.95		
	4	5.70	8.00	1.03	2.28	2.475	2.617	2.70	9.95		INV_PMA; Gmm assumed
	5	4.30	8.00	1.04	2.28	2.475	2.600	2.64	8.19	3.40	RHB_ACO_MIX_PROP; RHB_ACO_AGGR_PROP
	6	5.10	8.00	1.03	2.24	2.433	2.620	2.62	10.92		RHB_ACO_MIX_PROP; RHB_ACO_PROP; RHB_ACO_AGGR_P
531005	4	5.45	7.00	1.01	2.41	2.596	2.700	2.85	8.46		TST_AC04; Gsb assumed
	5	5.40	7.00	1.01	2.39	2.570	2.700	2.82	9.26		TST_AC04; Gsb assumed
	6	5.35	7.00	1.01	2.34	2.512	2.565	2.74	6.81		RHB_ACO_AGGR_PROP
836450	4	3.55	9.07	1.00	2.31	2.540	2.601	2.69	5.28	3.00	INV_PMA_ORIG_MIX; TST_AC04;INV_PMA
	5	3.90	7.82	1.00	2.34	2.534	2.608	2.70	6.13	4.40	RHB_ACO_MIX_PROP; TST_AC04; RHB_ACO_AGGR_PROP
	6	4.80	8.00	1.00	2.25	2.451	2.640	2.64	10.69		
	7	4.80	8.00	1.00	2.25	2.451	2.640	2.64	10.70		TST_AC04; Gmm assumed
836451	4	3.50	8.31	1.00	2.31	2.516	2.601	2.66	6.10	3.00	INV_PMA_ORIG_MIX; INV_PMA
	5	4.00	7.85	1.03	2.34	2.535	2.608	2.70	6.16	4.40	RHB_ACO_MIX_PROP;RHB_ACO_AGGR_PROP
	6	4.00	8.00	1.03	2.26	2.456	2.608	2.61	8.83		
	7	5.20	8.00	1.03	2.26	2.456	2.640	2.66	10.86		
906410	4	5.25	8.00	1.02	2.26	2.452	2.635	2.66	10.88	4.60	INV_PMA_ORIG_MIX
	5	5.35	7.00	1.02	2.28	2.451	2.635	2.66	11.14		INV_PMA
	6	4.55	7.00	1.02	2.30	2.473	2.635	2.65	9.71	5.10	RHB_ACO_MIX_PROP; Gsb assumed
906412	4	5.10	6.69	1.02	2.29	2.452	2.635	2.65	10.91	4.60	INV_PMA_ORIG_MIX
	5	5.60	7.00	1.02	2.29	2.457	2.635	2.68	11.14		INV_PMA
	6	4.75	7.00	1.02	2.29	2.463	2.635	2.65	10.20	5.10	RHB_ACO_MIX_PROP; Gsb assumed
040502	3	4.30	8.00	1.03	2.21	2.407	2.640	2.56	11.73		TST_AC04; Gsb assumed
	4	4.30	8.00	1.00	2.21	2.407	2.640	2.57	11.73		RHB_HMRAP_NEW_AC_PROP
	5	4.93	8.00	1.06	2.22	2.416	2.572	2.59	9.84		
040503	3	4.05	8.00	1.03	2.21	2.407	2.640	2.55	11.52		
	4	4.05	8.00	1.03	2.21	2.407	2.640	2.55	11.52		
	5	4.93	8.00	1.00	2.32	2.525	2.571	2.74	6.10		RHB_HMRAP_LAB_MIX
040504	3	4.50	8.00	1.03	2.21	2.407	2.640	2.57	11.89		
	4	4.50	6.10	1.03	2.26	2.407	2.640	2.57	12.14		
	5	4.47	6.10	1.01	2.27	2.416	2.571	2.58	9.60		RHB_ACO_AGGR_PROP
040505	3	3.50	8.00	1.03	2.21	2.407	2.640	2.53	11.06		TST_AC04
	4	3.50	6.10	1.03	2.26	2.407	2.640	2.53	11.28		
	5	4.47	6.10	1.03	2.27	2.416	2.571	2.58	9.60		RHB_ACO_AGGR_PROP

Table A-6 (Cont'd) Effective Binder Content

Section	Layer Number	Pb (%)	Est. Va Original (%)[1]	Gb	Est. Gmb	Gmm	Gsb	Gse	Est. Vbe	Vbe	Sources of Information
040506	3	4.05	8.00	1.03	2.21	2.407	2.640	2.55	11.52		
	4	4.05	6.10	1.03	2.26	2.407	2.640	2.55	11.75		
	5	4.70	6.10	1.01	2.27	2.416	2.571	2.59	9.81		RHB_ACO-LAB-MIX; RHB_ACO_AGGR_PROP
	6	4.47	6.10	1.01	2.27	2.416	2.571	2.58	9.60		RHB_ACO_AGGR_PROP
040507	3	3.90	8.00	1.03	2.21	2.407	2.640	2.55	11.39		TST_AC04
	4	3.90	6.10	1.03	2.26	2.407	2.640	2.55	11.63		
	5	4.70	6.10	1.01	2.27	2.416	2.571	2.59	9.81		RHB_ACO-LAB-MIX; RHB_ACO_AGGR_PROP
	6	4.47	6.10	1.01	2.27	2.416	2.571	2.58	9.60		RHB_ACO_AGGR_PROP
040508	3	4.05	8.00	1.03	2.21	2.407	2.640	2.55	11.52		
	4	4.05	8.00	1.03	2.21	2.407	2.640	2.55	11.52		
	5	5.50	8.00	1.00	2.32	2.525	2.571	2.77	6.62		RHB_HMRAP_LAB_MIX
	6	4.93	8.00	1.00	2.32	2.525	2.571	2.74	6.10		RHB_HMRAP_LAB_MIX
040509	3	3.70	8.00	1.03	2.23	2.422	2.640	2.55	10.72		
	4	3.70	8.00	1.03	2.23	2.422	2.640	2.55	10.72		
	5	4.93	8.00	1.00	2.32	2.525	2.571	2.74	6.10		RHB_HMRAP_LAB_MIX
	6	4.93	8.00	1.00	2.32	2.525	2.571	2.74	6.10		RHB_HMRAP_LAB_MIX
270502	4	5.00	8.00	1.03	2.31	2.511	2.64	2.72	8.87		
	5	5.00	8.00	1.03	2.31	2.511	2.64	2.72	8.87		
	6		8.00						12.00		Vbe assumed
270503	4	5.00	8.00	1.03	2.31	2.511	2.64	2.72	8.87		
	5	5.00	8.00	1.03	2.31	2.511	2.64	2.72	8.87		
	6		8.00						12.00		Vbe assumed
	7		8.00						12.00		Vbe assumed
270504	4	5.00	8.00	1.03	2.31	2.511	2.64	2.72	8.87		
	5	5.00	8.00	1.03	2.31	2.511	2.64	2.72	8.87		
	6		8.00						12.00		Vbe assumed
	7		8.00						12.00		Vbe assumed
270505	4	5.00	8.00	1.03	2.31	2.511	2.64	2.72	8.87		TST_AC03; Pb, Gsb assumed
	5	5.00	8.00	1.03	2.31	2.511	2.64	2.72	8.87		
	6		8.00						12.00		Vbe assumed
270506	4	5.00	8.00	1.03	2.30	2.500	2.64	2.70	9.23		
	5	5.00	8.00	1.03	2.30	2.500	2.64	2.70	9.23		
	6		8.00						12.00		Vbe assumed
270507	4	5.00	8.00	1.03	2.30	2.500	2.64	2.70	9.23		TST_AC03; Pb, Gsb assumed
	5	5.00	8.00	1.03	2.30	2.500	2.64	2.70	9.23		
	6		8.00						12.00		Vbe assumed
	7		8.00						12.00		Vbe assumed
270508	4	5.00	8.00	1.03	2.30	2.503	2.64	2.71	9.14		TST_AC03; Pb, Gsb assumed
	5	5.00	8.00	1.03	2.30	2.503	2.64	2.71	9.14		
	6		8.00						12.00		Vbe assumed
	7		8.00						12.00		Vbe assumed
270509	4	5.00	8.00	1.03	2.30	2.503	2.64	2.71	9.14		
	5	5.00	8.00	1.03	2.30	2.503	2.64	2.71	9.14		
	6		8.00						12.00		Vbe assumed
300502	4	6.10	8.00	1.02	2.28	2.475	2.64	2.73	11.01		Gsb assumed
	5	6.10	8.00	1.03	2.28	2.475	2.64	2.72	11.01		
	6	4.77	8.00	1.04	2.32	2.517	2.699	2.71	10.28		TST_AC04; G_{sb} CALCULATED
300503	4	6.10	8.00	1.02	2.28	2.475	2.64	2.73	11.01		
	5	6.10	8.00	1.03	2.28	2.475	2.64	2.72	11.01		
	6	3.70	8.00	1.04	2.33	2.537	2.699	2.69	8.72		RHB_HMRAP_LAB_MIX; Gsb CALCULATED
300504	4	6.10	8.00	1.02	2.28	2.475	2.64	2.73	11.01		
	5	6.10	8.00	1.03	2.28	2.475	2.64	2.72	11.01		
	6	5.00	8.00	1.04	2.31	2.511	2.699	2.71	10.69		RHB_ACO_LAB_MIX
300505	4	6.10	8.00	1.02	2.28	2.475	2.64	2.73	11.01		
	5	6.10	8.00	1.03	2.28	2.475	2.64	2.72	11.01		
	6	5.13	7.00	1.04	2.34	2.511	2.702	2.72	11.00		
300506	4	5.50	8.00	1.02	2.28	2.475	2.64	2.70	10.49		TST_AC03; TST_AC04
	5	5.50	8.00	1.03	2.28	2.475	2.64	2.70	10.49		
	6	5.50	8.00	1.04	2.31	2.511	2.702	2.74	11.21		
	7	5.00	8.00	1.04	2.31	2.511	2.702	2.71	10.78		RHB_ACO_LAB_MIX
300507	4	6.10	8.00	1.02	2.28	2.482	2.64	2.74	10.78		
	5	6.10	8.00	1.03	2.28	2.482	2.64	2.73	10.78		
	6	5.00	8.00	1.04	2.31	2.511	2.702	2.71	10.78		RHB_ACO_LAB_MIX
	7	5.00	8.00	1.04	2.31	2.511	2.702	2.71	10.78		RHB_ACO_LAB_MIX

Table A-6 (Cont'd) Effective Binder Content

Section	Layer Number	Pb (%)	Est. Va Original (%)[1]	Gb	Est. Gmb	Gmm	Gsb	Gse	Est. Vbe	Vbe	Sources of Information
300508	4	5.90	8.00	1.02	2.28	2.482	2.64	2.73	10.61		TST_AC04
	5	5.90	8.00	1.03	2.28	2.482	2.64	2.72	10.61		
	6	5.00	8.00	1.04	2.31	2.511	2.697	2.71	10.63		
	7	5.00	8.00	1.04	2.31	2.511	2.697	2.71	10.63		
300509	4	6.10	8.00	1.02	2.23	2.423	2.64	2.66	12.71		
	5	6.10	8.00	1.03	2.23	2.423	2.64	2.66	12.71		
	6	3.70	8.00	1.04	2.33	2.537	2.697	2.69	8.66		RHB_HMRAP_LAB_MIX; G_{sb} CALCULATED
	7	3.70	8.00	1.04	2.33	2.537	2.697	2.69	8.66		RHB_HMRAP_LAB_MIX; Gsb CALCULATED
307066	4	5.75	7.00	1.02	2.25	2.423	2.64	2.64	12.55		TST_AC03: TST_AC04
	5	5.75	7.00	1.02	2.25	2.423	2.64	2.64	12.55		
	6	5.55	8.00	1.03	2.30	2.505	2.697	2.74	11.29		
340502	4	4.60	8.00	1.01	2.28	2.480	2.64	2.67	9.55	4.30	INV_PMA_ORIG_MIX; Gmm assumed; Gsb assumed
	5	6.50	8.00	1.02	2.28	2.480	2.64	2.76	11.19	6.30	INV_PMA_ORIG_MIX; Gmm assumed; Gsb assumed
	6	4.30	7.00	1.07	2.45	2.638	2.809	2.82	9.42		
340503	5	4.60	8.00	1.01	2.28	2.480	2.64	2.67	9.55	4.30	INV_PMA_ORIG_MIX
	6	6.50	8.00	1.02	2.28	2.480	2.64	2.76	11.19	6.30	INV_PMA_ORIG_MIX
	7	4.30	7.00	1.07	2.45	2.638	2.809	2.82	9.42		
	8	4.30	7.00	1.07	2.45	2.638	2.809	2.83	9.43		
340504	5	4.60	8.00	1.01	2.28	2.480	2.64	2.67	9.55	4.30	INV_PMA_ORIG_MIX
	6	6.50	8.00	1.02	2.28	2.480	2.64	2.76	11.19	6.30	INV_PMA_ORIG_MIX
	7	4.77	7.00	1.04	2.49	2.678	2.844	2.91	9.59		
	8	4.77	7.00	1.04	2.49	2.678	2.844	2.91	9.61		
340505	5	4.60	8.00	1.01	2.28	2.480	2.64	2.67	9.55	4.30	INV_PMA_ORIG_MIX
	6	6.50	8.00	1.02	2.28	2.480	2.64	2.76	11.19	6.30	INV_PMA_ORIG_MIX
	7	4.77	7.00	1.04	2.49	2.678	2.844	2.91	9.61		
340506	3	4.60	8.00	1.01	2.28	2.480	2.64	2.67	9.55	4.30	INV_PMA_ORIG_MIX
	4	6.50	8.00	1.02	2.28	2.480	2.64	2.76	11.19	6.30	INV_PMA_ORIG_MIX
	5	4.77	7.00	1.04	2.49	2.678	2.844	2.91	9.61		
	6	4.77	7.00	1.04	2.49	2.678	2.844	2.91	9.61		
340507	4	4.60	8.00	1.01	2.28	2.480	2.64	2.67	9.55	4.30	INV_PMA_ORIG_MIX
	5	6.50	8.00	1.02	2.28	2.480	2.64	2.76	11.19	6.30	INV_PMA_ORIG_MIX
	6	4.90	7.00	1.07	2.45	2.636	2.827	2.85	10.53		
	7	4.90	7.00	1.07	2.45	2.636	2.827	2.85	10.53		
	8	4.90	7.00	1.07	2.45	2.636	2.827	2.85	10.53		
340508	5	4.60	8.00	1.01	2.28	2.480	2.64	2.67	9.55	4.30	INV_PMA_ORIG_MIX
	6	6.50	8.00	1.02	2.28	2.480	2.64	2.76	11.19	6.30	INV_PMA_ORIG_MIX
	7	4.28	7.00	1.16	2.49	2.674	2.816	2.84	8.47		
	8	4.28	7.00	1.16	2.49	2.674	2.816	2.84	8.48		
	9	4.28	7.00	1.16	2.49	2.674	2.816	2.84	8.47		
340509	5	4.60	8.00	1.01	2.28	2.480	2.64	2.67	9.55	4.30	INV_PMA_ORIG_MIX
	6	6.50	8.00	1.02	2.28	2.480	2.64	2.76	11.19	6.30	INV_PMA_ORIG_MIX
	7	4.28	7.00	1.16	2.49	2.674	2.816	2.84	8.47		
	8	4.28	7.00	1.16	2.49	2.674	2.816	2.84	8.47		

[1] From Table A-7

Table A-7 Air Voids

Section	Layer Num	Air Voids at Age = t (%)	Date Completed	Age t (months)	Maat (°F)	Original Air Voids (%)[1]	Source of Information	Est. Original Air Voids (%)	Total Unit Weight (pcf)
014127	3				60.32	4.66		8.00	147.98
	4				60.32	3.26		7.00	149.34
	5				60.32			8.00	
	6				60.32			8.00	
	7				60.32			8.00	
014129	4				61.81	8.53		8.53	145.45
	5				61.81	2.70	Layer < 1". Join with Layer 4	7.00	
	6				61.81	6.19		6.19	146.72
124135	4				72.69	7.40	INV_PMA_ORIG_MIX	7.40	137.28
	5	3.20	2/16/1992	252.00	72.69			8.00	
	6	5.00	2/16/1992	252.00	72.69			8.00	
	7	5.00	2/16/1992	252.00	72.69		Layer < 1". Join with Layer 6	8.00	137.28
316700	2				50.17	2.18		7.00	147.23
	3				50.17	1.83		7.00	147.20
	4				50.17	5.30	RHB_ACO_MIX_PROP	8.00	146.48
371802	3				58.20	7.70		7.70	
	4				58.20	8.70	INV_PMA_ORIG_MIX	8.70	150.70
	5				58.20	8.10	RHB_ACO_MIX_PROP	8.10	150.26
481093	3				70.03	8.01		8.01	125.13
	4				70.03	6.70	Layer < 1". Join with Layer 6	6.70	
	5				70.03	6.70	Layer < 1". Join with Layer 6	6.70	
	6				70.03	6.70	RHB_ACO_MIX_PROP	6.70	146.39
481113	3				64.54	8.46	Layer < 1". Join with Layer 5	8.46	
	4				64.54	8.46	Layer < 1". Join with Layer 5	8.46	
	5				64.54	8.46		8.46	145.08
	6				64.54	6.60		6.60	
	7				64.54	6.70		6.70	
481116	3				64.73			8.00	
	4				64.73			8.00	
	5				64.73	5.10		8.00	
	6				64.73	4.20	RHB_ACO_MIX_PROP	8.00	
531005	4				49.06	3.91		7.00	155.66
	5				49.06	2.19		7.00	156.85
	6				49.06	3.60	RHB_ACO_MIX_PROP	7.00	152.26
836450	4				36.12	9.07		9.07	144.11
	5				36.12	7.82		7.82	145.74
	6				36.12	4.24	Layer < 1". Join with Layer 7	8.00	
	7				36.12	4.24		8.00	146.42
836451	4				36.13	8.31		8.31	143.96
	5				36.13	7.85		7.85	145.77
	6				36.13	5.33	Layer < 1". Join with Layer 7	8.00	
	7				36.13	5.33		8.00	145.08
906410	4				36.56	5.18		8.00	145.08
	5				36.56	3.60	INV_PMA_ORIG_MIX	7.00	148.17
	6				36.56	3.03		7.00	149.60
906412	4				36.57	6.69		6.69	142.77
	5				36.57	3.60	INV_PMA_ORIG_MIX	7.00	149.14
	6				36.57	3.90	RHB_ACO_MIX_PROP	7.00	149.14
040502	3				70.28			8.00	
	4				70.28	5.40	Layer < 1". Join with Layer 5	8.00	
	5	5.40	5/8/1990	0.00	70.28	5.40	RHB_HMRAP_LAB_MIX	8.00	
040503	3				70.28			8.00	
	4				70.28	5.40	Layer < 1". Join with Layer 5	8.00	
	5	5.40	5/3/1990	0.00	70.28	5.40	RHB_HMRAP_LAB_MIX	8.00	
040504	3				70.28			8.00	
	4				70.28	6.10	Layer < 1". Join with Layer 5	6.10	
	5	6.10	5/24/1990	0.00	70.28	6.10	RHB_ACO_LAB_MIX	6.10	
040505	3				70.28			8.00	
	4				70.28	6.10	Layer < 1". Join with Layer 5	6.10	
	5	6.10	5/24/1990	0.00	70.28	6.10	RHB_ACO_LAB_MIX	6.10	

Table A-7 (Cont'd) Air Voids

Section	Layer Num	Air Voids at Age = t (%)	Date Completed	Age t (months)	Maat (°F)	Original Air Voids (%)[1]	Source of Information	Est. Original Air Voids (%)	Total Unit Weight (pcf)
040506	3				70.28			8.00	
	4				70.28	6.10	Layer < 1". Join with Layer 5	6.10	
	5				70.28	6.10		6.10	
	6	6.10	5/24/1990	0.00	70.28	6.10	RHB_ACO_LAB_MIX	6.10	
040507	3				70.28			8.00	
	4				70.28	6.10	Layer < 1". Join with Layer 5	6.10	
	5	6.10	5/24/1990	0.00	70.28	6.10	RHB_ACO_LAB_MIX	6.10	
	6	6.10	5/24/1990	0.00	70.28	6.10	RHB_ACO_LAB_MIX	6.10	
040508	3				70.28			8.00	
	4				70.28	5.40	Layer < 1". Join with Layer 5	8.00	
	5	5.40	5/24/1990	0.00	70.28	5.40	RHB_HMRAP_LAB_MIX	8.00	
	6	5.40	5/24/1990	0.00	70.28	5.40	RHB_HMRAP_LAB_MIX	8.00	
040509	3				70.28			8.00	
	4				70.28	5.40	Layer < 1". Join with Layer 5	8.00	
	5	5.40	5/2/1990	0.00	70.28	5.40	RHB_HMRAP_LAB_MIX	8.00	
	6	5.40	5/8/1990	0.00	70.28	5.40	RHB_HMRAP_LAB_MIX	8.00	
240504	5				55.36	3.10	INV_PMA_ORIG_MIX	7.00	
	6				55.36	5.04	Assumed	8.00	
	7				55.36	6.00	Layer < 1". Join with Layer 8	6.00	
	8	6	6/1/1992	0	55.36	6.00	RHB_ACO_LAB_MIX	6.00	
	9	5.2	6/1/1992	0	55.36	5.20	RHB_ACO_LAB_MIX	8.00	
240505	5				55.36	3.10	INV_PMA_ORIG_MIX	7.00	
	6				55.36	5.04	Assumed	8.00	
	7				55.36	5.03	Layer < 1". Join with Layer 8	8.00	
	8	5.2	6/1/1992	2	55.36	5.03	RHB_ACO_LAB_MIX	8.00	
240506	5				55.36	3.10	INV_PMA_ORIG_MIX	7.00	
	6				55.36	5.04	Assumed	8.00	
	7				55.36	5.20	Layer < 1". Join with Layer 8	8.00	
	8	5.2	6/1/1992	2	55.36	5.20	RHB_ACO_LAB_MIX	8.00	
240507	5				55.36	5.17		8.00	
	6				55.36	5.04		8.00	
	7				55.36	6.00	Layer < 1". Join with Layer 8	6.00	
	8	6	6/1/1992	0	55.36	6.00	RHB_ACO_LAB_MIX	6.00	
	9	5.2	6/1/1992	0	55.36	5.20	RHB_ACO_LAB_MIX	8.00	
240509	5				55.36	2.65		7.00	
	6				55.36	5.07		8.00	
	7				55.36	5.29	Layer < 1". Join with Layer 8	8.00	
	8	4.8	6/3/1992	2	55.36	5.29		8.00	
270502	4				38.44			8.00	
	5				38.44			8.00	
	6				38.44			8.00	
270503	4				38.44			8.00	
	5				38.44			8.00	
	6				38.44			8.00	
	7				38.44			8.00	
270504	4				38.44			8.00	
	5				38.44			8.00	
	6				38.44			8.00	
	7				38.44			8.00	
270505	4				38.44			8.00	
	5				38.44			8.00	
	6				38.44			8.00	
270506	4				38.44			8.00	
	5				38.44			8.00	
	6				38.44			8.00	
270507	4				38.44			8.00	
	5				38.44			8.00	
	6				38.44			8.00	
	7				38.44			8.00	
270508	4				38.44			8.00	
	5				38.44			8.00	
	6				38.44			8.00	
	7				38.44			8.00	

Table A-7 (Cont'd) Air Voids

Section	Layer Num	Air Voids at Age = t (%)	Date Completed	Age t (months)	Maat (°F)	Original Air Voids (%)[1]	Source of Information	Est. Original Air Voids (%)	Total Unit Weight (pcf)
270509	4				38.44			8.00	
	5				38.44			8.00	
	6				38.44			8.00	
300502	4				32.00	4.80	INV_PMA_ORIG_MIX	8.00	
	5				32.00	4.80	Layer < 1". Join with Layer 4	8.00	
	6				32.00	5.63		8.00	
300503	4				32.00	4.80	INV_PMA_ORIG_MIX	8.00	
	5				32.00	4.80	Layer < 1". Join with Layer 4	8.00	
	6				32.00	5.63		8.00	
300504	4				32.00	4.80	INV_PMA_ORIG_MIX	8.00	
	5				32.00	4.80	Layer < 1". Join with Layer 4	8.00	
	6				32.00	5.63		8.00	
300505	4				32.00	4.80	INV_PMA_ORIG_MIX	8.00	
	5				32.00	4.80	Layer < 1". Join with Layer 4	8.00	
	6				32.00	3.13		7.00	
300506	4				32.00	5.02		8.00	
	5				32.00	5.02	Layer < 1". Join with Layer 4	8.00	
	6				32.00			8.00	
	7				32.00	5.63		8.00	
300507	4				32.00	4.80	INV_PMA_ORIG_MIX	8.00	
	5				32.00	4.80	Layer < 1". Join with Layer 4	8.00	
	6				32.00			8.00	
	7				32.00	5.63		8.00	
300508	4				32.00	5.98		8.00	
	5				32.00	5.98	Layer < 1". Join with Layer 4	8.00	
	6				32.00			8.00	
	7				32.00	5.63		8.00	
300509	4				32.00	4.80	INV_PMA_ORIG_MIX	8.00	
	5				32.00	4.80	Layer < 1". Join with Layer 4	8.00	
	6				32.00			8.00	
	7				32.00	5.63		8.00	
307066	4				32.00	1.03		7.00	
	5				32.00	1.03	Layer < 1". Join with Layer 4	7.00	
	6				32.00	5.61		8.00	
340502	4				52.66	5.00	INV_PMA_ORIG_MIX	8.00	
	5				52.66	5.00	INV_PMA_ORIG_MIX	8.00	
	6				52.66	3.75	Assumed	7.00	
340503	5				52.66	5.00	INV_PMA_ORIG_MIX	8.00	
	6				52.66	5.00	INV_PMA_ORIG_MIX	8.00	
	7				52.66	2.12	Assumed	7.00	
	8				52.66	3.75		7.00	
340504	5				52.66	5.00	INV_PMA_ORIG_MIX	8.00	
	6				52.66	5.00	INV_PMA_ORIG_MIX	8.00	
	7				52.66	2.12		7.00	
	8				52.66	3.75	Assumed	7.00	
340505	5				52.66	5.00	INV_PMA_ORIG_MIX	8.00	
	6				52.66	5.00	INV_PMA_ORIG_MIX	8.00	
	7				52.66	3.75	Assumed	7.00	
340506	3				52.66	5.00	INV_PMA_ORIG_MIX	8.00	
	4				52.66	5.00	INV_PMA_ORIG_MIX	8.00	
	5				52.66	2.12	Assumed	7.00	
	6				52.66	3.75	Assumed	7.00	
340507	4				52.66	5.00	INV_PMA_ORIG_MIX	8.00	
	5				52.66	5.00	INV_PMA_ORIG_MIX	8.00	
	6				52.66	2.12	Assumed	7.00	
	7				52.66	2.12	Assumed	7.00	
	8				52.66	3.67		7.00	
340508	5				52.66	5.00	INV_PMA_ORIG_MIX	8.00	
	6				52.66	5.00	INV_PMA_ORIG_MIX	8.00	
	7				52.66	3.88	Assumed	7.00	
	8				52.66	3.88		7.00	
	9				52.66	3.67	Assumed	7.00	

Table A-7 (Cont'd) Air Voids

Section	Layer Num	Air Voids at Age = t (%)	Date Completed	Age t (months)	Maat (°F)	Original Air Voids (%)[1]	Source of Information	Est. Original Air Voids (%)	Total Unit Weight (pcf)
340509	5				52.66	5.00	INV_PMA_ORIG_MIX	8.00	
	6				52.66	5.00	INV_PMA_ORIG_MIX	8.00	
	7				52.66	3.88	Assumed	7.00	
	8				52.66	3.67	Assumed	7.00	

[1] From LTPP database

Table A-8 Asphalt Binder Grade

Section	Layer Number	Viscosity Grade	Penetration Grade	Pen 77 °F	Visc 140 °F (Poises)	Comments
014127	3	AC-20				From INV_PMA_ASPHALT
	4	AC-20				From INV_PMA_ASPHALT
	5	AC-20				From INV_PMA_ASPHALT
	6	AC-20				Assumed
	7	AC-20				Assumed
014129	4	AC-20		91.00	1781.00	From INV_PMA_ASPHALT
	5	AC-20		97.00	1622.00	From INV_PMA_ASPHALT
	6	AC-20				Assumed
124135	4		Pen 60-70		2542.00	From INV_PMA_ASPHALT
	5		Pen 60-70			Assumed
	6		Pen 60-70			Assumed
	7		Pen 60-70			Assumed
316700	2		Pen 85-100	93.00		From penetration data
	3		Pen 85-100			Assumed
	4		Pen 120-150	129.00		From penetration data
371802	3	AC-20		97.00	2051.00	From INV_PMA_ASPHALT
	4	AC-20		97.00	2051.00	From INV_PMA_ASPHALT
	5	AC-20				Assumed
481093	3		Pen 85-100	93.00	834.00	From penetration data
	4		Pen 85-100			
	5		Pen 85-100			
	6	AC-10		67.00		From INV_PMA_ASPHALT
481113	3	AC-20				
	4	AC-20		77.00	1914.00	From INV_PMA_ASPHALT
	5	AC-20				
	6	AC-20				Assumed
	7	AC-20				Assumed
481116	3	AC-20				
	4	AC-20		75.00	2181.00	From INV_PMA_ASPHALT
	5	AC-20		67.00	2055.00	From viscosity data
531005	4		Pen 85-100	93.00		From INV_PMA_ASPHALT
	5		Pen 85-100	93.00		From INV_PMA_ASPHALT
	6		Pen 85-100	80.00		Assumed
836450	4	Cutback Asphalt 3000				From INV_PMA_ASPHALT
	5	AC-10		161.00	815.00	Assumed
	6	AC-10				Assumed
	7	AC-10				Assumed
836451	4	Cutback Asphalt 3000				From INV_PMA_ASPHALT
	5	AC-10		161.00	815.00	From viscosity data
	6	AC-10				Assumed
	7	AC-10				Assumed
906410	4	AC-6				Assumed
	5	AC-6				From INV_PMA_ASPHALT
	6	AC-6				Assumed
906412	4	AC-6				Assumed
	5	AC-6				From INV_PMA_ASPHALT
	6	AC-6				Assumed
040502	3		Pen 60-70	63.00		
	4		Pen 60-70			
	5	AC-20		2.33		
040503	3		Pen 60-70	63.00		
	4		Pen 60-70			
	5	AC-20				
040504	3		Pen 60-70	63.00		
	4		Pen 60-70			
	5	AC-40				
040505	3		Pen 60-70	63.00		
	4		Pen 60-70			
	5	AC-40		18.33	73243.00	
040506	3		Pen 60-70	63.00		
	4		Pen 60-70			
	5	AC-40				
	6	AC-40				

Table A-8 (Cont'd) Asphalt Binder Grade

Section	Layer Number	Viscosity Grade	Penetration Grade	Pen 77 °F	Visc 140 °F (Poises)	Comments
040507	3		Pen 60-70	63.00		
	4		Pen 60-70			
	5	AC-40				
	6	AC-40				
040508	3		Pen 60-70	63.00		
	4		Pen 60-70			
	5	AC-20				
	6	AC-20				
040509	3		Pen 60-70	63.00		
	4		Pen 60-70			
	5	AC-20				
	6	AC-20				
270502	4		Pen 120-150			Assumed
	5		Pen 120-150			Assumed
	6		Pen 120-150			Assumed
270503	4		Pen 120-150			Assumed
	5		Pen 120-150			Assumed
	6		Pen 120-150			Assumed
	7		Pen 120-150			Assumed
270504	4		Pen 120-150			Assumed
	5		Pen 120-150			Assumed
	6		Pen 120-150			Assumed
	7		Pen 120-150			Assumed
270505	4		Pen 120-150			Assumed
	5		Pen 120-150			Assumed
	6		Pen 120-150			Assumed
270506	4		Pen 120-150			Assumed
	5		Pen 120-150			Assumed
	6		Pen 120-150			Assumed
270507	4		Pen 120-150			Assumed
	5		Pen 120-150			Assumed
	6		Pen 120-150			Assumed
	7		Pen 120-150			Assumed
270508	4		Pen 120-150			Assumed
	5		Pen 120-150			Assumed
	6		Pen 120-150			Assumed
	7		Pen 120-150			Assumed
270509	4		Pen 120-150			Assumed
	5		Pen 120-150			Assumed
	6		Pen 120-150			Assumed
300502	4		Pen 120-150	122.00		
	5		Pen 120-150			
	6	AC-20		36.67	5143.00	
300503	4		Pen 120-150	122.00		
	5		Pen 120-150			
	6	AC-20		37.00	5445.00	
300504	4		Pen 120-150	122.00		
	5		Pen 120-150			
	6		Pen 85-100	41.00	4412.00	
300505	4		Pen 120-150	122.00		
	5		Pen 120-150			
	6		Pen 85-100	41.33	4547.00	
300506	4		Pen 120-150	122.00	4310.00	
	5		Pen 120-150			
	6		Pen 85-100	41.00	4412.00	
	7	AC-20		41.00	4412.00	
300507	4		Pen 120-150	122.00		
	5		Pen 120-150			
	6		Pen 85-100	41.00	4412.00	
	7		Pen 85-100	41.00	4412.00	
300508	4		Pen 120-150	122.00	8823.00	
	5		Pen 120-150			
	6		Pen 85-100	37.00	5445.00	
	7		Pen 85-100	37.00	5445.00	

Table A-8 (Cont'd) Asphalt Binder Grade

Section	Layer Number	Viscosity Grade	Penetration Grade	Pen 77 °F	Visc 140 °F (Poises)	Comments
300509	4		Pen 120-150	122.00		
	5		Pen 120-150			
	6		Pen 85-100	37.00	5445.00	
	7		Pen 85-100	37.00	5445.00	
307066	4		Pen 120-150			
	5		Pen 85-100			
	6		Pen 85-100	90.00		
340502	4		Pen 85-100	89.00	1452.00	
	5		Pen 85-100	91.00	1440.00	
	6		Pen 85-100			Assumed
340503	5		Pen 85-100	89.00	1452.00	
	6		Pen 85-100	91.00	1440.00	
	7		Pen 85-100			Assumed
	8		Pen 85-100	7.00	4900.00	
340504	5		Pen 85-100	89.00	1452.00	
	6		Pen 85-100	91.00	1440.00	
	7		Pen 85-100	8.00	3144.00	
	8		Pen 85-100			
340505	5		Pen 85-100	89.00	1452.00	
	6		Pen 85-100	91.00	1440.00	
	7		Pen 85-100			
340506	3		Pen 85-100	89.00	1452.00	
	4		Pen 85-100	91.00	1440.00	
	5		Pen 85-100			
	6		Pen 85-100			
340507	4		Pen 85-100	89.00	1452.00	
	5		Pen 85-100	91.00	1440.00	
	6		Pen 85-100			Assumed
	7		Pen 85-100			
	8		Pen 85-100	14.00	1436.00	
340508	5		Pen 85-100	89.00	1452.00	
	6		Pen 85-100	91.00	1440.00	
	7		Pen 85-100			
	8		Pen 85-100		10945.00	
	9		Pen 85-100	5.00		
340509	5		Pen 85-100	89.00	1452.00	
	6		Pen 85-100	91.00	1440.00	
	7		Pen 85-100			
	8		Pen 85-100			

Table A-9a Unbound Materials Data

Section	Layer Number	Layer Type	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)	% Passing #200 Sieve	% Passing #4 Sieve	Diameter D_{60} (mm)	AASHTO CLASS	USCS CLASS	Source
014127	1	SS	35.5	19.5	16	47.5	80.5	0.3970	A-4	CL	
	2	GB	0	0	NP	10.05	40.5	9.5728	A-1-a	GP-GM	
014129	1	SS	32	26	6	33.65	81.0	0.5937	A-2-4	SM	
	2	GS	0	0	NP	10.4	65.0	3.2642	A-1-b	SP-SM	
	3	GB	30	23	7	15.6	59.0	4.8864	A-2-4	SM	
124135	1	SS	21	18.5	2.5	1.95	99.5	0.2855	A-2-4	SW	
	2	GS			NP	12.4	92.0	0.3100	A-2-4	SM	
	3	GB			NP	37.9	94.5	0.2806	A-4	SM	
316700	1	SS	29.5	23	6.5	97.2	100.0	0.0288	A-4	ML	
371802	1	SS	44.5	28	16.5	49.8	86.0	0.2234	A-7-5	ML	
	2	GB	21	21	NP	9.75	51.5	7.0696	A-1-a	GP-GM	
481093	1	SS	22	19	3	26.75	74.5	0.2200	A-2-4	SM	
	2	GB			NP	11.7	46.0	11.3667	A-1-b	GP-GM	TST_UG04_SS03
481113	1	SS	35	21	14	57.1	94.0	0.0806	A-6	CL	TST_UG04_SS03
	2	GB	22	18	4	27.7	83.5	0.6000	A-2-5	SM	
481116	1	SS	34	15	19	61.4	99.0	0.0689	A-6	CL	TST_UG04_SS03
	2	GB	25	21	4	31.1	77.5	0.3000	A-2-4	CL-ML	
531005	1	SS	0	0	NP	29.4	53.0	7.1013	A-2-4	GM	
	2	GS	0	0	NP	4.7	27.5	13.5689	A-1-a	GW	
	3	GB	0	0	NP	5.05	44.5	6.3974	A-1-a	GP-GM	
836450	1	SS	0	0	NP	11.75	99.0	0.2023	A-2-4	SP-SM	
	2	GS	0	0	NP	13.15	60.5	4.4983	A-1-a	SM	
	3	GB	0	0	NP	10.25	61.5	3.8431	A-1-a	SW-SM	
836451	1	SS	0	0	NP	7.9	97.0	0.2870	A-2-4	SP-SM	
	2	GS	0	0	NP	11.3	66.0	3.4884	A-1-a	SW-SM	
	3	GB	0	0	NP	10.2	61.0	4.0000	A-1-a	SW-SM	
906410	1	SS	0	0	NP	48.7	97.0	0.0920	A-4	SM	
	2	GS	0	0	NP	16.95	99.0	0.1685	A-2-4	ML	
	3	GB	0	0	NP	9.45	78.0	1.8820	A-1-b	SW-SM	
906412	1	SS	0	0	NP	42.7	97.0	0.1040	A-4	SM	
	2	GS	0	0	NP	13.2	99.0	0.1627	A-2-4	SM	
	3	GB	0	0	NP	10	79.0	1.8288	A-1-b	SW-SM	
040502	1	SS	28	20	8	28.5	87.0	1.4340	A-2-4	SC	
	2	GB	0	0	NP	5.1	62.0	3.5969	A-1-b	SW-SM	
040503	1	SS	22	16	6	25.5	73.0	1.6615	A-2-4	SC	Assumed same as Section 040504
	2	GB			NP	4.8	66.0	3.5969	A-1-a	SW	Assumed same as Section 040504
040504	1	SS	22	16	6	25.5	73.0	1.6615	A-2-4	SC	
	2	GB			NP	4.8	66.0	3.5969	A-1-b	SW	
040505	1	SS	27	19	8	38.7	87.0	0.6300	A-4	SC	Assumed same as Section 040504
	2	GB			NP	7	71.0	2.3485	A-1-b	SW-SM	Assumed same as Section 040504
040506	1	SS	27	19	8	38.7	87.0	0.6300	A-4	SC	
	2	GB			NP	7	71.0	2.3485	A-1-b	SW-SM	
040507	1	SS	21	16	5	26.4	72.0	1.4224	A-2-4	SC	
	2	GB			NP	5.8	73.0	1.8348	A-1-b	SW-SM	
040508	1	SS	23	18	5	24.4	83.0	1.1000	A-1-b	SC	Assumed same as Section 040508
	2	GB			NP	5.1	70.0	2.5160	A-1-b	SP-SM	Assumed same as Section 040508
040509	1	SS	23	18	5	24.4	83.0	1.1000	A-1-b	SC	
	2	GB			NP	5.1	70.0	2.5160	A-1-b	SP-SM	
270502	1	SS			9	34.7	96.0	0.2531	A-2-4	SC	Assumed same as Section 270501
	2	GS			NP	7.8	90.7	0.7792	A-1-b	SP-SM	Assumed same as Section 270501
	3	GB			NP	7.4	68.7	2.8730	A-1-b	SW-SM	Assumed same as Section 270501
270503	1	SS			9	34.7	96.0	0.2531	A-2-4	SC	Assumed same as Section 270501
	2	GS			NP	7.8	90.7	0.7792	A-1-b	SP-SM	Assumed same as Section 270501
	3	GB			NP	7.4	68.7	2.8730	A-1-b	SW-SM	Assumed same as Section 270501
270504	1	SS	30	15	15	40.2	93.0	0.2090	A-6	SC	Assumed same as Section 270505
	2	GS	0	0	NP	9.1	86.2	1.0372	A-1-b	SW-SM	Assumed same as Section 270505
	3	GB	0	0	NP	7	67.0	3.0000	A-1-b	SW-SM	Assumed same as Section 270505
270505	1	SS	30	15	15	40.2	93.0	0.2090	A-6	SC	
	2	GS	0	0	NP	9.1	86.2	1.0372	A-1-b	SW-SM	
	3	GB	0	0	NP	7	67.0	3.0000	A-1-b	SW-SM	
270506	1	SS	30	15	15	40.2	93.0	0.2090	A-6	SC	Assumed same as Section 270505
	2	GS	0	0	NP	9.1	86.2	1.0372	A-1-b	SW-SM	Assumed same as Section 270505
	3	GB	0	0	NP	7	67.0	3.0000	A-1-b	SW-SM	Assumed same as Section 270505

Table A-9a (Cont'd) Unbound Materials Data

Section	Layer Number	Layer Type	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)	% Passing #200 Sieve	% Passing #4 Sieve	Diameter D_{60} (mm)	AASHTO CLASS	USCS CLASS	Source
270507	1	SS	31	16	15	49.7	95.0	0.1302	A-6	SC	
	2	GS	0	0	NP	7.5	82.1	1.4148	A-1-b	SW-SM	
	3	GB	15	13	2	7	70.7	2.7013	A-1-b	SW-SM	
270508	1	SS	22	14	8	29.3	92.0	0.3241	A-2-4	SC	
	2	GS	16	0	NP	9.4	87.0	0.9626	A-1-b	SW-SM	
	3	GB	0	0	NP	7.6	74.0	1.9848	A-1-b	SW-SM	
270509	1	SS	22	14	8	29.3	92.0	0.3241	A-2-4	SC	Assumed same as Section 270508
	2	GS	16	0	NP	9.4	87.0	0.9626	A-1-b	SW-SM	Assumed same as Section 270508
	3	GB	0	0	NP	7.6	74.0	1.9848	A-1-b	SW-SM	Assumed same as Section 270508
300502	1	SS	28	16	12	32.6	66.0	1.5029	A-2-6	GC	Assumed same as Section 300506
	2	GS	21	0	NP	7.8	42.0	11.4003	A-1-a	GP-GM	Assumed same as Section 300506
	3	GB			NP	8.9	52.0	5.9232	A-1-a	GP-GM	Assumed same as Section 300506
300503	1	SS	28	16	12	32.6	66.0	1.5029	A-2-6	GC	Assumed same as Section 300506
	2	GS	21	0	NP	7.8	42.0	11.4003	A-1-a	GP-GM	Assumed same as Section 300506
	3	GB			NP	8.9	52.0	5.9232	A-1-a	GP-GM	Assumed same as Section 300506
300504	1	SS	28	16	12	32.6	66.0	1.5029	A-2-6	GC	Assumed same as Section 300506
	2	GS	21	0	NP	7.8	42.0	11.4003	A-1-a	GP-GM	Assumed same as Section 300506
	3	GB			NP	8.9	52.0	5.9232	A-1-a	GP-GM	Assumed same as Section 300506
300505	1	SS	28	16	12	32.6	66.0	1.5029	A-2-6	GC	
	2	GS	21	0	NP	7.8	42.0	11.4003	A-1-a	GP-GM	
	3	GB			NP	8.9	52.0	5.9232	A-1-a	GP-GM	
300506	1	SS	28	16	12	32.6	66.0	1.5029	A-2-6	GC	
	2	GS	21	0	NP	7.8	42.0	11.4003	A-1-a	GP-GM	
	3	GB			NP	8.9	52.0	5.9232	A-1-a	GP-GM	
300507	1	SS	27	11	16	38.9	45.0	9.0000	A-6	GC	Assumed same as Section 300508
	2	GS	21	0	NP	11.3	47.0	10.6206	A-1-a	GW-GM	Assumed same as Section 300508
	3	GB	20	0	NP	12.7	62.0	3.9126	A-1-a	SM	Assumed same as Section 300508
300508	1	SS	27	11	16	38.9	45.0	9.0000	A-6	GC	
	2	GS	21	0	NP	11.3	47.0	10.6206	A-1-a	GW-GM	
	3	GB	20	0	NP	12.7	62.0	3.9126	A-1-a	SM	
300509	1	SS	27	11	16	38.9	45.0	9.0000	A-6	GC	Assumed same as Section 300508
	2	GS	21	0	NP	11.3	47.0	10.6206	A-1-a	GW-GM	Assumed same as Section 300508
	3	GB	20	0	NP	12.7	62.0	3.9126	A-1-a	SM	Assumed same as Section 300508
307066	1	SS	32	13.5	18.5	55.5	90.5	0.1006	A-6	CL	
	2	GS	0	0	NP	10.05	42.0	10.4254	A-1-a	GP-GM	
	3	GB	0	0	NP	10.1	63.0	4.2322	A-1-a	SP-SM	
340502	1	SS			NP	20.2	86.6	0.3500	A-2-4	SM	
	2	GS			NP	9.9	71.0	2.2289	A-1-b	SW-SM	
	3	GB			NP	7	64.0	1.9000	A-1-a	SP-SM	
340503	1	SS			NP	33.8	96.0	0.2687	A-2-4	SM	
	2	GS			NP	7.8	71.0	2.3494	A-1-b	SP-SM	
	3	GS			NP	9.9	71.0	2.2289	A-1-b	SW-SM	Assumed same as Section 340502
	4	GB			NP	7.8	70.5	1.9000	A-1-a	SP-SM	
340504	1	SS			NP	33.8	96.0	0.2687	A-2-4	SM	Assumed same as Section 340503
	2	GS			NP	7.8	71.0	2.3494	A-1-b	SP-SM	Assumed same as Section 340503
	3	GS			NP	9.9	71.0	2.2289	A-1-b	SW-SM	Assumed same as Section 340503
	4	GB			NP	7.8	70.5	1.9000	A-1-a	SP-SM	Assumed same as Section 340503
340505	1	SS			NP	30.1	96.0	0.2777	A-2-4	SM	
	2	GS			NP	6.3	64.0	3.5	A-1-b	SW-SM	
	3	GS			NP	9.9	71.0	2.2289	A-1-b	SW-SM	Assumed same as Section 340502
	4	GB			NP	6.3	63.9	3.7429	A-1-a	SW-SM	
340506	1	SS			NP	30.1	96.0	0.2777	A-2-4	SM	Assumed same as Section 340505
	2	GB			NP	6.3	63.9	3.7429	A-1-a	SW-SM	Assumed same as Section 340505
340507	1	SS			NP	30.1	96.0	0.2777	A-2-4	SM	Assumed same as Section 340505
	2	GS			NP	9.9	71.0	2.2289	A-1-b	SW-SM	Assumed same as Section 340502
	3	GB			NP	6.3	63.9	3.7429	A-1-a	SW-SM	Assumed same as Section 340505
340508	1	SS			NP	30.1	96.0	0.2777	A-2-4	SM	Assumed same as Section 340505
	2	GS			NP	6.3	64.0	3.5	A-1-b	SW-SM	Assumed same as Section 340505
	3	GS			NP	9.9	71.0	2.2289	A-1-b	SW-SM	Assumed same as Section 340502
	4	GB			NP	6.3	63.9	3.7429	A-1-a	SW-SM	Assumed same as Section 340505
340509	1	SS			NP	30.1	96.0	0.2777	A-2-4	SM	Assumed same as Section 340505
	2	GS			NP	6.3	64.0	3.5	A-1-b	SW-SM	Assumed same as Section 340505
	3	GS			NP	9.9	71.0	2.2289	A-1-b	SW-SM	Assumed same as Section 340502
	4	GB			NP	6.3	63.9	3.7429	A-1-a	SW-SM	Assumed same as Section 340505

Table A-9b Unbound Materials Gradation Data

Section	Layer	Layer Type	% Passing 3"	% Passing 2"	% Passing 1 1/2"	% Passing 1"	% Passing 3/4"	% Passing 1/2"	% Passing 3/8"	% Passing #4	% Passing #10	% Passing #40	% Passing #80	% Passing #200	% Passing 0.02 mm	% Passing 0.002 mm	% Passing 0.001 mm	Source
014127	1	SS	100.0	99.5	98.0	96.5	94.5	90.5	87.0	80.5	72.0	62.5	55.0	47.5	40.3	26.5		TST_SS02_UG03
	2	GB	100.0	100.0	100.0	93.0	86.0	70.0	59.0	40.5	29.0	17.5	13.5	10.1				TST_SS01_UG01_UG02
014129	1	SS	100.0	96.5	95.5	94.0	92.0	89.0	87.0	81.0	72.5	56.5	46.0	33.7	25.7	12.5		TST_SS02_UG03
	2	GS	100.0	100.0	100.0	99.0	94.0	92.0	85.0	65.0	51.0	31.0	22.0	10.4				TST_SS01_UG01_UG02
	3	GB	100.0	100.0	99.5	95.0	89.0	83.0	76.5	59.0	42.5	28.0	21.5	15.6				TST_SS01_UG01_UG02
124135	1	SS	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.5	98.5	88.0	20.0	2.0				TST_SS01_UG01_UG02
	2	GS	100.0	100.0	100.0	99.5	99.0	97.5	96.0	92.0	86.0	71.0	24.5	12.4				TST_SS01_UG01_UG02
	3	GB	100.0	100.0	100.0	99.5	99.0	98.5	97.5	94.5	87.0	68.0	52.0	37.9				TST_SS01_UG01_UG02
316700	1	SS	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.0	99.0	97.2	42.6	14.6		TST_SS02_UG03
371802	1	SS	100.0	95.0	94.0	93.0	91.0	90.0	88.0	86.0	82.0	65.0	57.0	49.8	32.5	16.6	14.3	TST_SS02_UG03
	2	GB	100.0	100.0	100.0	94.5	84.5	73.5	64.5	51.5	40.5	27.5	17.0	9.8				TST_SS01_UG01_UG02
481093	1	SS	100.0	100.0	100.0	97.0	91.0	85.5	82.0	74.5	72.0	68.0	55.0	26.8	12.5	8.8		TST_SS02_UG03
	2	GB	100.0	100.0	99.0	85.5	74.5	62.5	54.5	46.0	41.0	37.0	25.5	11.7				TST_SS01_UG01_UG02
481113	1	SS	100.0	100.0	100.0	99.5	99.0	98.5	98.0	94.0	99.5	89.5	74.0	57.1	42.3	32.6	0.0	TST_SS02_UG03
	2	GB	100.0	100.0	99.5	98.5	97.5	95.0	91.5	83.5	69.0	56.5	46.5	27.7				TST_SS01_UG01_UG02
481116	1	SS	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.0	91.5	95.5	88.0	61.4	38.0	22.0	0.0	TST_SS02_UG03
	2	GB	100.0	100.0	99.5	98.5	95.5	92.0	87.5	77.5	66.5	63.5	53.5	31.1				TST_SS01_UG01_UG02
531005	1	SS	100.0	100.0	99.5	92.5	86.0	74.0	68.0	53.0	44.5	37.0	34.0	29.4	13.3	2.9	2.6	TST_SS02_UG03
	2	GS	100.0	100.0	93.0	78.5	68.5	58.0	50.0	27.5	16.0	8.5	6.5	4.7				TST_SS01_UG01_UG02
	3	GB	100.0	100.0	100.0	99.0	97.5	94.5	77.5	44.5	23.0	9.5	7.0	5.1				TST_SS01_UG01_UG02
836450	1	SS	100.0	100.0	100.0	100.0	100.0	99.0	99.0	99.0	96.5	94.5	49.5	11.8	7.3	4.3		TST_SS02_UG03
	2	GS	100.0	100.0	99.5	95.5	88.5	80.0	74.0	60.5	41.0	27.0	19.0	13.2				TST_SS01_UG01_UG02
	3	GB	100.0	100.0	100.0	100.0	99.5	86.5	77.5	61.5	49.0	27.5	14.0	10.3				TST_SS01_UG01_UG02
836451	1	SS	100.0	100.0	100.0	100.0	100.0	99.0	98.0	97.0	96.0	92.0	23.0	7.9	5.1	2.4		TST_SS02_UG03
	2	GS	100.0	100.0	100.0	98.0	95.0	87.0	81.0	66.0	49.0	25.0	17.0	11.3				TST_SS01_UG01_UG02
	3	GB	100.0	100.0	100.0	100.0	99.0	85.0	75.0	61.0	49.0	28.0	14.0	10.2				TST_SS01_UG01_UG02
906410	1	SS	100.0	100.0	100.0	100.0	99.0	99.0	98.0	97.0	96.0	94.0	92.0	48.7	19.8	13.0		TST_SS02_UG03
	2	GS	100.0	100.0	100.0	100.0	99.5	99.5	99.5	99.0	99.0	98.0	64.0	17.0				TST_SS01_UG01_UG02
	3	GB	100.0	100.0	100.0	100.0	100.0	94.5	89.5	78.0	64.0	24.0	13.5	9.5				TST_SS01_UG01_UG02

Table A-9b (Cont'd) Unbound Materials Gradation Data

Section	Layer	Layer Type	% Passing 3"	% Passing 2"	% Passing 1 1/2"	% Passing 1"	% Passing 3/4"	% Passing 1/2"	% Passing 3/8"	% Passing #4	% Passing #10	% Passing #40	% Passing #80	% Passing #200	% Passing 0.02 mm	% Passing 0.002 mm	% Passing 0.001 mm	Source
306412	1	SS	100.0	100.0	100.0	100.0	99.0	98.0	98.0	97.0	95.0	92.0	88.0	42.7	18.3	11.2		TST_SS02_UG03
	2	GS	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.0	99.0	98.0	67.0	13.2				TST_SS01_UG01_UG02
	3	GB	100.0	100.0	100.0	100.0	100.0	95.0	90.0	79.0	65.0	24.0	14.0	10.0				TST_SS01_UG01_UG02
040502	1	SS	100.0	100.0	100.0	100.0	100.0	97.0	96.0	87.0	67.0	43.0	36.0	28.5	15.4	6.9	5.6	TST_SS02_UG03
	2	GB	100.0	100.0	100.0	100.0	95.0	81.0	75.0	62.0	51.0	21.0	8.0	5.1				TST_SS01_UG01_UG02
040503	1	SS	100.0	100.0	99.0	98.0	95.0	90.0	86.0	73.0	58.0	41.0	33.0	25.5	13.2	6.1	5.5	TST_SS02_UG03
	2	GB	100.0	100.0	100.0	100.0	94.0	84.0	78.0	66.0	50.0	19.0	8.0	4.8				TST_SS01_UG01_UG02
040504	1	SS	100.0	100.0	99.0	98.0	95.0	90.0	86.0	73.0	58.0	41.0	33.0	25.5	13.2	6.1	5.5	TST_SS02_UG03
	2	GB	100.0	100.0	100.0	100.0	94.0	84.0	78.0	66.0	50.0	19.0	8.0	4.8				TST_SS01_UG01_UG02
040505	1	SS	100.0	100.0	100.0	99.0	97.0	96.0	94.0	87.0	74.0	55.0	47.0	38.7	18.6	9.3	7.8	TST_SS02_UG03
	2	GB	100.0	100.0	98.0	96.0	92.0	86.0	81.0	71.0	55.0	25.0	11.0	7.0				TST_SS01_UG01_UG02
040506	1	SS	100.0	100.0	100.0	99.0	97.0	96.0	94.0	87.0	74.0	55.0	47.0	38.7	18.6	9.3	7.8	TST_SS02_UG03
	2	GB	100.0	100.0	98.0	96.0	92.0	86.0	81.0	71.0	55.0	25.0	11.0	7.0				TST_SS01_UG01_UG02
040507	1	SS	100.0	100.0	99.0	97.0	95.0	89.0	86.0	72.0	62.0	44.0	34.0	26.4	15.1	7.1	6.4	TST_SS02_UG03
	2	GB	100.0	100.0	100.0	99.0	96.0	88.0	84.0	73.0	64.0	29.0	10.0	5.8				TST_SS01_UG01_UG02
040508	1	SS	100.0	100.0	99.0	98.0	98.0	95.0	93.0	83.0	68.0	44.0	35.0	24.4	14.1	6.9	5.9	TST_SS02_UG03
	2	GB	100.0	96.0	93.0	92.0	90.0	83.0	79.0	70.0	57.0	24.0	9.0	5.1				TST_SS01_UG01_UG02
040509	1	SS	100.0	100.0	99.0	98.0	98.0	95.0	93.0	83.0	68.0	44.0	35.0	24.4	14.1	6.9	5.9	TST_SS02_UG03
	2	GB	100.0	96.0	93.0	92.0	90.0	83.0	79.0	70.0	57.0	24.0	9.0	5.1				
270502	1	SS	100.0	100.0	100.0	100.0	99.0		98.0	96.0	92.0	74.0	49.0	34.7				INV_GRADATION
	2	GS	100.0	100.0	100.0	99.6	99.1		95.3	90.7	83.7	41.3	11.6	7.8				INV_GRADATION
	3	GB	100.0	100.0	100.0	100.0	95.4		80.3	68.7	53.8	21.4	9.8	7.4				INV_GRADATION
270503	1	SS	100.0	100.0	100.0	100.0	99.0		98.0	96.0	92.0	74.0	49.0	34.7				INV_GRADATION
	2	GS	100.0	100.0	100.0	99.6	99.1		95.3	90.7	83.7	41.3	11.6	7.8				INV_GRADATION
	3	GB	100.0	100.0	100.0	100.0	95.4		80.3	68.7	53.8	21.4	9.8	7.4				INV_GRADATION
270504	1	SS	100.0	100.0	100.0	100.0	99.0		98.0	93.0	90.0	76.0	54.0	40.2				INV_GRADATION
	2	GS	100.0	100.0	100.0	98.3	97.4		92.1	86.2	74.3	38.4	12.9	9.1				INV_GRADATION
	3	GB	100.0	100.0	100.0	99.7	93.9		77.6	67.0	55.9	40.5	10.1	7.0				INV_GRADATION

Table A-9b (Cont'd) Unbound Materials Gradation Data

Section	Layer	Layer Type	% Passing 3"	% Passing 2"	% Passing 1 1/2"	% Passing 1"	% Passing 3/4"	% Passing 1/2"	% Passing 3/8"	% Passing #4	% Passing #10	% Passing #40	% Passing #80	% Passing #200	% Passing 0.02 mm	% Passing 0.002 mm	% Passing 0.001 mm	Source
270505	1	SS	100.0	100.0	100.0	100.0	99.0		98.0	93.0	90.0	76.0	54.0	40.2				INV_GRADATION
	2	GS	100.0	100.0	100.0	98.3	97.4		92.1	86.2	74.3	38.4	12.9	9.1				INV_GRADATION
	3	GB	100.0	100.0	100.0	99.7	93.9		77.6	67.0	55.9	40.5	10.1	7.0				INV_GRADATION
270506	1	SS	100.0	100.0	100.0	100.0	99.0		98.0	93.0	90.0	76.0	54.0	40.2				INV_GRADATION
	2	GS	100.0	100.0	100.0	98.3	97.4		92.1	86.2	74.3	38.4	12.9	9.1				INV_GRADATION
	3	GB	100.0	100.0	100.0	99.7	93.9		77.6	67.0	55.9	40.5	10.1	7.0				INV_GRADATION
270507	1	SS	100.0	100.0	100.0	98.0	98.0		98.0	95.0	85.0	79.0	65.0	43.7				INV_GRADATION
	2	GS	100.0	100.0	100.0	98.1	97.0		90.4	82.1	64.5	30.7	10.8	7.5				INV_GRADATION
	3	GB	100.0	100.0	100.0	100.0	96.0		82.2	70.7	54.5	21.4	9.6	7.0				INV_GRADATION
270508	1	SS	100.0	100.0	100.0	98.0	97.0		96.0	92.0	85.0	71.0	40.0	29.3				INV_GRADATION
	2	GS	100.0	100.0	100.0	98.6	97.5		93.2	87.0	76.7	38.4	15.2	9.4				INV_GRADATION
	3	GB	100.0	100.0	100.0	100.0	95.7		83.0	74.0	62.0	28.0	11.0	7.6				INV_GRADATION
270509	1	SS	100.0	100.0	100.0	98.0	97.0		96.0	92.0	85.0	71.0	40.0	29.3				INV_GRADATION
	2	GS	100.0	100.0	100.0	98.6	97.5		93.2	87.0	76.7	38.4	15.2	9.4				INV_GRADATION
	3	GB	100.0	100.0	100.0	100.0	95.7		83.0	74.0	62.0	28.0	11.0	7.6				INV_GRADATION
300502	1	SS	100.0	91.0	88.0	86.0	82.0	77.0	74.0	66.0	61.0	52.0	43.0	32.6	26.3	15.6	12.8	TST_SS02_UG03
	2	GS	100.0	100.0	100.0	85.0	74.0	61.0	55.0	42.0	33.0	20.0	12.0	7.8				TST_SS01_UG01_UG02
	3	GB	100.0	100.0	100.0	97.0	92.0	82.0	72.0	52.0	40.0	23.0	14.0	8.9				TST_SS01_UG01_UG02
300503	1	SS	100.0	91.0	88.0	86.0	82.0	77.0	74.0	66.0	61.0	52.0	43.0	32.6	26.3	15.6	12.8	TST_SS02_UG03
	2	GS	100.0	100.0	100.0	85.0	74.0	61.0	55.0	42.0	33.0	20.0	12.0	7.8				TST_SS01_UG01_UG02
	3	GB	100.0	100.0	100.0	97.0	92.0	82.0	72.0	52.0	40.0	23.0	14.0	8.9				TST_SS01_UG01_UG02
300504	1	SS	100.0	91.0	88.0	86.0	82.0	77.0	74.0	66.0	61.0	52.0	43.0	32.6	26.3	15.6	12.8	TST_SS02_UG03
	2	GS	100.0	100.0	100.0	85.0	74.0	61.0	55.0	42.0	33.0	20.0	12.0	7.8				TST_SS01_UG01_UG02
	3	GB	100.0	100.0	100.0	97.0	92.0	82.0	72.0	52.0	40.0	23.0	14.0	8.9				TST_SS01_UG01_UG02
300505	1	SS	100.0	91.0	88.0	86.0	82.0	77.0	74.0	66.0	61.0	52.0	43.0	32.6	26.3	15.6	12.8	TST_SS02_UG03
	2	GS	100.0	100.0	100.0	85.0	74.0	61.0	55.0	42.0	33.0	20.0	12.0	7.8				TST_SS01_UG01_UG02
	3	GB	100.0	100.0	100.0	97.0	92.0	82.0	72.0	52.0	40.0	23.0	14.0	8.9				TST_SS01_UG01_UG02

Table A-9b (Cont'd) Unbound Materials Gradation Data

Section	Layer	Layer Type	% Passing 3"	% Passing 2"	% Passing 1 1/2"	% Passing 1"	% Passing 3/4"	% Passing 1/2"	% Passing 3/8"	% Passing #4	% Passing #10	% Passing #40	% Passing #80	% Passing #200	% Passing 0.02 mm	% Passing 0.002 mm	% Passing 0.001 mm	Source
300506	1	SS	100.0	91.0	88.0	86.0	82.0	77.0	74.0	66.0	61.0	52.0	43.0	32.6	26.3	15.6	12.8	TST_SS02_UG03
	2	GS	100.0	100.0	100.0	85.0	74.0	61.0	55.0	42.0	33.0	20.0	12.0	7.8				TST_SS01_UG01_UG02
	3	GB	100.0	100.0	100.0	97.0	92.0	82.0	72.0	52.0	40.0	23.0	14.0	8.9				TST_SS01_UG01_UG02
300507	1	SS	100.0	96.0	94.0	89.0	83.0	71.0	62.0	45.0	45.0	44.0	43.0	38.9	17.0	6.7	5.5	TST_SS02_UG03
	2	GS	100.0	100.0	100.0	85.0	74.0	63.0	57.0	47.0	41.0	28.0	17.0	11.3				TST_SS01_UG01_UG02
	3	GB	100.0	100.0	100.0	100.0	100.0	91.0	81.0	62.0	45.0	31.0	19.0	12.7				TST_SS01_UG01_UG02
300508	1	SS	100.0	96.0	94.0	89.0	83.0	71.0	62.0	45.0	45.0	44.0	43.0	38.9	17.0	6.7	5.5	TST_SS02_UG03
	2	GS	100.0	100.0	100.0	85.0	74.0	63.0	57.0	47.0	41.0	28.0	17.0	11.3				TST_SS01_UG01_UG02
	3	GB	100.0	100.0	100.0	100.0	100.0	91.0	81.0	62.0	45.0	31.0	19.0	12.7				TST_SS01_UG01_UG02
300509	1	SS	100.0	96.0	94.0	89.0	83.0	71.0	62.0	45.0	45.0	44.0	43.0	38.9	17.0	6.7	5.5	TST_SS02_UG03
	2	GS	100.0	100.0	100.0	85.0	74.0	63.0	57.0	47.0	41.0	28.0	17.0	11.3				TST_SS01_UG01_UG02
	3	GB	100.0	100.0	100.0	100.0	100.0	91.0	81.0	62.0	45.0	31.0	19.0	12.7				TST_SS01_UG01_UG02
307066	1	SS	100.0	99.0	99.0	97.0	95.5	94.5	93.5	90.5	86.0	79.0	67.5	55.5	40.3	24.6	21.8	TST_SS02_UG03
	2	GS	100.0	100.0	100.0	91.5	80.5	64.5	57.5	42.0	36.0	21.0	14.0	10.1				TST_SS01_UG01_UG02
	3	GB	100.0	100.0	100.0	100.0	100.0	93.0	85.0	63.0	40.0	22.0	14.0	10.1				TST_SS01_UG01_UG02
340502	1	SS	100.0	100.0	98.0	95.0	93.0	91.0	90.0	87.0	81.0	64.0	36.0	20.2	12.9	7.5		TST_SS02_UG03
	2	GS	100.0	100.0	97.0	93.0	89.0	82.0	79.0	71.0	61.0	30.0	16.0	9.9				TST_SS01_UG01_UG02
	3	GB	100.0	100.0	95.9	86.1	81.2	76.8	74.9	70.5	62.2	28.7	11.3	7.8				TST_SS01_UG01_UG02
340503	1	SS	100.0	100.0	100.0	100.0	99.0	99.0	98.0	96.0	92.0	77.0	43.0	33.8	17.8	8.2		TST_SS02_UG03
	2	GS	100.0	100.0	96.0	86.0	81.0	77.0	75.0	71.0	62.0	23.0	11.0	7.8				TST_SS01_UG01_UG02
	3	GS	100.0	100.0	97.0	93.0	89.0	82.0	79.0	71.0	61.0	30.0	16.0	9.9				TST_SS01_UG01_UG02
	4	GB	100.0	100.0	95.9	86.1	81.2	76.8	74.9	70.5	62.2	28.7	11.3	7.8				TST_SS01_UG01_UG02
340504	1	SS	100.0	100.0	100.0	100.0	99.0	99.0	98.0	96.0	92.0	77.0	43.0	33.8	17.8	8.2		TST_SS02_UG03
	2	GS	100.0	100.0	96.0	86.0	81.0	77.0	75.0	71.0	62.0	23.0	11.0	7.8				TST_SS01_UG01_UG02
	3	GS	100.0	100.0	97.0	93.0	89.0	82.0	79.0	71.0	61.0	30.0	16.0	9.9				TST_SS01_UG01_UG02
	4	GB	100.0	100.0	95.9	86.1	81.2	76.8	74.9	70.5	62.2	28.7	11.3	7.8				TST_SS01_UG01_UG02

Table A-9b (Cont'd) Unbound Materials Gradation Data

Section	Layer	Layer Type	% Passing 3"	% Passing 2"	% Passing 1 1/2"	% Passing 1"	% Passing 3/4"	% Passing 1/2"	% Passing 3/8"	% Passing #4	% Passing #10	% Passing #40	% Passing #80	% Passing #200	% Passing 0.02 mm	% Passing 0.002 mm	% Passing 0.001 mm	Source
340505	1	SS	100.0	100.0	100.0	100.0	99.0	98.0	97.0	96.0	93.0	74.0	44.0	30.1	11.1	5.7		TST_SS02_UG03
	2	GS	100.0	100.0	98.0	84.0	79.0	74.0	71.0	64.0	53.0	20.0	8.0	6.3				TST_SS01_UG01_UG02
	3	GS	100.0	100.0	97.0	93.0	89.0	82.0	79.0	71.0	61.0	30.0	16.0	9.9				TST_SS01_UG01_UG02
	4	GB	100.0	100.0	98.1	84.1	79.2	74.0	71.4	63.9	53.3	20.0	8.4	6.3				TST_SS01_UG01_UG02
340506	1	SS	100.0	100.0	100.0	100.0	99.0	98.0	97.0	96.0	93.0	74.0	44.0	30.1	11.1	5.7		TST_SS01_UG01_UG02
	2	GB	100.0	100.0	98.1	84.1	79.2	74.0	71.4	63.9	53.3	20.0	8.4	6.3				TST_SS01_UG01_UG02
340507	1	SS	100.0	100.0	100.0	100.0	99.0	98.0	97.0	96.0	93.0	74.0	44.0	30.1	11.1	5.7		TST_SS01_UG01_UG02
	2	GS	100.0	100.0	97.0	93.0	89.0	82.0	79.0	71.0	61.0	30.0	16.0	9.9				TST_SS01_UG01_UG02
	3	GB	100.0	100.0	98.1	84.1	79.2	74.0	71.4	63.9	53.3	20.0	8.4	6.3				TST_SS01_UG01_UG02
340508	1	SS	100.0	100.0	100.0	100.0	99.0	98.0	97.0	96.0	93.0	74.0	44.0	30.1	11.1	5.7		TST_SS01_UG01_UG02
	2	GS	100.0	100.0	98.0	84.0	79.0	74.0	71.0	64.0	53.0	20.0	8.0	6.3				INV_GRADATION
	3	GS	100.0	100.0	97.0	93.0	89.0	82.0	79.0	71.0	61.0	30.0	16.0	9.9				TST_SS01_UG01_UG02
	4	GB	100.0	100.0	98.1	84.1	79.2	74.0	71.4	63.9	53.3	20.0	8.4	6.3				TST_SS01_UG01_UG02
340509	1	SS	100.0	100.0	100.0	100.0	99.0	98.0	97.0	96.0	93.0	74.0	44.0	30.1	11.1	5.7		TST_SS01_UG01_UG02
	2	GS	100.0	100.0	98.0	84.0	79.0	74.0	71.0	64.0	53.0	20.0	8.0	6.3				INV_GRADATION
	3	GS	100.0	100.0	97.0	93.0	89.0	82.0	79.0	71.0	61.0	30.0	16.0	9.9				TST_SS01_UG01_UG02
	4	GB	100.0	100.0	98.1	84.1	79.2	74.0	71.4	63.9	53.3	20.0	8.4	6.3				TST_SS01_UG01_UG02

Table A-10 Distress Data - Rutting

Section	Survey Date	Rehab. Date	LLH Mean Depth (in)	RLH Mean Depth (in)	Max Mean Depth (in)	Average Rutting (in)
014127	Assumed				0.59	
	06/05/89				0.35	
	06/30/90				0.20	
	04/08/92				0.16	
	06/02/94	04/03/89			0.24	
	12/09/95				0.24	
	12/04/97				0.20	
014129	04/03/89		0.236	0.236	0.39	0.236
	06/30/90				0.31	
	04/02/92				0.20	
	03/22/94	06/01/89			0.24	
	01/09/96				0.20	
	09/04/97				0.35	
124135	1/29/1994		0.512	0.669	0.87	0.591
	03/10/94				0.12	
	01/17/96	05/01/94			0.16	
	04/16/97				0.16	
316700	Assumed				0.59	
	05/10/89	10/22/88			0.08	
	04/08/96				0.28	
371802	04/02/96		0.512	0.315	0.83	0.413
	12/11/96	05/01/96			0.16	
	10/10/97				0.12	
481093	Assumed				0.59	
	04/14/89				0.20	
	10/17/90				0.28	
	03/12/92	09/15/88			0.20	
	02/18/93				0.28	
	02/21/95				0.47	
481113	01/30/92		0.197	0.157	0.24	0.177
	11/10/93				0.16	
	03/01/95	08/02/92			0.28	
	07/14/97				0.24	
481116	Assumed				0.59	
	03/07/91				0.24	
	01/30/92	10/18/90			0.24	
531005	Assumed				0.59	
	09/13/89				0.24	
	07/03/91				0.20	
	08/29/94	07/01/89			0.24	
	05/17/95				0.24	
	07/08/97				0.35	
	10/08/98				0.35	
836450	06/27/89		0.354	0.236	0.47	0.295
	05/25/90				0.12	
	06/09/93	09/13/89			0.16	
	06/11/93				0.16	
	08/11/98				0.12	
836451	06/27/89		0.472	0.394	0.55	0.433
	05/25/90				0.12	
	06/09/93	09/13/89			0.12	
	06/11/93				0.12	
	08/12/98				0.12	
906410	07/04/89		0.276	0.118	0.31	0.197
	05/16/90	10/01/89			0.28	
	06/11/93				0.12	
906412	07/04/89		0.236	0.157	0.35	0.197
	05/16/90	10/01/89			0.20	
	06/11/93				0.16	

Table A-10 (Cont'd) Distress Data - Rutting

Section	Survey Date	Rehab. Date	LLH Mean Depth (in)	RLH Mean Depth (in)	Max Mean Depth (in)	Average Rutting (in)
040502	Assumed				**0.59**	
	01/15/91		0.24	0.24	0.24	0.236
	09/22/91		0.12	0.20	0.20	0.157
	10/19/94	05/08/90	0.20	0.24	0.24	0.217
	03/22/95		0.28	0.31	0.31	0.295
	11/12/96		0.24	0.28	0.28	0.256
	11/13/97		0.28	0.28	0.28	0.276
	12/10/98		0.28	0.31	0.31	0.295
	12/13/99		0.31	0.43	0.43	0.374
	10/17/00		0.28	0.24	0.28	0.256
040503	Assumed				**0.59**	
	01/15/91		0.28	0.24	0.28	0.256
	09/22/91		0.16	0.20	0.20	0.177
	10/18/94		0.24	0.24	0.24	0.236
	03/22/95	05/03/90	0.35	0.39	0.39	0.374
	09/12/96		0.28	0.28	0.28	0.276
	11/13/97		0.28	0.24	0.28	0.256
	12/09/98		0.28	0.24	0.28	0.256
	12/13/99		0.35	0.35	0.35	0.354
	10/16/00		0.28	0.24	0.28	0.256
040504	Assumed				**0.59**	
	01/15/91		0.20	0.20	0.20	0.197
	09/22/91		0.08	0.12	0.12	0.098
	10/18/94		0.16	0.08	0.16	0.118
	03/22/95	05/24/90	0.12	0.16	0.16	0.138
	09/11/96		0.08	0.12	0.12	0.098
	09/12/96		0.16	0.12	0.16	0.138
	11/13/97		0.12	0.08	0.12	0.098
	12/09/98		0.12	0.08	0.12	0.098
	12/13/99		0.20	0.20	0.20	0.197
	10/16/00		0.20	0.08	0.20	0.138
040505	Assumed				**0.59**	
	01/15/91		0.16	0.24	0.24	0.197
	09/22/91		0.04	0.16	0.16	0.098
	10/20/94		0.04	0.08	0.08	0.059
	03/22/95		0.16	0.28	0.28	0.217
	07/12/96	05/24/90	0.08	0.12	0.12	0.098
	11/13/97		0.08	0.12	0.12	0.098
	12/10/98		0.08	0.12	0.12	0.098
	12/14/99		0.12	0.24	0.24	0.177
	10/18/00		0.12	0.12	0.12	0.118
040506	Assumed				**0.59**	
	09/22/91		0.12	0.12	0.12	0.118
	10/20/94		0.12	0.08	0.12	0.098
	03/22/95		0.12	0.16	0.16	0.138
	09/12/96		0.12	0.08	0.12	0.098
	11/13/97	05/24/90	0.12	0.12	0.12	0.118
	12/10/98		0.12	0.12	0.12	0.118
	12/14/99		0.16	0.20	0.20	0.177
	10/17/00		0.12	0.12	0.12	0.118
040507	Assumed				**0.59**	
	01/15/91		0.35	0.20	0.35	0.276
	09/22/91		0.24	0.16	0.24	0.197
	10/18/94		0.31	0.12	0.31	0.217
	03/22/95	05/24/90	0.28	0.20	0.28	0.236
	09/12/96		0.35	0.16	0.35	0.256
	11/13/97		0.35	0.16	0.35	0.256
	12/09/98		0.35	0.16	0.35	0.256
	12/09/99		0.39	0.35	0.39	0.374
	10/16/00		0.43	0.16	0.43	0.295

Table A-10 (Cont'd) Distress Data - Rutting

Section	Survey Date	Rehab. Date	LLH Mean Depth (in)	RLH Mean Depth (in)	Max Mean Depth (in)	Average Rutting (in)
040508	Assumed				**0.59**	
	01/15/91		0.24	0.31	0.31	0.276
	09/22/91		0.12	0.20	0.20	0.157
	10/19/94		0.24	0.24	0.24	0.236
	03/22/95	05/08/90	0.24	0.28	0.28	0.256
	09/12/96		0.31	0.31	0.31	0.315
	11/13/97		0.24	0.28	0.28	0.256
	12/09/98		0.28	0.28	0.28	0.276
	12/13/99		0.39	0.43	0.43	0.413
	10/17/00		0.24	0.24	0.24	0.236
040509	Assumed				**0.59**	
	01/15/91		0.31	0.28	0.31	0.295
	09/22/91		0.12	0.16	0.16	0.138
	10/19/94		0.28	0.24	0.28	0.256
	03/22/95		0.31	0.28	0.31	0.295
	09/12/96	05/08/90	0.31	0.28	0.31	0.295
	11/13/97		0.28	0.24	0.28	0.256
	12/09/98		0.28	0.24	0.28	0.256
	12/13/99		0.35	0.35	0.35	0.354
	10/17/00		0.28	0.24	0.28	0.256
270502	Assumed				**0.43**	
	06/03/93		0.12	0.08	0.12	0.098
	09/29/93	09/15/90	0.12	0.08	0.12	0.098
	06/13/95		0.16	0.12	0.16	0.138
	06/07/99		0.12	0.08	0.12	0.098
	07/25/00		0.12	0.08	0.12	0.098
270503	Assumed				**0.43**	
	06/03/93		0.08	0.04	0.08	0.059
	09/29/93	09/15/90	0.12	0.04	0.12	0.079
	06/13/95		0.12	0.12	0.12	0.118
	07/25/00		0.08	0.00	0.08	0.039
270504	Assumed				**0.43**	
	06/03/93		0.08	0.04	0.08	0.059
	09/28/93		0.08	0.04	0.08	0.059
	06/13/95	09/15/90	0.16	0.12	0.16	0.138
	08/23/95		0.08	0.04	0.08	0.059
	02/09/96		0.08	0.04	0.08	0.059
	10/23/97		0.12	0.04	0.12	0.079
	06/03/99		0.08	0.04	0.08	0.059
	07/24/00		0.08	0.00	0.08	0.039
270505	Assumed				**0.43**	
	06/03/93		0.08	0.12	0.12	0.098
	09/29/93		0.12	0.08	0.12	0.098
	06/13/95	09/15/90	0.16	0.12	0.16	0.138
	08/23/95		0.08	0.08	0.08	0.079
	02/09/96		0.08	0.08	0.08	0.079
	06/03/99		0.08	0.08	0.08	0.079
	07/24/00		0.08	0.04	0.08	0.059
270506	Assumed				**0.43**	
	06/03/93		0.08	0.08	0.08	0.079
	09/29/93		0.08	0.08	0.08	0.079
	06/13/95		0.16	0.12	0.16	0.138
	08/23/95	09/15/90	0.08	0.08	0.08	0.079
	10/23/97		0.12	0.08	0.12	0.098
	06/03/99		0.08	0.04	0.08	0.059
	07/24/00		0.08	0.04	0.08	0.059
270507	Assumed				**0.43**	
	06/03/93		0.08	0.04	0.08	0.059
	09/28/93		0.12	0.04	0.12	0.079
	06/13/95	09/15/90	0.20	0.08	0.20	0.138
	08/23/95		0.12	0.04	0.12	0.079
	02/09/96		0.12	0.04	0.12	0.079
	10/23/97		0.12	0.04	0.12	0.079
	06/03/99		0.12	0.04	0.12	0.079
	07/24/00		0.12	0.04	0.12	0.079

Table A-10 (Cont'd) Distress Data - Rutting

Section	Survey Date	Rehab. Date	LLH Mean Depth (in)	RLH Mean Depth (in)	Max Mean Depth (in)	Average Rutting (in)
270508	Assumed				0.43	
	06/03/93		0.08	0.04	0.08	0.059
	09/29/93	09/15/90	0.08	0.04	0.08	0.059
	06/13/95		0.16	0.08	0.16	0.118
	07/25/00		0.08	0.04	0.08	0.059
270509	Assumed				0.43	
	06/03/93		0.12	0.12	0.12	0.118
	09/29/93		0.12	0.08	0.12	0.098
	06/13/95	09/15/90	0.20	0.16	0.20	0.177
	06/07/99		0.12	0.12	0.12	0.118
	07/24/00		0.12	0.08	0.12	0.098
300502	**05/16/91**		**0.51**	**0.63**	**0.87**	**0.571**
	06/08/96	09/12/91	0.16	0.35	0.35	0.256
	08/02/96		0.20	0.35	0.35	0.276
	05/22/98		0.28	0.43	0.43	0.354
	06/09/99		0.24	0.43	0.43	0.335
	07/25/00		0.28	0.47	0.47	0.374
300503	**05/17/91**		**0.55**	**0.43**	**0.71**	**0.492**
	06/08/96	09/12/91	0.20	0.24	0.24	0.217
	08/01/96		0.12	0.20	0.20	0.157
	05/20/98		0.12	0.28	0.28	0.197
	06/07/99		0.16	0.28	0.28	0.217
	07/24/00		0.16	0.31	0.31	0.236
300504	**05/17/91**		0.55	0.51	**0.71**	0.531
	06/08/96	09/11/91	0.20	0.24	0.24	0.217
	08/01/96		0.24	0.24	0.24	0.236
	05/20/98		0.28	0.31	0.31	0.295
	06/07/99		0.31	0.31	0.31	0.315
	07/21/00		0.35	0.35	0.35	0.354
300505	**05/16/91**		**0.47**	**0.43**	**0.71**	**0.453**
	06/08/96	09/11/91	0.16	0.20	0.20	0.177
	07/31/96		0.16	0.16	0.16	0.157
	05/19/98		0.20	0.24	0.24	0.217
	06/04/99		0.20	0.24	0.24	0.217
	07/20/00		0.24	0.28	0.28	0.256
300506	**05/16/91**		**0.47**	**0.51**	**0.83**	**0.492**
	06/08/96	09/11/91	0.28	0.35	0.35	0.315
	07/31/96		0.31	0.28	0.31	0.295
	05/20/98		0.35	0.35	0.35	0.354
	06/07/99		0.43	0.39	0.43	0.413
	07/20/00		0.47	0.43	0.47	0.453
300507	**05/17/91**		**0.55**	**0.55**	**0.83**	**0.551**
	06/08/96		0.16	0.35	0.35	0.256
	08/01/96		0.24	0.28	0.28	0.256
	05/20/98		0.24	0.31	0.31	0.276
	06/07/99		0.31	0.39	0.39	0.354
	07/21/00		0.31	0.39	0.39	0.354
300508	**05/17/91**		**0.51**	**0.43**	**0.71**	**0.472**
	06/08/96	09/12/91	0.12	0.16	0.16	0.138
	08/01/96		0.12	0.16	0.16	0.138
	05/21/98		0.12	0.16	0.16	0.138
	06/09/99		0.16	0.20	0.20	0.177
	07/24/00		0.16	0.20	0.20	0.177
300509	**05/16/91**		**0.51**	**0.51**	**0.91**	**0.512**
	06/08/96	09/12/91	0.16	0.39	0.39	0.276
	08/01/96		0.20	0.35	0.35	0.276
	05/22/98		0.28	0.47	0.47	0.374
	06/09/99		0.31	0.47	0.47	0.394
	07/24/00		0.31	0.51	0.51	0.413
307066	**05/16/91**		**0.43**	**0.43**	**0.71**	**0.433**
	06/08/96	09/13/91	0.24	0.28	0.28	0.256
	07/31/96		0.28	0.28	0.28	0.276
	05/19/98		0.31	0.31	0.31	0.315
	06/04/99		0.31	0.39	0.39	0.354
	07/20/00		0.43	0.43	0.43	0.433

Table A-10 (Cont'd) Distress Data - Rutting

Section	Survey Date	Rehab. Date	LLH Mean Depth (in)	RLH Mean Depth (in)	Max Mean Depth (in)	Average Rutting (in)
340502	04/06/92		0.28	0.20	0.43	0.236
	02/24/93	08/13/92	0.12	0.12	0.12	0.118
	11/04/95		0.20	0.12	0.20	0.157
	12/03/96		0.04	0.04	0.04	0.039
	10/28/98		0.16	0.08	0.16	0.118
	06/22/99		0.20	0.20	0.20	0.197
	11/09/99		0.16	0.08	0.16	0.118
	10/19/00		0.16	0.08	0.16	0.118
340503	04/06/92		0.28	0.20	0.43	0.236
	02/24/93		0.20	0.12	0.20	0.157
	11/04/95	08/13/92	0.20	0.12	0.20	0.157
	11/09/95		0.16	0.04	0.16	0.098
	08/27/96		0.16	0.04	0.16	0.098
	10/27/98		0.16	0.04	0.16	0.098
	06/22/99		0.16	0.16	0.16	0.157
	10/19/99		0.16	0.04	0.16	0.098
	10/17/00		0.16	0.04	0.16	0.098
340504	04/06/92		0.16	0.08	0.24	0.118
	02/24/93	08/21/92	0.20	0.08	0.20	0.138
	11/04/95		0.16	0.12	0.16	0.138
	12/03/96		0.04	0.04	0.04	0.039
	10/29/98		0.12	0.04	0.12	0.079
	06/22/99		0.16	0.16	0.16	0.157
	11/10/99		0.12	0.08	0.12	0.098
	10/19/00		0.12	0.08	0.12	0.098
340505	04/06/92		0.24	0.20	0.35	0.217
	02/24/93	08/21/92	0.12	0.08	0.12	0.098
	11/04/95		0.16	0.12	0.16	0.138
	12/03/96		0.04	0.04	0.04	0.039
	10/29/98		0.08	0.08	0.08	0.079
	06/22/99		0.12	0.12	0.12	0.118
	11/10/99		0.12	0.08	0.12	0.098
	10/23/00		0.12	0.08	0.12	0.098
340506	04/06/92		0.35	0.31	0.47	0.335
	02/24/93		0.20	0.16	0.20	0.177
	11/04/95	08/20/92	0.16	0.16	0.16	0.157
	08/28/96		0.12	0.08	0.12	0.098
	10/28/98		0.12	0.12	0.12	0.118
	06/22/99		0.16	0.16	0.16	0.157
	11/08/99		0.12	0.12	0.12	0.118
	10/18/00		0.12	0.12	0.12	0.118
340507	04/06/92		0.31	0.20	0.51	0.256
	02/24/93		0.24	0.12	0.24	0.177
	11/04/95	08/13/92	0.24	0.12	0.24	0.177
	11/09/95		0.16	0.08	0.16	0.118
	08/27/96		0.16	0.08	0.16	0.118
	10/27/98		0.16	0.08	0.16	0.118
	06/22/99		0.16	0.16	0.16	0.157
	10/19/99		0.16	0.08	0.16	0.118
	10/17/00		0.20	0.08	0.20	0.138
340508	04/06/92		0.24	0.24	0.35	0.236
	02/24/93		0.20	0.12	0.20	0.157
	11/04/95	08/13/92	0.20	0.12	0.20	0.157
	11/09/95		0.12	0.04	0.12	0.079
	08/28/96		0.12	0.04	0.12	0.079
	10/27/98		0.12	0.04	0.12	0.079
	06/22/99		0.16	0.12	0.16	0.138
	11/08/99		0.12	0.08	0.12	0.098
	10/17/00		0.12	0.08	0.12	0.098
340509	04/06/92		0.24	0.28	0.47	0.256
	02/24/93	08/20/92	0.28	0.20	0.28	0.236
	11/04/95		0.16	0.16	0.16	0.157
	08/28/96		0.12	0.08	0.12	0.098
	10/27/98		0.12	0.08	0.12	0.098
	06/22/99		0.16	0.16	0.16	0.157
	11/08/99		0.12	0.12	0.12	0.118
	10/18/00		0.12	0.12	0.12	0.118

Table A-11 Distress Data – Alligator Cracking

Section	Survey Date	Rehab Date	Low Severity Cracking (ft^2)	Medium Severity Cracking (ft^2)	High Severity Cracking (ft^2)	Total Sum Cracking (ft^2)
014127	**04/03/89**		**2723**	**1290**	**0**	4013
	03/30/93		0	0	0	0
	06/02/94		0	0	0	0
	12/09/95	04/03/89	0	0	0	0
	12/04/97		0	0	0	0
	11/16/99		0	0	0	0
014129	09/19/91		91	0	0	91
	03/31/93		313	0	0	313
	03/22/94	06/01/89	53	87	70	210
	01/09/96		58	39	244	341
	09/04/97		241	0	2301	2542
124135	**03/12/93**		**0**	**0**	**0**	**0**
	03/10/94		0	0	0	0
	01/17/96	05/01/94	0	0	0	0
	04/16/97		0	0	0	0
	07/27/99		0	0	0	0
	02/08/00		40	0	0	40
316700	08/16/91		0	0	0	0
	04/15/93		0	0	0	0
	04/08/96	10/22/88	0	0	0	0
	10/27/99		0	0	0	0
	11/04/99		0	0	0	0
371802	**04/02/96**		**2608**	**206**	**0**	**2814**
	12/11/96		505	0	0	505
	10/10/97	05/01/96	31	0	0	31
	02/02/00		792	105	0	898
481093	**08/05/88**		**0**	**0**	**0**	**0**
	03/26/91		0	0	0	0
	02/18/93		0	0	0	0
	04/01/93		388	0	0	388
	02/21/95	09/15/88	17	0	0	17
	03/23/95		389	0	0	389
	07/03/97		639	0	0	639
	05/10/99		815	0	1076	1891
481113	**06/03/92**		**71**	**0**	**0**	**71**
	08/11/93		435	0	0	435
	03/01/95		0	0	0	0
	07/19/95		0	0	0	0
	07/14/97	08/02/92	0	0	0	0
	05/26/99		0	0	0	0
	11/05/99		0	0	0	0
481116	06/25/91		0	896	0	896
531005	**06/08/89**		**84**	**0**	**0**	**84**
	06/28/93		0	0	0	0
	08/29/94		13	0	0	13
	05/17/95	07/01/89	0	0	0	0
	07/08/97		1	0	0	1
	10/08/98		65	0	0	65
836450	**06/27/89**		**0**	**0**	**0**	**0**
	06/09/93		0	0	0	0
	06/11/93		0	0	0	0
	06/09/95	09/13/89	0	0	0	0
	08/12/98		152	0	0	152
836451	**06/27/89**		**0**	**0**	**0**	**0**
	06/09/93		0	0	0	0
	06/11/93		0	0	0	0
	06/09/95	09/13/89	0	0	0	0
	08/12/98		606	184	93	883
906410	**07/04/89**		**0**	**0**	**0**	**0**
	06/11/93		0	0	0	0
	08/15/94		0	0	0	0
	06/06/95	10/01/89	0	0	0	0
	06/10/99		0	0	0	0

Table A-11 (Cont'd) Distress Data - Alligator Cracking

Section	Survey Date	Rehab Date	Low Severity Cracking (ft^2)	Medium Severity Cracking (ft^2)	High Severity Cracking (ft^2)	Total Sum Cracking (ft^2)
906412	**07/04/89**		**0**	**0**	**0**	**0**
	06/11/93		0	0	0	0
	08/15/94		0	0	0	0
	06/06/95	10/01/89	0	0	0	0
	06/10/99		0	0	0	0
040502	**11/29/89**		**385**	**0**	**0**	**385**
	09/22/91		0	0	0	0
	01/29/93		3	0	0	3
	10/19/94		4	0	0	4
	03/22/95	05/08/90	88	0	0	88
	09/17/96		156	0	0	156
	12/10/98		460	1838	0	2298
	10/06/99		1260	0	0	1260
	12/13/99		296	1770	1216	3282
	10/17/00		362	1891	1187	3440
	01/15/01		0	0	0	0
040503	09/22/91		0	0	0	0
	01/29/93		0	0	0	0
	10/18/94		0	0	0	0
	03/22/95	05/03/90	8	0	0	8
	09/11/96		0	0	0	0
	11/12/97		0	0	0	0
	12/09/98		4	0	0	4
	10/06/99		0	0	0	0
	12/13/99		0	0	0	0
	10/16/00		0	0	0	0
	01/15/01		0	0	0	0
040504	**11/29/89**		**338**	**0**	**0**	**338**
	01/15/91		0	0	0	0
	09/22/91		0	0	0	0
	01/29/93		0	0	0	0
	10/18/94		0	0	0	0
	03/22/95	05/24/90	18	0	0	18
	09/11/96		0	0	0	0
	11/12/97		0	0	0	0
	12/09/98		0	0	0	0
	10/06/99		0	0	0	0
	12/13/99		0	0	0	0
	10/16/00		0	0	0	0
040505	**11/29/89**		**606**	**0**	**0**	**606**
	09/22/91		0	0	0	0
	01/29/93		0	0	0	0
	10/20/94		41	142	0	183
	03/22/95		0	0	0	0
	09/12/96		630	48	0	678
	11/13/97	05/24/90	248	348	0	595
	12/10/98		60	483	34	578
	10/06/99		582	0	0	582
	12/14/99		0	325	1531	1856
	10/18/00		0	403	1310	1713
	01/15/01		0	0	0	0
040506	**11/29/89**		**1743**	**0**	**0**	**1743**
	09/22/91		0	0	0	0
	01/29/93		0	0	0	0
	10/20/94		0	0	0	0
	01/16/96		0	0	0	0
	09/12/96		0	0	0	0
	11/13/97	05/24/90	0	0	0	0
	12/10/98		2	0	0	2
	10/06/99		0	0	0	0
	12/14/99		0	0	0	0
	10/17/00		0	0	0	0
	01/15/01		0	0	0	0

Table A-11 (Cont'd) Distress Data - Alligator Cracking

Section	Survey Date	Rehab Date	Low Severity Cracking (ft^2)	Medium Severity Cracking (ft^2)	High Severity Cracking (ft^2)	Total Sum Cracking (ft^2)
040507	11/29/89		1830	0	0	1830
	01/15/91		0	0	0	0
	09/22/91		0	0	0	0
	01/29/93		0	0	0	0
	10/18/94		0	0	0	0
	03/22/95		0	0	0	0
	09/11/96	05/24/90	0	0	0	0
	11/12/97		0	0	0	0
	12/09/98		0	0	0	0
	10/06/99		0	0	0	0
	12/13/99		0	0	0	0
	10/16/00		0	0	0	0
040508	11/29/1989		934	0	0	934
	01/15/91		0	0	0	0
	09/22/91		0	0	0	0
	01/29/93		0	0	0	0
	10/19/94		0	0	0	0
	03/22/95		0	0	0	0
	09/12/96	05/08/90	0	0	0	0
	11/12/97		0	0	0	0
	12/09/98		0	0	0	0
	10/06/99		0	0	0	0
	12/13/99		0	0	0	0
	10/17/00		0	0	0	0
040509	11/29/1989		240	0	0	240
	01/15/91		0	0	0	0
	09/22/91		0	0	0	0
	01/29/93		0	0	0	0
	10/19/94		0	0	0	0
	03/22/95		0	0	0	0
	09/12/96	05/08/90	0	0	0	0
	11/12/97		0	0	0	0
	12/09/98		0	0	0	0
	10/06/99		0	0	0	0
	12/13/99		0	0	0	0
	10/17/00		0	0	0	0
270502	05/29/90		0	0	0	0
	11/09/90		0	0	0	0
	06/18/91		0	0	0	0
	06/17/92		0	0	0	0
	06/03/93		0	0	0	0
	09/29/93	09/15/90	0	0	0	0
	11/09/94		0	0	0	0
	06/13/95		0	0	0	0
	08/24/95		0	0	0	0
	06/07/99		0	0	0	0
	08/18/99		0	0	0	0
	07/25/00		0	0	0	0
270503	05/29/90		0	0	0	0
	11/09/90		0	0	0	0
	06/18/91		0	0	0	0
	06/17/92		0	0	0	0
	06/03/93	09/15/90	0	0	0	0
	09/29/93		0	0	0	0
	11/09/94		0	0	0	0
	06/13/95		0	0	0	0
	06/07/99		0	0	0	0
	07/25/00		0	0	0	0

Table A-11 (Cont'd) Distress Data - Alligator Cracking

Section	Survey Date	Rehab Date	Low Severity Cracking (ft^2)	Medium Severity Cracking (ft^2)	High Severity Cracking (ft^2)	Total Sum Cracking (ft^2)
270504	05/29/90		0	0	0	0
	11/06/90		0	0	0	0
	06/18/91		0	0	0	0
	06/17/92		0	0	0	0
	06/03/93		0	0	0	0
	09/28/93		0	0	0	0
	06/17/94	09/15/90	0	0	0	0
	06/13/95		0	0	0	0
	08/23/95		0	0	0	0
	10/23/97		0	0	0	0
	06/03/99		0	0	0	0
	08/18/99		0	0	0	0
	07/24/00		0	0	0	0
270505	11/06/90		0	0	0	0
	06/18/91		0	0	0	0
	06/17/92		0	0	0	0
	06/03/93		0	0	0	0
	09/29/93		0	0	0	0
	06/17/94	09/15/90	0	0	0	0
	06/13/95		0	0	0	0
	08/23/95		0	0	0	0
	06/03/99		0	0	0	0
	08/18/99		0	0	0	0
	07/24/00		0	0	0	0
270506	05/29/90		0	0	0	0
	11/06/90		0	0	0	0
	06/18/91		0	0	0	0
	06/17/92		0	0	0	0
	06/03/93		0	0	0	0
	09/29/93		0	0	0	0
	06/17/94	09/15/90	0	0	0	0
	06/13/95		0	0	0	0
	08/23/95		0	0	0	0
	10/23/97		0	0	0	0
	06/03/99		0	0	0	0
	08/18/99		0	0	0	0
	07/24/00		0	0	0	0
270507	05/29/90		0	0	0	0
	11/05/90		0	0	0	0
	06/18/91		0	0	0	0
	06/16/92		0	0	0	0
	06/03/93		0	0	0	0
	09/28/93		0	0	0	0
	06/16/94	09/15/90	0	0	0	0
	06/13/95		0	0	0	0
	08/23/95		0	0	0	0
	10/23/97		0	0	0	0
	06/03/99		0	0	0	0
	08/18/99		0	0	0	0
	07/24/00		0	0	0	0
270508	05/29/90		0	0	0	0
	11/05/90		0	0	0	0
	11/09/90		0	0	0	0
	06/18/91		0	0	0	0
	06/17/92		0	0	0	0
	06/03/93		0	0	0	0
	09/29/93	09/15/90	0	0	0	0
	06/17/94		0	0	0	0
	06/13/95		0	0	0	0
	08/24/95		0	0	0	0
	06/07/99		0	0	0	0
	08/18/99		0	0	0	0
	07/25/00		0	0	0	0

Table A-11 (Cont'd) Distress Data - Alligator Cracking

Section	Survey Date	Rehab Date	Low Severity Cracking (ft^2)	Medium Severity Cracking (ft^2)	High Severity Cracking (ft^2)	Total Sum Cracking (ft^2)
270509	05/29/90		0	0	0	0
	11/06/90		0	0	0	0
	06/18/91		0	0	0	0
	06/17/92		0	0	0	0
	06/03/93		0	0	0	0
	09/29/93		0	0	0	0
	06/17/94	09/15/90	0	1	0	1
	06/13/95		0	0	0	0
	08/23/95		0	0	0	0
	06/07/99		0	0	0	0
	08/18/99		0	0	0	0
	07/24/00		0	0	0	0
300502	05/16/91		0	1085	0	1085
	08/18/93		443	37	0	480
	06/08/96	09/12/91	132	0	0	132
	05/22/98		1790	1014	151	2955
	06/09/99		982	1674	320	2975
	08/25/99		640	0	0	640
	07/25/00		254	0	3015	3269
300503	05/17/91		191	1327	475	1992
	08/18/93		0	0	0	0
	06/08/96		170	11	0	181
	08/01/96		420	1522	0	1942
	05/20/98	09/12/91	1446	406	0	1851
	06/07/99		1230	1235	406	2871
	08/25/99		0	0	0	0
	07/24/00		1087	1443	461	2991
300504	05/17/91		332	1861	0	2193
	08/18/93		0	0	0	0
	06/08/96		0	0	0	0
	08/01/96	09/11/91	0	0	0	0
	05/20/98		0	0	0	0
	06/07/99		0	0	0	0
	08/25/99		0	0	0	0
	07/21/00		0	0	0	0
300505	05/16/91		0	483	0	483
	08/18/93		0	0	0	0
	06/08/96		0	0	0	0
	07/31/96	09/11/91	0	0	0	0
	05/19/98		108	0	0	108
	06/04/99		16	0	0	16
	08/25/99		0	0	0	0
	07/20/00		0	0	0	0
300506	05/16/91		0	1163	0	1163
	08/18/93		0	0	0	0
	06/08/96		40	0	0	40
	07/31/96	09/11/91	0	0	0	0
	05/20/98		0	0	0	0
	06/07/99		8	0	0	8
	08/25/99		0	0	0	0
	07/20/00		6	0	0	6
300507	05/17/91		90	1574	0	1664
	08/18/93		0	0	0	0
	06/08/96		0	0	0	0
	07/31/96	09/11/91	0	0	0	0
	05/20/98		0	0	0	0
	06/07/99		0	0	0	0
	08/25/99		0	0	0	0
	07/21/00		0	0	0	0

Table A-11 (Cont'd) Distress Data - Alligator Cracking

Section	Survey Date	Rehab Date	Low Severity Cracking (ft^2)	Medium Severity Cracking (ft^2)	High Severity Cracking (ft^2)	Total Sum Cracking (ft^2)
300508	07/17/91		64	1132	0	1196
	08/18/93		0	0	0	0
	06/08/96		68	0	0	68
	08/01/96	09/12/91	892	0	0	892
	05/21/98		722	913	0	1635
	06/09/99		722	913	0	1635
	08/25/99		0	0	0	0
	07/24/00		1369	1356	11	2736
300509	05/16/91		0	1368	104	1473
	08/18/93		758	440	0	1198
	06/08/96		316	0	0	316
	08/01/96	09/12/91	0	0	0	0
	05/22/98		0	6243	0	6243
	06/09/99		0	3778	0	3778
	08/25/99		1644	0	0	1644
	07/24/00		0	3281	0	3281
307066	05/16/91		0	229	0	229
	08/18/93		0	0	0	0
	06/08/96		0	0	0	0
	07/31/96	09/13/91	0	0	0	0
	05/19/98		0	0	0	0
	06/04/99		0	0	0	0
	08/25/99		0	0	0	0
	07/20/00		0	0	0	0
340502	04/02/92		4809	100	0	4909
	04/06/92		89	15	0	104
	02/24/93		0	0	0	0
	11/04/95		0	0	0	0
	10/09/96	08/19/92	0	0	0	0
	10/28/98		52	24	0	75
	06/22/99		0	0	0	0
	11/09/99		95	24	0	118
	10/19/00		141	112	0	253
340503	04/06/92		110	58	32	200
	02/24/93		0	0	0	0
	11/04/95		0	0	0	0
	11/09/95	08/13/92	0	0	0	0
	08/27/96		0	0	0	0
	10/27/98		11	0	0	11
	06/22/99		0	0	0	0
	10/19/99		0	0	0	0
	10/17/00		0	0	0	0
340504	04/02/92		306	0	0	306
	04/06/92		22	0	0	22
	02/24/93		0	0	0	0
	11/04/95		0	0	0	0
	10/09/96	08/21/92	0	0	0	0
	10/29/98		0	0	0	0
	06/22/99		0	0	0	0
	11/10/99		0	0	0	0
	10/19/00		265	0	0	265
340505	04/02/92		626	79	0	705
	02/24/93		0	0	0	0
	11/04/95		0	0	0	0
	10/09/96	08/21/92	0	0	0	0
	10/29/98		1	16	0	17
	06/22/99		0	0	0	0
	11/10/99		0	29	0	29
	10/23/00		221	0	41	262

Table A-11 (Cont'd) Distress Data - Alligator Cracking

Section	Survey Date	Rehab Date	Low Severity Cracking (ft^2)	Medium Severity Cracking (ft^2)	High Severity Cracking (ft^2)	Total Sum Cracking (ft^2)
340506	**04/06/92**		**167**	**175**	**0**	**342**
	02/24/93		0	0	0	0
	11/04/95		0	0	0	0
	08/28/96	08/20/92	0	0	0	0
	10/28/98		0	0	0	0
	06/22/99		0	0	0	0
	11/08/99		0	0	0	0
	10/18/00		17	0	0	17
340507	**04/06/92**		**418**	**269**	**26**	**713**
	02/24/93		0	0	0	0
	11/04/95		0	0	0	0
	11/09/95		0	0	0	0
	08/27/96	08/13/92	0	0	0	0
	10/27/98		0	0	0	0
	06/22/99		0	0	0	0
	10/19/99		0	0	0	0
	10/17/00		0	0	0	0
340508	**04/06/92**		**227**	**22**	**0**	**249**
	02/24/93		0	0	0	0
	11/04/95		0	0	0	0
	11/09/95		0	0	0	0
	08/28/96	08/13/92	0	0	0	0
	10/27/98		0	0	0	0
	06/22/99		0	0	0	0
	11/08/99		0	0	0	0
	10/17/00		0	0	0	0
340509	**04/06/92**		**104**	**12**	**0**	**116**
	02/24/93		0	0	0	0
	11/04/95		0	0	0	0
	08/28/96	08/20/92	0	0	0	0
	10/27/98		51	0	0	51
	06/22/99		0	0	0	0
	11/08/99		67	0	0	67
	10/18/00		279	52	0	330

Table A-12 Distress Data - Longitudinal Cracking

Section	Survey Date	Rehab. Date	Low Severity (ft)	Medium Severity (ft)	High Severity (ft)	Total Sum Cracking (ft)
014127	**04/03/89**		**44.0**	**0.0**	**0.0**	**43.95**
	03/30/93		0.0	0.0	0.0	0.00
	06/02/94		0.0	0.0	0.0	0.00
	12/09/95	04/03/89	3.9	0.0	0.0	3.94
	12/04/97		0.0	0.0	0.0	0.00
	11/16/99		13.1	0.0	0.0	13.12
014129						0.00
	09/19/91		0.0	0.0	0.0	0.00
	03/31/93		6.6	0.0	0.0	6.56
	03/22/94	06/01/89	9.2	0.0	0.0	9.19
	01/09/96		13.5	0.0	0.0	13.45
	09/04/97		37.7	0.0	0.0	37.73
124135	**03/10/94**		**0.0**	**0.0**	**0.0**	**0.00**
	01/17/96		0.0	0.0	0.0	0.00
	04/16/97	05/01/94	0.0	0.0	0.0	0.00
	07/27/99		0.0	0.0	0.0	0.00
	02/08/00		0.0	0.0	0.0	0.00
316700	08/16/91		0.0	0.0	0.0	0.00
	04/15/93		9.2	0.0	0.0	9.19
	04/08/96	10/22/88	5.6	0.0	0.0	5.58
	10/27/99		1.0	0.0	0.0	0.98
	11/04/99		14.8	0.0	0.0	14.76
371802	**07/18/95**		**41.0**	**0.0**	**0.0**	**41.00**
	12/11/96		0.0	0.0	0.0	0.00
	10/10/97	05/01/96	25.9	0.0	0.0	25.92
	02/02/00		89.9	0.0	0.0	89.90
481093	**08/05/88**		**0.0**	**0.0**	**0.0**	**0.00**
	03/26/91		0.0	0.0	0.0	0.00
	02/18/93		38.7	0.0	0.0	38.72
	04/01/93	09/15/88	31.8	0.0	0.0	31.83
	02/21/95		86.3	0.0	0.0	86.29
	03/23/95		50.5	0.0	0.0	50.53
	07/03/97		94.8	0.0	0.0	94.82
	05/10/99		0.0	0.0	0.0	0.00
481113	06/03/92		**0.0**	**0.0**	**0.0**	**0.00**
	08/11/93		0.0	0.0	0.0	0.00
	03/01/95		0.0	0.0	0.0	0.00
	07/19/95	08/02/92	0.0	0.0	0.0	0.00
	07/14/97		0.0	0.0	0.0	0.00
	05/26/99		0.0	0.0	0.0	0.00
	11/05/99		0.0	0.0	0.0	0.00
481116	06/25/91	10/18/90	0.0	0.0	0.0	0.00
531005	**06/08/89**		**0.0**	**21.0**	**0.0**	**20.99**
	06/28/93		0.0	0.0	0.0	0.00
	08/29/94		0.0	0.0	0.0	0.00
	05/17/95	07/01/89	24.3	0.0	0.0	24.28
	07/08/97		0.0	0.0	0.0	0.00
	10/08/98		0.0	0.0	0.0	0.00
836450	**06/27/89**		**0**	**0**	**0**	**0.00**
	06/09/93		0.0	0.0	0.0	0.00
	06/11/93	09/13/89	0.0	0.0	0.0	0.00
	06/09/95		0.0	0.0	0.0	0.00
	08/12/98		0.0	0.0	0.0	0.00
836451	**06/27/89**		**0**	**0**	**0**	**0.00**
	06/09/93		0.0	0.0	0.0	0.00
	06/11/93		0.0	0.0	0.0	0.00
	06/09/95	09/13/89	4.6	0.0	0.0	4.59
	08/12/98		16.1	0.0	0.0	16.08
906410	06/11/93		11.5	0.0	0.0	11.48
	08/15/94		0.0	0.0	0.0	0.00
	06/06/95	10/01/89	13.1	0.0	0.0	13.12
	06/10/99		0.0	0.0	0.0	0.00

Table A-12 (Cont'd) Distress Data - Longitudinal Cracking

Section	Survey Date	Rehab. Date	Low Severity (ft)	Medium Severity (ft)	High Severity (ft)	Total Sum Cracking (ft)
906412	06/11/93		0.0	0.0	0.0	0.00
	08/15/94	10/01/89	0.0	0.0	0.0	0.00
	06/06/95		0.0	0.0	0.0	0.00
	06/10/99		0.0	0.0	0.0	0.00
040502	09/22/91		0.0	0.0	0.0	0.00
	01/29/93		67.9	0.0	0.0	67.91
	10/19/94		136.2	0.0	0.0	136.15
	03/22/95		434.7	0.0	0.0	434.71
	09/17/96	05/08/90	124.7	0.0	0.0	124.67
	12/10/98		0.0	0.0	0.0	0.00
	10/06/99		70.2	0.0	0.0	70.21
	12/13/99		0.0	0.0	0.0	0.00
	10/17/00		0.0	0.0	0.0	0.00
	01/15/01		0.0	0.0	0.0	0.00
040503	09/22/91		0.0	0.0	0.0	0.00
	01/29/93		0.0	0.0	0.0	0.00
	10/18/94		0.0	0.0	0.0	0.00
	03/22/95		61.4	0.0	0.0	61.35
	09/11/96	05/03/90	11.5	0.0	0.0	11.48
	11/12/97		15.7	16.4	0.0	32.15
	12/09/98		107.9	0.0	0.0	107.94
	10/06/99		42.0	0.0	0.0	41.99
	12/13/99		140.1	46.9	0.0	187.01
	10/16/00		163.4	41.0	0.0	204.39
	01/15/01		0.0	0.0	0.0	0.00
040504	01/15/91		0.0	0.0	0.0	0.00
	09/22/91		0.0	0.0	0.0	0.00
	01/29/93		19.7	0.0	0.0	19.68
	10/18/94	05/24/90	0.0	0.0	0.0	0.00
	03/22/95		16.1	0.0	0.0	16.08
	09/11/96		0.0	0.0	0.0	0.00
	11/12/97		0.0	0.0	0.0	0.00
	12/09/98		0.0	0.0	0.0	0.00
	10/06/99		0.0	0.0	0.0	0.00
	12/13/99		0.0	0.0	0.0	0.00
	10/16/00		0.0	0.0	0.0	0.00
040505	09/22/91		0.0	0.0	0.0	0.00
	01/29/93		2.6	0.0	0.0	2.62
	10/20/94		0.0	0.0	0.0	0.00
	03/22/95		56.4	0.0	0.0	56.43
	09/12/96	05/24/90	28.9	0.0	0.0	28.87
	11/13/97		9.8	0.0	0.0	9.84
	12/10/98		12.1	0.0	0.0	12.14
	10/06/99		28.9	2.3	0.0	31.17
	12/14/99		0.0	16.4	0.0	16.40
	10/18/00		0.0	17.7	0.0	17.72
	01/15/01		0.0	0.0	0.0	0.00
040506	09/22/91		8.9	0.0	0.0	8.86
	01/29/93		0.0	0.0	0.0	0.00
	10/20/94		0.0	0.0	0.0	0.00
	01/16/96		8.9	0.0	0.0	8.86
	09/12/96	05/24/90	0.0	0.0	0.0	0.00
	11/13/97		0.0	0.0	0.0	0.00
	12/10/98		14.4	0.0	0.0	14.44
	10/06/99		0.0	0.0	0.0	0.00
	12/14/99		0.0	0.0	0.0	0.00
	10/17/00		31.2	20.7	0.0	51.84
	01/15/01		0.0	0.0	0.0	0.00

Table A-12 (Cont'd) Distress Data - Longitudinal Cracking

Section	Survey Date	Rehab. Date	Low Severity (ft)	Medium Severity (ft)	High Severity (ft)	Total Sum Cracking (ft)
040507	01/15/91		0.0	0.0	0.0	0.00
	09/22/91		49.5	0.0	0.0	49.54
	01/29/93		0.0	0.0	0.0	0.00
	10/18/94		0.0	0.0	0.0	0.00
	03/22/95	05/24/90	29.9	0.0	0.0	29.86
	09/11/96		0.0	0.0	0.0	0.00
	11/12/97		0.0	0.0	0.0	0.00
	12/09/98		0.0	0.0	0.0	0.00
	10/06/99		0.0	0.0	0.0	0.00
	12/13/99		0.0	0.0	0.0	0.00
	10/16/00		0.0	0.0	0.0	0.00
040508	01/15/91		13.1	19.0	0.0	32.15
	09/22/91		0.0	0.0	0.0	0.00
	01/29/93		0.0	0.0	0.0	0.00
	10/19/94		0.0	0.0	0.0	0.00
	03/22/95		22.6	0.0	0.0	22.64
	09/12/96	05/08/90	0.0	0.0	0.0	0.00
	11/12/97		0.0	0.0	0.0	0.00
	12/09/98		0.0	0.0	0.0	0.00
	10/06/99		0.0	0.0	0.0	0.00
	12/13/99		0.0	6.2	0.0	6.23
	10/17/00		0.0	0.0	0.0	0.00
040509	01/15/91		0.0	0.0	0.0	0.00
	09/22/91		3.9	0.0	0.0	3.94
	01/29/93		0.0	0.0	0.0	0.00
	10/19/94		0.0	0.0	0.0	0.00
	03/22/95		28.5	0.0	0.0	28.54
	09/12/96	05/08/90	5.9	0.0	0.0	5.91
	11/12/97		50.5	0.0	0.0	50.52
	12/09/98		253.9	0.0	0.0	253.93
	10/06/99		91.2	0.0	0.0	91.21
	12/13/99		24.6	166.3	0.0	190.94
	10/17/00		61.4	155.8	0.0	217.19
270502	11/09/90		0.0	0.0	0.0	0.00
	06/18/91		0.0	0.0	0.0	0.00
	06/17/92		0.0	0.0	0.0	0.00
	06/03/93	09/15/90	0.0	0.0	0.0	0.00
	09/29/93		0.0	0.0	0.0	0.00
	11/09/94		0.0	0.0	0.0	0.00
	06/13/95		0.0	0.0	0.0	0.00
	08/24/95		0.0	0.0	0.0	0.00
	06/07/99		0.0	0.0	0.0	0.00
	08/18/99		0.0	0.0	0.0	0.00
	07/25/00		0.0	0.0	0.0	0.00
270503	11/09/90		0.0	0.0	0.0	0.00
	06/18/91		0.0	0.0	0.0	0.00
	06/17/92		0.0	0.0	0.0	0.00
	06/03/93	09/15/90	0.0	0.0	0.0	0.00
	09/29/93		0.0	0.0	0.0	0.00
	11/09/94		0.0	0.0	0.0	0.00
	06/13/95		0.0	0.0	0.0	0.00
	06/07/99		0.0	500.3	0.0	500.32
	07/25/00		0.0	0.0	0.0	0.00
270504	11/06/90		0.0	0.0	0.0	0.00
	06/18/91		0.0	0.0	0.0	0.00
	06/17/92		0.0	0.0	0.0	0.00
	06/03/93		0.0	0.0	0.0	0.00
	09/28/93	09/15/90	0.0	0.0	0.0	0.00
	06/17/94		0.0	0.0	0.0	0.00
	06/13/95		0.0	0.0	0.0	0.00
	08/23/95		0.0	0.0	0.0	0.00
	10/23/97		0.0	0.0	0.0	0.00
	06/03/99		0.0	0.0	0.0	0.00
	08/18/99		0.0	0.0	0.0	0.00
	07/24/00		0.0	0.0	0.0	0.00

Table A-12 (Cont'd) Distress Data - Longitudinal Cracking

Section	Survey Date	Rehab. Date	Low Severity (ft)	Medium Severity (ft)	High Severity (ft)	Total Sum Cracking (ft)
270505	11/06/90		0.0	0.0	0.0	0.00
	06/18/91		0.0	0.0	0.0	0.00
	06/17/92		0.0	0.0	0.0	0.00
	06/03/93		0.0	0.0	0.0	0.00
	09/29/93	09/15/90	0.0	0.0	0.0	0.00
	06/17/94		0.0	0.0	0.0	0.00
	06/13/95		0.0	0.0	0.0	0.00
	08/23/95		0.0	0.0	0.0	0.00
	06/03/99		0.0	0.0	0.0	0.00
	08/18/99		0.0	0.0	0.0	0.00
	07/24/00		0.0	0.0	0.0	0.00
270506	11/06/90		0.0	0.0	0.0	0.00
	06/18/91		0.0	0.0	0.0	0.00
	06/17/92	09/15/90	44.9	0.0	0.0	44.95
	06/03/93		0.0	0.0	0.0	0.00
	09/29/93		0.0	0.0	0.0	0.00
	06/17/94		0.0	0.0	0.0	0.00
	06/13/95		0.0	0.0	0.0	0.00
	08/23/95		0.0	0.0	0.0	0.00
	10/23/97		0.0	0.0	0.0	0.00
	06/03/99		0.0	0.0	0.0	0.00
	08/18/99		23.9	4.9	0.0	28.87
	07/24/00		0.0	0.0	0.0	0.00
270507	11/05/90		0.0	0.0	0.0	0.00
	06/18/91		0.0	0.0	0.0	0.00
	06/16/92		0.0	0.0	0.0	0.00
	06/03/93	09/15/90	0.0	0.0	0.0	0.00
	09/28/93		0.0	0.0	0.0	0.00
	06/16/94		0.0	0.0	0.0	0.00
	06/13/95		0.0	0.0	0.0	0.00
	08/23/95		0.0	0.0	0.0	0.00
	10/23/97		0.0	0.0	0.0	0.00
	06/03/99		0.0	0.0	0.0	0.00
	08/18/99		0.0	0.0	0.0	0.00
	07/24/00		0.0	0.0	0.0	0.00
270508	11/05/90		0.0	0.0	0.0	0.00
	11/09/90		0.0	0.0	0.0	0.00
	06/18/91		0.0	0.0	0.0	0.00
	06/17/92		0.0	0.0	0.0	0.00
	06/03/93		0.0	0.0	0.0	0.00
	09/29/93	09/15/90	0.0	0.0	0.0	0.00
	06/17/94		0.0	0.0	0.0	0.00
	06/13/95		0.0	0.0	0.0	0.00
	08/24/95		0.0	0.0	0.0	0.00
	06/07/99		0.0	0.0	0.0	0.00
	08/18/99		10.2	0.0	0.0	10.17
	07/25/00		0.0	0.0	0.0	0.00
270509	11/06/90		0.0	0.0	0.0	0.00
	06/18/91		0.0	0.0	0.0	0.00
	06/17/92		56.1	0.0	0.0	56.10
	06/03/93		11.5	0.0	0.0	11.48
	09/29/93		0.0	0.0	0.0	0.00
	06/17/94	09/15/90	0.0	0.0	0.0	0.00
	06/13/95		0.0	0.0	0.0	0.00
	08/23/95		0.0	0.0	0.0	0.00
	06/07/99		14.8	0.0	0.0	14.76
	08/18/99		5.2	0.0	0.0	5.25
	07/24/00		0.0	0.0	0.0	0.00
300502	**07/29/90**		**5.6**	**0.0**	**0.0**	**5.58**
	08/18/93		30.2	0.0	0.0	30.18
	06/08/96	09/12/91	15.7	0.0	0.0	15.75
	05/22/98		0.0	0.0	0.0	0.00
	06/09/99		0.0	0.0	0.0	0.00
	08/25/99		0.0	1.0	0.0	0.98
	07/25/00		0.0	0.0	0.0	0.00

Table A-12 (Cont'd) Distress Data - Longitudinal Cracking

Section	Survey Date	Rehab. Date	Low Severity (ft)	Medium Severity (ft)	High Severity (ft)	Total Sum Cracking (ft)
300503	05/17/91		0.0	62.0	16.7	78.74
	08/18/93		0.0	0.0	0.0	0.00
	06/08/96		45.9	0.0	0.0	45.93
	08/01/96	09/12/91	0.0	0.0	0.0	0.00
	05/20/98		0.0	0.0	0.0	0.00
	06/07/99		0.0	0.0	0.0	0.00
	08/25/99		0.0	18.4	0.0	18.37
	07/24/00		0.0	0.0	0.0	0.00
300504	05/17/91		0.0	35.1	4.9	40.03
	08/18/93		0.0	0.0	0.0	0.00
	06/08/96		36.4	0.0	0.0	36.42
	08/01/96	09/11/91	0.0	0.0	0.0	0.00
	05/20/98		0.0	0.0	0.0	0.00
	06/07/99		0.0	0.0	0.0	0.00
	08/25/99		0.0	0.0	0.0	0.00
	07/21/00		0.0	0.0	0.0	0.00
300505	07/29/90		148.9	0.0	0.0	148.95
	08/18/93		0.0	0.0	0.0	0.00
	06/08/96		0.0	0.0	0.0	0.00
	07/31/96	09/11/91	6.9	0.0	0.0	6.89
	05/19/98		3.6	1.6	0.0	5.25
	06/04/99		4.9	2.6	0.0	7.55
	08/25/99		0.0	3.3	0.0	3.28
	07/20/00		3.9	0.0	0.0	3.94
300506	07/29/90		50.2	0.7	0.0	50.85
	08/18/93		0.0	0.0	0.0	0.00
	06/08/96		30.2	0.0	0.0	30.18
	07/31/96	09/11/91	0.0	0.0	0.0	0.00
	05/20/98		0.0	0.0	0.0	0.00
	06/07/99		0.0	0.0	0.0	0.00
	08/25/99		4.3	0.0	0.0	4.27
	07/20/00		0.0	0.0	0.0	0.00
300507	05/17/91		0.0	138.1	0.0	138.12
	08/18/93		0.0	0.0	0.0	0.00
	06/08/96		0.0	0.0	0.0	0.00
	07/31/96	09/11/91	0.0	0.0	0.0	0.00
	05/20/98		0.0	0.0	0.0	0.00
	06/07/99		0.0	0.0	0.0	0.00
	08/25/99		0.0	0.0	0.0	0.00
	07/21/00		0.0	0.0	0.0	0.00
300508	07/29/90		18.0	0.0	0.0	18.04
	08/18/93		0.0	0.0	0.0	0.00
	06/08/96	09/12/91	237.9	0.0	0.0	237.86
	08/01/96		0.0	0.0	0.0	0.00
	05/21/98		0.0	0.0	0.0	0.00
	06/09/99		0.0	0.0	0.0	0.00
	08/25/99		48.2	45.9	0.0	94.16
	07/24/00		0.0	0.0	0.0	0.00
300509	05/16/91		0.0	33.1	0.0	33.14
	08/18/93		0.0	0.0	0.0	0.00
	06/08/96	09/12/91	3.0	0.0	0.0	2.95
	08/01/96		0.0	0.0	0.0	0.00
	05/22/98		0.0	0.0	0.0	0.00
	06/09/99		0.0	0.0	0.0	0.00
	08/25/99		0.0	0.0	0.0	0.00
	07/24/00		0.0	0.0	0.0	0.00
307066	07/29/91		5.6	0.0	0.0	5.58
	08/18/93		0.0	0.0	0.0	0.00
	06/08/96		0.0	0.0	0.0	0.00
	07/31/96	09/13/91	0.0	0.0	0.0	0.00
	05/19/98		0.0	0.0	0.0	0.00
	06/04/99		0.0	0.0	0.0	0.00
	08/25/99		0.0	0.0	0.0	0.00
	07/20/00		0.0	0.0	0.0	0.00

Table A-12 (Cont'd) Distress Data - Longitudinal Cracking

Section	Survey Date	Rehab. Date	Low Severity (ft)	Medium Severity (ft)	High Severity (ft)	Total Sum Cracking (ft)
340502	04/06/92		90.2	10.5	0.0	100.72
	02/24/93		0.0	0.0	0.0	0.00
	11/04/95	08/13/92	0.0	0.0	0.0	0.00
	10/09/96		0.0	0.0	0.0	0.00
	10/28/98		0.0	0.0	0.0	0.00
	06/22/99		2.6	1.3	0.0	3.94
	11/09/99		37.7	0.0	0.0	37.73
	10/19/00		12.8	0.0	0.0	12.80
340503	04/06/92		55.4	6.9	0.0	62.34
	02/24/93		0.0	0.0	0.0	0.00
	11/04/95		0.0	0.0	0.0	0.00
	11/09/95	08/13/92	0.0	0.0	0.0	0.00
	08/27/96		2.6	0.0	0.0	2.62
	10/27/98		0.0	0.0	0.0	0.00
	06/22/99		9.8	1.6	0.0	11.48
	10/19/99		44.9	0.0	0.0	44.95
	10/17/00		19.7	9.5	0.0	29.20
340504	04/06/92		72.2	0.0	0.0	72.18
	02/24/93		0.0	0.0	0.0	0.00
	11/04/95	08/21/92	0.0	0.0	0.0	0.00
	10/09/96		0.0	0.0	0.0	0.00
	10/29/98		0.0	0.0	0.0	0.00
	06/22/99		0.0	0.0	0.0	0.00
	11/10/99		0.0	0.0	0.0	0.00
	10/19/00		0.0	0.0	0.0	0.00
340505	04/02/92		33.1	0.0	0.0	33.14
	02/24/93		0.0	0.0	0.0	0.00
	11/04/95		0.0	0.0	0.0	0.00
	10/09/96	08/21/92	4.9	0.0	0.0	4.92
	10/29/98		0.0	0.0	0.0	0.00
	06/22/99		0.0	0.0	0.0	0.00
	11/10/99		0.0	0.0	0.0	0.00
	10/23/00		4.9	0.0	0.0	4.92
340506	04/06/92		48.9	0.0	0.0	48.88
	02/24/93		0.0	0.0	0.0	0.00
	11/04/95		0.0	0.0	0.0	0.00
	08/28/96	08/20/92	0.0	0.0	0.0	0.00
	10/28/98		0.0	0.0	0.0	0.00
	06/22/99		0.3	0.0	0.0	0.33
	11/08/99		0.0	0.0	0.0	0.00
	10/18/00		0.0	0.0	0.0	0.00
340507	04/06/92		115.5	2.3	0.0	117.78
	02/24/93		0.0	0.0	0.0	0.00
	11/04/95		0.0	0.0	0.0	0.00
	11/09/95	08/13/92	0.0	0.0	0.0	0.00
	08/27/96		0.0	0.0	0.0	0.00
	10/27/98		0.0	0.0	0.0	0.00
	06/22/99		0.0	0.0	0.0	0.00
	10/19/99		0.0	0.0	0.0	0.00
	10/17/00		0.0	0.0	0.0	0.00
340508	04/06/92		51.2	2.6	0.0	53.81
	02/24/93		0.0	0.0	0.0	0.00
	11/04/95		0.0	0.0	0.0	0.00
	11/09/95	08/13/92	0.0	0.0	0.0	0.00
	08/28/96		0.0	0.0	0.0	0.00
	10/27/98		0.0	0.0	0.0	0.00
	06/22/99		0.0	0.0	0.0	0.00
	11/08/99		16.4	0.0	0.0	16.40
	10/17/00		0.0	7.9	0.0	7.87
340509	04/06/92		47.9	0.0	0.0	47.90
	02/24/93		0.0	0.0	0.0	0.00
	11/04/95		0.0	0.0	0.0	0.00
	08/28/96	08/20/92	2.3	0.0	0.0	2.30
	10/27/98		0.0	0.0	0.0	0.00
	06/22/99		9.5	2.6	0.0	12.14
	11/08/99		36.4	18.0	0.0	54.46
	10/18/00		9.2	0.0	0.0	9.19

Table A-13 Distress Data - Transverse Cracking

Section	Survey Date	Rehab. Date	Low Severity (ft)	Medium Severity (ft)	High Severity (ft)	Weighted Average Cracking (ft)
014127	**4/3/1989**		**318.816**	**0**	**0**	**35.424**
	03/30/93		7.55	0.00	0.00	0.84
	06/02/94		12.14	0.00	0.00	1.35
	12/09/95	04/03/89	27.89	0.00	0.00	3.10
	12/04/97		12.14	0.00	0.00	1.35
	11/16/99		31.17	9.84	0.00	6.74
014129	09/19/91		2.95	0.00	0.00	0.33
	03/31/93		19.69	0.00	0.00	2.19
	03/22/94	06/01/89	12.80	5.91	0.00	3.39
	01/09/96		98.10	12.80	0.00	15.16
	09/04/97		0.00	0.00	0.00	0.00
124135	03/12/93		0.00	0.00	0.00	0.00
	03/10/94		0.00	0.00	0.00	0.00
	01/17/96	05/01/94	0.00	0.00	0.00	0.00
	04/16/97		0.00	0.00	0.00	0.00
	07/27/99		0.00	0.00	0.00	0.00
	02/08/00		8.20	0.00	0.00	0.91
316700	08/16/91		69.55	108.92	0.00	44.04
	04/15/93		103.67	83.66	0.00	39.41
	04/08/96	10/22/88	143.37	38.71	17.06	38.31
	10/27/99		162.07	12.47	0.00	22.16
	11/04/99		176.18	0.00	0.00	19.58
371802	**04/02/96**		**137.76**	**5.904**	**0**	**17.27466667**
	12/11/96		133.20	0.00	0.00	14.80
	10/10/97	05/01/96	164.04	0.00	0.00	18.23
	02/02/00		271.33	16.40	0.00	35.62
481093	03/26/91		0.00	0.00	0.00	0.00
	02/18/93		0.00	0.00	0.00	0.00
	04/01/93	09/15/88	6.56	0.00	0.00	0.73
	02/21/95		13.12	0.00	0.00	1.46
	03/23/95		9.84	0.00	0.00	1.09
	07/03/97		89.90	0.00	0.00	9.99
	05/10/99		120.08	0.00	0.00	13.34
481113	**06/03/92**		**0**	**0**	**0**	**0**
	08/11/93		0.00	0.00	0.00	0.00
	03/01/95		0.00	0.00	0.00	0.00
	07/19/95		0.00	0.00	0.00	0.00
	07/14/97	08/02/92	0.00	0.00	0.00	0.00
	05/26/99		0.00	0.00	0.00	0.00
	11/05/99		0.00	0.00	0.00	0.00
481116	06/25/91	10/18/90	0.00	0.00	0.00	0.00
531005	**06/08/89**		**68.88**	**8.856**	**43.952**	**35.02311111**
	06/28/93		150.92	0.00	0.00	16.77
	08/29/94		44.62	91.86	0.00	35.58
	05/17/95	07/01/89	135.50	40.68	0.00	28.62
	07/08/97		30.84	52.49	58.73	53.55
	10/08/98		0.00	56.43	86.61	66.93
836450	**06/27/89**		**0**	**0**	**0**	**0**
	06/09/93		1.64	0.00	0.00	0.18
	06/11/93	09/13/89	1.64	0.00	0.00	0.18
	06/09/95		48.88	0.00	0.00	5.43
	08/12/98		203.74	109.25	0.00	59.06
836451	**06/27/89**		**0**	**0**	**0**	**0**
	06/09/93		0.00	12.80	0.00	4.27
	06/11/93	09/13/89	0.00	11.48	0.00	3.83
	06/09/95		28.54	12.80	0.00	7.44
	08/12/98		203.41	95.47	0.00	54.43
906410	**07/04/89**		**43.296**	**64.616**	**26.568**	**41.10933333**
	06/11/93		2.30	136.81	0.00	45.86
	08/15/94		12.14	95.80	0.00	33.28
	06/06/95	10/01/89	0.00	136.15	0.00	45.38
	06/10/99		0.00	12.14	109.25	64.74

Table A-13 (Cont'd) Distress Data - Transverse Cracking

Section	Survey Date	Rehab. Date	Low Severity (ft)	Medium Severity (ft)	High Severity (ft)	Weighted Average Cracking (ft)
906412	07/04/89		34.768	95.448	5.248	38.59466667
	06/11/93		65.29	12.80	0.00	11.52
	08/15/94		36.09	47.90	0.00	19.98
	06/06/95	10/01/89	65.62	26.25	0.00	16.04
	06/10/99		12.14	0.00	72.83	41.81
040502	11/29/89		1561.3	34.1	0.0	184.9
	09/22/91		26.9	0.0	0.0	3.0
	01/29/93		202.8	13.5	0.0	27.0
	10/19/94		233.3	0.0	0.0	25.9
	03/22/95		505.9	93.8	0.0	87.5
	09/17/96	05/08/90	337.6	22.6	0.0	45.1
	12/10/98		0.0	0.0	0.0	0.0
	10/06/99		163.7	12.8	0.0	22.5
	12/13/99		91.9	49.2	3.3	28.4
	10/17/00		153.5	47.6	1.0	33.5
	01/15/01		21.3	0.0	0.0	2.4
040503	09/22/91		45.9	0.0	0.0	5.1
	01/29/93		0.0	0.0	0.0	0.0
	10/18/94		0.0	0.0	0.0	0.0
	03/22/95		225.4	0.0	0.0	25.0
	09/11/96	05/03/90	128.6	0.0	0.0	14.3
	11/12/97		231.0	24.3	0.0	33.8
	12/09/98		234.9	96.1	0.0	58.1
	10/06/99		319.9	13.1	0.0	39.9
	12/13/99		173.2	230.0	0.0	95.9
	10/16/00		202.8	209.0	0.0	92.2
	01/15/01		0.0	0.0	0.0	0.0
040504	11/29/89		479.3	182.7	0.0	114.2
	01/15/91		0.0	0.0	0.0	0.0
	09/22/91		156.2	0.0	0.0	17.4
	01/29/93		0.0	0.0	0.0	0.0
	10/18/94		0.0	0.0	0.0	0.0
	03/22/95	05/24/90	57.1	0.0	0.0	6.3
	09/11/96		0.0	0.0	0.0	0.0
	11/12/97		0.0	0.0	0.0	0.0
	12/09/98		7.2	0.0	0.0	0.8
	10/06/99		0.0	0.0	0.0	0.0
	12/13/99		157.5	0.0	0.0	17.5
	10/16/00		16.4	0.0	0.0	1.8
040505	11/29/89		493.8	43.0	0.0	69.2
	09/22/91		147.6	25.3	0.0	24.8
	01/29/93		4.9	0.0	0.0	0.5
	10/20/94		4.6	0.0	0.0	0.5
	03/22/95		145.3	4.3	0.0	17.6
	09/12/96		31.8	0.0	0.0	3.5
	11/13/97	05/24/90	70.2	28.9	0.0	17.4
	12/10/98		72.2	31.8	27.6	33.9
	10/06/99		180.4	116.1	0.0	58.8
	12/14/99		43.6	97.4	53.1	66.9
	10/18/00		54.1	102.0	43.3	64.1
	01/15/01		3.0	0.0	0.0	0.3
040506	11/29/89		483.9	40.0	0.0	67.1
	09/22/91		105.3	0.0	0.0	11.7
	01/29/93		0.0	0.0	0.0	0.0
	10/20/94		0.0	0.0	0.0	0.0
	01/16/96	05/24/90	81.7	0.0	0.0	9.1
	09/12/96		0.0	0.0	0.0	0.0
	11/13/97		0.0	0.0	0.0	0.0
	12/10/98		0.0	0.0	0.0	0.0
	10/06/99		2.6	0.0	0.0	0.3
	12/14/99		6.9	0.0	0.0	0.8
	10/17/00		16.4	0.0	0.0	1.8
	01/15/01		0.0	0.0	0.0	0.0

Table A-13 (Cont'd) Distress Data - Transverse Cracking

Section	Survey Date	Rehab. Date	Low Severity (ft)	Medium Severity (ft)	High Severity (ft)	Weighted Average Cracking (ft)
040507	11/29/89		843.8	33.1	0.0	104.8
	01/15/91		0.0	0.0	0.0	0.0
	09/22/91		142.1	0.0	0.0	15.8
	01/29/93		2.0	0.0	0.0	0.2
	10/18/94		0.0	0.0	0.0	0.0
	03/22/95		71.5	0.0	0.0	7.9
	09/11/96	05/24/90	0.0	0.0	0.0	0.0
	11/12/97		0.0	0.0	0.0	0.0
	12/09/98		0.0	0.0	0.0	0.0
	10/06/99		0.0	0.0	0.0	0.0
	12/13/99		0.0	0.0	0.0	0.0
	10/16/00		0.0	0.0	0.0	0.0
040508	11/29/89		766.4	0.0	0.0	85.2
	01/15/91		0.0	0.0	0.0	0.0
	09/22/91		97.4	0.0	0.0	10.8
	01/29/93		0.0	0.0	0.0	0.0
	10/19/94		0.0	0.0	0.0	0.0
	03/22/95		68.6	0.0	0.0	7.6
	09/12/96	05/08/90	0.0	0.0	0.0	0.0
	11/12/97		4.3	0.0	0.0	0.5
	12/09/98		81.7	0.0	0.0	9.1
	10/06/99		166.3	0.0	0.0	18.5
	12/13/99		128.6	79.7	0.0	40.9
	10/17/00		154.5	94.5	0.0	48.7
040509	11/29/89		904.5	49.5	0.0	117.0
	01/15/91		0.0	0.0	0.0	0.0
	09/22/91		32.8	0.0	0.0	3.6
	01/29/93		23.0	0.0	0.0	2.6
	10/19/94		54.8	0.0	0.0	6.1
	03/22/95		114.2	25.6	0.0	21.2
	09/12/96	05/08/90	147.0	0.0	0.0	16.3
	11/12/97		189.3	20.7	0.0	27.9
	12/09/98		116.8	75.1	79.1	81.9
	10/06/99		140.1	189.3	0.0	78.7
	12/13/99		83.3	137.5	131.6	128.2
	10/17/00		104.3	194.9	79.7	120.8
270502	05/29/90		320.2	13.5	0.0	40.1
	11/09/90		0.0	0.0	0.0	0.0
	06/18/91		242.1	0.0	0.0	26.9
	06/17/92		181.1	47.9	0.0	36.1
	06/03/93		306.1	0.0	0.0	34.0
	09/29/93	09/15/90	144.0	131.9	0.0	60.0
	11/09/94		0.0	0.0	0.0	0.0
	06/13/95		303.5	37.4	0.0	46.2
	08/24/95		215.9	112.2	0.0	61.4
	06/07/99		28.5	279.2	12.1	103.0
	08/18/99		299.2	26.2	0.0	42.0
	07/25/00		25.3	133.5	157.8	135.0
270503	05/29/90		492.8	0.0	0.0	54.8
	11/09/90		0.0	0.0	0.0	0.0
	06/18/91		140.7	0.0	0.0	15.6
	06/17/92		107.9	23.9	0.0	20.0
	06/03/93		132.2	0.0	13.1	22.0
	09/29/93	09/15/90	71.8	47.9	12.1	30.7
	11/09/94		0.0	0.0	0.0	0.0
	06/13/95		143.0	13.1	13.1	27.6
	06/07/99		15.1	248.7	0.0	84.6
	07/25/00		15.1	126.6	120.4	110.8

Table A-13 (Cont'd) Distress Data - Transverse Cracking

Section	Survey Date	Rehab. Date	Low Severity (ft)	Medium Severity (ft)	High Severity (ft)	Weighted Average Cracking (ft)
270504	**05/29/90**		**552.2**	**0.0**	**0.0**	**61.4**
	11/06/90		0.0	0.0	0.0	0.0
	06/18/91		103.7	0.0	0.0	11.5
	06/17/92		100.1	0.0	0.0	11.1
	06/03/93		104.0	13.1	0.0	15.9
	09/28/93		84.0	23.9	0.0	17.3
	06/17/94	09/15/90	100.1	0.0	0.0	11.1
	06/13/95		132.5	103.0	0.0	49.1
	08/23/95		119.7	59.7	0.0	33.2
	10/23/97		15.4	85.0	145.7	111.0
	06/03/99		3.9	133.5	109.3	105.6
	08/18/99		30.5	193.9	39.4	89.9
	07/24/00		5.6	12.1	230.6	132.8
270505	11/06/90		0.0	0.0	0.0	0.0
	06/18/91		377.6	0.0	0.0	42.0
	06/17/92		236.9	96.1	23.9	71.7
	06/03/93		353.3	67.6	0.0	61.8
	09/29/93		73.2	252.0	47.9	118.7
	06/17/94	09/15/90	236.9	96.1	23.9	71.7
	06/13/95		271.0	154.5	0.0	81.6
	08/23/95		56.8	200.8	0.0	73.2
	06/03/99		14.4	173.6	194.2	167.4
	08/18/99		203.7	187.7	53.1	114.7
	07/24/00		5.6	20.3	350.1	201.9
270506	**05/29/90**		**509.5**	**0.0**	**0.0**	**56.6**
	11/06/90		0.0	0.0	0.0	0.0
	06/18/91		174.2	0.0	0.0	19.4
	06/17/92		155.8	11.8	0.0	21.3
	06/03/93		147.3	38.4	0.0	29.2
	09/29/93		47.9	131.9	0.0	49.3
	06/17/94	09/15/90	155.8	11.8	0.0	21.3
	06/13/95		214.6	100.7	0.0	57.4
	08/23/95		118.1	118.1	35.4	72.2
	10/23/97		61.7	193.2	121.4	138.7
	06/03/99		26.6	267.1	97.1	145.9
	08/18/99		204.4	82.0	84.3	96.9
	07/24/00		11.8	99.7	275.9	187.8
270507	**05/29/90**		**351.0**	**94.2**	**0.0**	**70.4**
	11/05/90		0.0	0.0	0.0	0.0
	06/18/91		109.6	0.0	0.0	12.2
	06/16/92		101.0	11.8	0.0	15.2
	06/03/93		143.0	0.0	0.0	15.9
	09/28/93		91.9	23.9	0.0	18.2
	06/16/94	09/15/90	101.0	11.8	0.0	15.2
	06/13/95		101.7	63.6	0.0	32.5
	08/23/95		37.4	99.7	24.9	51.3
	10/23/97		3.3	24.3	145.7	89.4
	06/03/99		0.0	97.1	72.8	72.8
	08/18/99		40.0	132.2	13.1	55.8
	07/24/00		6.6	12.1	153.9	90.3
270508	**05/29/90**		**366.8**	**13.5**	**0.0**	**45.2**
	11/05/90		0.0	0.0	0.0	0.0
	11/09/90		0.0	0.0	0.0	0.0
	06/18/91		80.1	0.0	0.0	8.9
	06/17/92		76.1	0.0	0.0	8.5
	06/03/93		91.5	0.0	0.0	10.2
	09/29/93		68.9	12.1	0.0	11.7
	06/17/94	09/15/90	76.1	0.0	0.0	8.5
	06/13/95		118.1	13.1	0.0	17.5
	08/24/95		98.4	0.0	0.0	10.9
	06/07/99		47.6	287.4	0.0	101.1
	08/18/99		279.2	13.5	0.0	35.5
	07/25/00		73.2	200.8	60.7	108.8

Table A-13 (Cont'd) Distress Data - Transverse Cracking

Section	Survey Date	Rehab. Date	Low Severity (ft)	Medium Severity (ft)	High Severity (ft)	Weighted Average Cracking (ft)
270509	**05/29/90**		**351.0**	**13.5**	**0.0**	**43.5**
	11/06/90		0.0	0.0	0.0	0.0
	06/18/91		180.8	0.0	0.0	20.1
	06/17/92		160.1	11.8	0.0	21.7
	06/03/93		170.6	0.0	13.1	26.2
	09/29/93	09/15/90	132.9	36.1	12.1	33.5
	06/17/94		160.1	11.8	0.0	21.7
	06/13/95		193.9	78.7	0.0	47.8
	08/23/95		180.8	36.4	12.1	39.0
	06/07/99		26.2	254.9	24.3	101.4
	08/18/99		209.0	93.2	0.0	54.3
	07/24/00		33.5	174.2	109.3	122.5
300502	07/29/90		428.1	38.4	0.0	60.4
	05/16/91		5.9	67.9	0.0	23.3
	08/18/93	09/12/91	65.0	16.7	0.0	12.8
	06/08/96		227.7	81.0	13.1	59.6
	05/22/98		30.2	0.0	0.0	3.4
	06/09/99		62.0	17.4	0.0	12.7
	08/25/99		127.0	86.9	13.1	50.4
	07/25/00		54.8	47.6	0.0	21.9
300503	05/17/91		104.0	209.0	79.1	125.1
	08/18/93		0.0	0.0	0.0	0.0
	06/08/96		116.8	0.0	0.0	13.0
	08/01/96	09/12/91	6.6	0.0	0.0	0.7
	05/20/98		7.5	15.1	0.0	5.9
	06/07/99		0.0	14.1	0.0	4.7
	08/25/99		11.8	39.0	0.0	14.3
	07/24/00		8.9	20.0	0.0	7.7
300504	07/29/90		205.7	341.5	95.5	189.7
	05/17/91		50.2	237.9	0.0	84.9
	08/18/93		0.0	0.0	0.0	0.0
	06/08/96	09/11/91	198.8	38.7	0.0	35.0
	08/01/96		25.6	12.5	0.0	7.0
	05/20/98		9.2	37.4	0.0	13.5
	06/07/99		0.0	47.2	0.0	15.7
	08/25/99		12.8	45.6	0.0	16.6
	07/21/00		0.0	42.3	0.0	14.1
300505	07/29/90		209.3	130.6	0.0	66.8
	05/16/91		7.9	68.9	49.9	51.5
	08/18/93		72.2	0.0	0.0	8.0
	06/08/96		69.9	39.7	0.0	21.0
	07/31/96	09/11/91	61.7	12.5	0.0	11.0
	05/19/98		57.1	24.9	0.0	14.7
	06/04/99		0.0	87.3	0.0	29.1
	08/25/99		63.0	25.6	0.0	15.5
	07/20/00		54.1	24.3	0.0	14.1
300506	07/29/90		153.2	183.4	65.9	114.8
	05/16/91		3.0	121.1	68.9	79.0
	08/18/93		7.5	0.0	0.0	0.8
	06/08/96	09/11/91	161.7	13.1	0.0	22.3
	07/31/96		58.1	0.0	0.0	6.5
	05/20/98		47.2	24.9	0.0	13.6
	06/07/99		12.8	62.0	0.0	22.1
	08/25/99		36.1	36.1	0.0	16.0
	07/20/00		32.5	34.4	0.0	15.1
300507	05/17/91		24.9	125.0	53.1	74.0
	08/18/93		0.0	0.0	0.0	0.0
	06/08/96		53.5	0.0	0.0	5.9
	07/31/96	09/11/91	7.9	0.0	0.0	0.9
	05/20/98		0.0	12.5	0.0	4.2
	06/07/99		12.5	0.0	0.0	1.4
	08/25/99		25.3	0.0	0.0	2.8
	07/21/00		0.0	12.1	0.0	4.0

Table A-13 (Cont'd) Distress Data - Transverse Cracking

Section	Survey Date	Rehab. Date	Low Severity (ft)	Medium Severity (ft)	High Severity (ft)	Weighted Average Cracking (ft)
300508	07/29/90		232.3	300.8	5.9	129.4
	07/17/91		78.1	244.1	45.9	115.6
	08/18/93		0.0	0.0	0.0	0.0
	06/08/96		77.4	12.8	0.0	12.9
	08/01/96	09/12/91	17.1	0.0	0.0	1.9
	05/21/98		0.0	7.5	0.0	2.5
	06/09/99		0.0	7.5	0.0	2.5
	08/25/99		8.2	12.5	0.0	5.1
	07/24/00		0.0	0.0	0.0	0.0
300509	07/29/90		175.5	255.2	8.9	109.5
	05/16/91		28.9	205.1	12.1	78.3
	08/18/93		39.7	0.0	0.0	4.4
	06/08/96		135.2	0.0	0.0	15.0
	08/01/96	09/12/91	0.0	0.0	0.0	0.0
	05/22/98		0.0	0.0	0.0	0.0
	06/09/99		0.0	0.0	0.0	0.0
	08/25/99		46.3	0.0	0.0	5.1
	07/24/00		0.0	0.0	0.0	0.0
307066	05/16/91		14.1	40.0	12.8	22.0
	07/29/91		54.1	19.0	0.0	12.4
	08/18/93	09/13/91	13.5	0.0	0.0	1.5
	06/08/96		37.1	13.1	0.0	8.5
	07/31/96		6.6	22.3	0.0	8.2
	05/19/98		28.2	0.0	0.0	3.1
	06/04/99		0.0	28.9	0.0	9.6
	08/25/99		25.9	0.0	0.0	2.9
	07/20/00		25.3	0.0	0.0	2.8
340502	04/02/92		33.1	0.0	0.0	3.7
	04/06/92		396.0	44.9	0.0	59.0
	02/24/93		0.0	0.0	0.0	0.0
	11/04/95		14.1	0.0	0.0	1.6
	10/09/96	08/13/92	82.7	0.0	0.0	9.2
	10/28/98		104.3	6.6	0.0	13.8
	06/22/99		139.4	5.6	0.0	17.4
	11/09/99		134.8	0.0	0.0	15.0
	10/19/00		168.0	22.0	0.0	26.0
340503	04/02/92		17.7	16.7	0.0	7.5
	04/06/92		196.5	78.7	14.1	55.9
	02/24/93		0.0	0.0	0.0	0.0
	11/04/95		0.0	0.0	0.0	0.0
	11/09/95	08/13/92	0.0	0.0	0.0	0.0
	08/27/96		0.0	0.0	0.0	0.0
	10/27/98		28.5	0.0	0.0	3.2
	06/22/99		19.0	9.5	0.0	5.3
	10/19/99		23.9	0.0	0.0	2.7
	10/17/00		56.8	2.3	0.0	7.1
340504	04/02/92		111.9	23.9	2.0	21.5
	04/06/92		165.7	47.6	0.0	34.3
	02/24/93		0.0	0.0	0.0	0.0
	11/04/95		0.0	0.0	0.0	0.0
	10/09/96	08/21/92	2.6	0.0	0.0	0.3
	10/29/98		15.7	0.0	0.0	1.7
	06/22/99		16.7	0.0	0.0	1.9
	11/10/99		26.2	0.0	0.0	2.9
	10/19/00		33.5	0.0	0.0	3.7
340505	04/02/92		97.1	0.0	5.9	14.1
	04/06/92		236.9	36.4	0.0	38.5
	02/24/93		0.0	0.0	0.0	0.0
	11/04/95		44.0	0.0	0.0	4.9
	10/09/96	08/21/92	102.7	0.0	0.0	11.4
	10/29/98		96.8	30.5	0.0	20.9
	06/22/99		113.5	9.8	0.0	15.9
	11/10/99		101.7	30.8	0.0	21.6
	10/23/00		72.5	80.1	0.0	34.7

Table A-13 (Cont'd) Distress Data - Transverse Cracking

Section	Survey Date	Rehab. Date	Low Severity (ft)	Medium Severity (ft)	High Severity (ft)	Weighted Average Cracking (ft)
340506	04/02/92		34.8	0.0	0.0	3.9
	04/06/92		175.9	29.5	0.0	29.4
	02/24/93		0.0	0.0	0.0	0.0
	11/04/95	08/20/92	4.6	0.0	0.0	0.5
	08/28/96		0.0	0.0	0.0	0.0
	10/28/98		0.0	0.0	0.0	0.0
	06/22/99		1.3	0.0	0.0	0.1
	11/08/99		1.0	0.0	0.0	0.1
	10/18/00		3.3	0.0	0.0	0.4
340507	04/02/92		29.9	34.1	0.0	14.7
	04/06/92		305.1	69.9	11.5	63.6
	02/24/93		0.0	0.0	0.0	0.0
	11/04/95		0.0	0.0	0.0	0.0
	11/09/95	08/13/92	0.0	0.0	0.0	0.0
	08/27/96		0.0	0.0	0.0	0.0
	10/27/98		0.0	0.0	0.0	0.0
	06/22/99		1.3	0.0	0.0	0.1
	10/19/99		0.0	0.0	0.0	0.0
	10/17/00		0.0	0.0	0.0	0.0
340508	04/02/92		40.0	15.1	0.0	9.5
	04/06/92		170.6	33.8	15.4	38.8
	02/24/93		0.0	0.0	0.0	0.0
	11/04/95		4.6	0.0	0.0	0.5
	11/09/95	08/13/92	0.0	0.0	0.0	0.0
	08/28/96		0.0	0.0	0.0	0.0
	10/27/98		5.6	0.0	0.0	0.6
	06/22/99		3.0	1.6	0.0	0.9
	11/08/99		14.8	0.0	0.0	1.6
	10/17/00		40.0	4.6	0.0	6.0
340509	04/02/92		6.9	0.0	0.0	0.8
	04/06/92		306.1	30.8	0.0	44.3
	02/24/93		0.0	0.0	0.0	0.0
	11/04/95		0.0	0.0	0.0	0.0
	08/28/96	08/20/92	4.6	0.0	0.0	0.5
	10/27/98		15.4	0.0	0.0	1.7
	06/22/99		3.0	0.0	0.0	0.3
	11/08/99		26.9	0.0	0.0	3.0
	10/18/00		73.5	2.6	0.0	9.0

APPENDIX B

Input Data for the Calibration and Validation of the 2002 Design Guide for HMA Overlay over Fractured Slab Rehabilitated Pavement Sections

Table B-1 Analysis Conditions

Section	State Code	SHRP ID	State	LTPP Project	Base/Subgrade Construction Completion Date[1]	Asphalt Construction Completion Date	Traffic Opening Date	Rehab Date	Design Period (years)
400607	40	0607	Oklahoma	SPS-6	9/1/1962	11/01/62	01/01/63	08/07/92	7
400608	40	0608	Oklahoma	SPS-6	9/1/1962	11/01/62	01/01/63	08/07/92	7
420608	42	0608	Pennsylvania	SPS-6	07/01/68	09/01/68	09/01/68	09/23/92	7

[1]Base/Subbase Completion Date = 2 months prior to Asphalt Construction Completion Date.

Table B-2 Pavement Lane Properties

Section	Project Type	Lane Width (ft)	Pavement Slope (%)	Thermal Conductivity (BTU/hr-ft-^{o}F)[1]	Heat Capacity (BTU/lb-^{o}F)[1]	Surface Short Wave Absorptivity[1]
400607	SPS-6	12	1.5	0.67	0.22	0.85
400608	SPS-6	12	1.5	0.67	0.22	0.85
420608	SPS-6	12	1.5	0.67	0.22	0.85

[1] Default values

Table B-3 Environmental / Climatic Properties

Section	Project Type	Latitude N. (degrees)	Latitude N. (minutes)	Longitude W. (degrees)	Longitude W. (minutes)	Elevation (ft)	GWT Depth[1] (ft)	Source of Information
400607	SPS-6	36	43	97	20	1005	12	USGS: water.usgs.gov/nwis/gwlevels
400608	SPS-6	36	43	97	20	1005	12	USGS: water.usgs.gov/nwis/gwlevels
420608	SPS-6	40	58	77	47	1360	80	USGS: water.usgs.gov/nwis/gwlevels

[1] From pavemente surface

Table B-4 Original Pavement Structure

Section	Project Type	Construction Number	No. of Layers	Layer Number	Layer Type[1]	Representative Thickness (in)	Source of Information
400607	SPS-6	1	3	1	SS		Additional_SPS6-MATL_DATA
		1		2	GB	15.2	
		1		3	JPCP	9	
400608	SPS-6	1	3	1	SS		Additional_SPS6-MATL_DATA
		1		2	GB	14.8	
		1		3	JPCP	9.2	
420608	SPS-6	1	3	1	SS		Additional_SPS6-MATL_DATA
		1		2	GB	9.5	
		1		3	JPCP	10.1	

[1] SS = Subgrade; GB = Granular Base; JPCP = Jointed Plain Concrete Pavement

Table B-5 Pavement Structure After Rehabilitation

Section	Project Type	Construction Number	No. of Layers	Layer Number	Layer Type[1]	Representative Thickness (in)	Comments
400607	SPS-6	2	5	1	SS		Additional_SPS6-MATL_DATA
		2		2	GB	15.2	
		2		3	JPCP	9	
		2		4	AC	4.6	
		3		1	SS		
		3		2	GB	15.2	
		3		3	JPCP	9	
		3		4	AC	4.6	
		3		5	AC	0.5	
400608	SPS-6	2	5	1	SS		Additional_SPS6-MATL_DATA
		2		2	GB	14.8	
		2		3	JPCP	9.2	
		2		4	AC	6	
		2		5	AC	1.8	
420608	SPS-6	2	7	1	SS		Additional_SPS6-MATL_DATA
		2		2	GB	9.5	
		2		3	JPCP	10.1	
		2		4	AC	1.1	
		2		5	AC	3	
		2		6	AC	2.5	
		2		7	AC	1.7	

[1] SS = Subgrade; GB = Granular Base; AC = Asphalt Concrete; JPCP = Jointed Plain Concrete Pavement

Table B-6a Overlay Aggregate Gradation

Section	Project Type	Layer Number	Construction No.	Layer Type	% Retained 3/4" Sieve	% Retained 3/8" Sieve	%Retained #4 Sieve	% Passing #200 Sieve	Notes
400607	SPS-6	4	3	AC	87	13	4	0.9	
		5	3	AC	71	44	30	6	
400608	SPS-6	4	2	AC	87	13	4	0.9	
		5	2	AC	71	44	30	6	
420608	SPS-6	4	2	AC	86	57	43	4	Assumed same as Layer 5
		5	2	AC	86	57	43	4	
		6	2	AC	78	45	35	4	
		7	2	AC	100	98	61	3.1	

Table B-6b Overlay Air Voids

Section	Layer Number	Layer Type	Air Voids at Age = t (%)	Date Completed	Age t (months)	Design Air Voids (%)[1]	Air Voids as Placed (%)[2]	Maat (°F)	Vis 77°F (Mpoises)[4]	Original Air Voids (%)[5]	Total Unit Weight (pcf)
400607	4	AC	7.80		0.83					7.80	139.76
400607	5	AC	7.80		0.83	5.20	5.50			7.80	139.76
400608	4	AC	7.20		0.83	5.00	4.40			7.20	140.65
400608	5	AC	7.20		0.83	5.20	5.50			7.20	140.65
420608	4	AC	6.80	Oct 29/98[3]	73.00	4.30		48.09	12.27	10.16	148.0[6]
420608	5	AC	6.80	Oct 29/98[3]	73.00	4.90		48.20	12.27	10.16	148.0[6]
420608	6	AC	6.90	Oct 29/98[3]	73.00	4.60		48.20	12.27	10.26	148.0[6]
420608	7	AC	6.90	Oct 29/98[3]	73.00	4.40		48.20	12.27	10.26	148.0[6]

[1] RHB_ACO_LAB_MIX

[2] RHB_ACO_MIX_PROP

[3] TST_ACO5

[4] Estimated based on A and VTS values

[5] Estimated based on Equation 5 on "Estimating Original Air Voids of GPS-LTPP Sections" report, June 2001

[6] Estimated

Table B-6c Overlay Binder Grades

Section	Layer Number	Const. Number	Layer Type	Viscosity Grade	Penetration Grade	Pen 77 °F	Vis 77°F (MPoises)	Vis 77°F (MPoises)[1]	Visc 140 °F (Poises)	Comments
400607	4	3	AC	AC-20		43.00			2128	
400607	5	3	AC	AC-20		43.00			2128	
400608	4	2	AC	AC-20	Pen 40-50	43.00			2128	
400608	5	2	AC	AC-20	Pen 40-50	43.00			2128	
420608	4	2	AC		Pen 40-50					Assumed same as Layer 5
420608	5	2	AC		Pen 40-50	49.00	4.92	12.27		
420608	6	2	AC		Pen 40-50	30.00	14.83	12.27		Assumed same as Layer 5
420608	7	2	AC		Pen 40-50	33.00	11.97	12.27		Assumed same as Layer 5

[1] Estimated based on A and VTS values

Table B-7 Overlay Effective Binder Content

Section	Layer Number	Pb (%)	Estimated Original Air Voids (%)[1]	Gb	Gmb Database	Estimated Gmb	Gmm	Gsb	Gse	Estimated Vbe	Sources of Information
400607	4	5.50	7.80	1.02	2.37	2.24	2.430	2.750	2.64	15.21	
400607	5	5.10	7.80	1.02	2.39	2.24	2.429	2.750	2.62	14.92	RHB_ACO_LAB_MIX
400608	4	5.50	7.20	1.02		2.29	2.466	2.700	2.69	12.70	RHB_ACO_LAB_MIX
400608	5	3.60	7.20	1.02		2.25	2.429	2.700	2.56	12.32	RHB_ACO_LAB_MIX
420608	4	5.70	10.16	1.04		2.36	2.622	2.700	2.89	7.57	RHB_ACO_LAB_MIX
420608	5	4.30	10.16	1.04	2.33	2.36	2.622	2.750	2.81	7.86	
420608	6	4.10	10.26	1.05	2.35	2.34	2.607	2.670	2.78	5.71	
420608	7	5.20	10.26	1.05	2.35	2.24	2.493	2.700	2.70	11.19	

[1] From Table B-6b.

Table B-8 PCC Data

State Code	SHRP ID	Construction No.	Layer No.	Unit Weight (pcf)	Date Complete	PCC Breakage Width (in)	PCC Breakage Length (in)	E_{fs} (ksi)	Modulus of Rupture (psi)[1]
40	**0607**	2	3	150	7/28/1992	2	2	Rubbilization - 150	650
40	**0608**	2	3	150	7/28/1992	2	2	Rubbilization - 150	650
42	**0608**	2	3	150	9/22/1992	18	18	Crack and seat - 225	650

[1] Assumed

Table B-9a Unbound Materials Data

Section	Layer Type	Layer Number	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)	Source	% Passing #200 Sieve	% Passing #4 Sieve	Diameter D_{60} (mm)
400607	SS	1	32	17	15	TST_UG04-SS03	85.9	100.0	0.0000
400607	GB	2	20	16	4	TST_UG04-SS03	16.8	100.0	0.1967
400608	SS	1	32	17	15	TST_UG04-SS03	85.9	100.0	0.0000
400608	GB	2	20	16	4	TST_UG04-SS03	16.8	100.0	0.1967
420608	SS	1	22	15	7	TST_UG04-SS03	18.3	58	5.4810
420608	GB	2	---	---	NP	TST_UG04-SS03	4.2	31	12.4920

Table B-9b Unbound Materials Data

Section	Layer Number	Passing 3"	Passing 2"	Passing 1.5"	Passing 1"	Passing 3/4"	Passing 1/2"	Passing 3/8"	Passing #4	Passing #10	Passing #40	Passing #80	Passing #200
400607	1	100	100	100	100	100	100	100	100	100	97	90	85.9
400607	2	100	100	100	100	100	100	100	100	100	97	51.4	16.8
400608	1	100	100	100	100	100	100	100	100	100	97	90	85.9
400608	2	100	100	100	100	100	100	100	100	100	97	51.4	16.8
420608	1	100	99	97	92	86	78	73	58	42	29	24	18.3
420608	2	100	99	97	87	76	59	49	31	18	8	6	4.2

Table B-9c Unbound Materials Data

Section	Layer Type	Layer Number	AASHTO Soil Class.	USCS Class.
400607	SS	1	A-6	CL
400607	GB	2	A-2-4	SM
400608	SS	1	A-6	CL
400608	GB	2	A-2-4	SM
420608	SS	1	A-2-4	GC
420608	GB	2	A-1-a	GP

Table B-10 Distress Data - Rutting

Section	Survey Date	Rehab. Date	LLH Mean Depth (in)	RLH Mean Depth (in)	Max Mean Depth (in)	Average Rutting (in)
400607	28-Oct-91		0.079	0.079	0.079	0.079
	10-Mar-93		0.118	0.039	0.118	0.079
	22-Apr-96		0.157	0.079	0.157	0.118
	20-Nov-98	08/07/92	0.236	0.079	0.236	0.157
	03-Nov-99		0.157	0.157	0.157	0.157
	14-Sep-00		0.118	0.157	0.157	0.138
400608	28-Oct-91		0.079	0.197	0.197	0.138
	10-Mar-93		0.118	0.079	0.118	0.098
	22-Apr-96	08/07/92	0.118	0.079	0.118	0.098
	18-Nov-98		0.157	0.039	0.157	0.098
	03-Nov-99		0.079	0.079	0.079	0.079
	14-Sep-00		0.157	0.039	0.157	0.098
420608	21-Jun-94		0.197	0.197	0.197	0.197
	08-Aug-94		0.197	0.157	0.197	0.177
	19-Jul-96		0.276	0.118	0.276	0.197
	26-Aug-97	09/23/92	0.315	0.118	0.315	0.217
	22-Jul-99		0.315	0.118	0.315	0.217
	02-Aug-99		0.433	0.197	0.433	0.315
	08-Aug-00		0.315	0.118	0.315	0.217

Table B-11 Distress Data – Alligator Cracking

Section	Survey Date	Rehab Date	Low Severity Cracking (ft^2)	Medium Severity Cracking (ft^2)	High Severity Cracking (ft^2)	Total Sum (ft^2)
400607	05-Nov-92		0.00	0.00	0.00	0.00
	10-Mar-93		0.00	0.00	0.00	0.00
	30-Mar-94		0.00	0.00	0.00	0.00
	02-Nov-94		0.00	0.00	0.00	0.00
	22-Apr-96		0.00	0.00	0.00	0.00
	22-May-97	08/07/92	529.53	0.00	0.00	529.53
	17-Nov-98		1055.52	0.00	0.00	1055.52
	03-Nov-99		0.00	0.00	0.00	0.00
	14-Sep-00		0.00	1369.71	0.00	1369.71
400608	05-Nov-92		0.00	0.00	0.00	0.00
	10-Mar-93		0.00	0.00	0.00	0.00
	30-Mar-94		0.00	0.00	0.00	0.00
	02-Nov-94		0.00	0.00	0.00	0.00
	22-Apr-96	08/07/92	0.00	0.00	0.00	0.00
	22-May-97		0.00	0.00	0.00	0.00
	18-Nov-98		35.30	0.00	0.00	35.30
	03-Nov-99		0.00	617.78	0.00	617.78
	14-Sep-00		758.99	0.00	0.00	758.99
420608	14-Jun-94		0.00	0.00	0.00	0.00
	08-Aug-94		0.00	0.00	0.00	0.00
	19-Jul-96		0.00	0.00	0.00	0.00
	26-Aug-97	09/23/92	0.00	0.00	0.00	0.00
	22-Jul-99		0.00	0.00	0.00	0.00
	02-Aug-99		0.00	0.00	0.00	0.00
	08-Aug-00		0.00	0.00	0.00	0.00
	12-Jul-01		0.00	0.00	0.00	0.00

Table B-12 Distress Data – Longitudinal Cracking

Section	Survey Date	Rehab. Date	Low Severity (ft)	Medium Severity (ft)	High Severity (ft)	Total Sum (ft)
400607	05-Nov-92		0.00	0.00	0.00	0.00
	10-Mar-93		0.00	0.00	0.00	0.00
	30-Mar-94		5.25	0.00	0.00	5.25
	02-Nov-94		5.25	0.00	0.00	5.25
	22-Apr-96		262.47	0.00	0.00	262.47
	22-May-97	08/07/92	122.70	0.00	0.00	122.70
	17-Nov-98		374.67	0.00	0.00	374.67
	03-Nov-99		91.86	0.00	0.00	91.86
	14-Sep-00		0.00	0.00	0.00	0.00
400608	05-Nov-92		0.00	0.00	0.00	0.00
	10-Mar-93		0.00	0.00	0.00	0.00
	30-Mar-94		0.00	0.00	0.00	0.00
	02-Nov-94		0.00	0.00	0.00	0.00
	22-Apr-96	08/07/92	150.92	1.31	0.00	152.23
	22-May-97		49.54	0.00	0.00	49.54
	18-Nov-98		768.70	0.00	0.00	768.70
	03-Nov-99		806.76	0.00	0.00	806.76
	14-Sep-00		180.12	0.00	0.00	180.12
420608	14-Jun-94		0.00	0.00	0.00	0.00
	08-Aug-94		0.00	0.00	0.00	0.00
	19-Jul-96		0.00	0.00	0.00	0.00
	26-Aug-97	09/23/92	0.00	0.00	0.00	0.00
	22-Jul-99		0.00	0.00	0.00	0.00
	02-Aug-99		0.00	0.00	0.00	0.00
	08-Aug-00		0.00	0.00	0.00	0.00
	12-Jul-01		0.00	0.00	0.00	0.00

Table B-13 Distress Data - Transverse Cracking

Section ID	Survey Date	Rehab. Date	Low Severity (ft)	Medium Severity (ft)	High Severity (ft)	Weighted Average (ft)
400607	05-Nov-92		0.00	0	0	0.00
	10-Mar-93		0.00	0	0	0.00
	30-Mar-94		3.94	0	0	0.44
	02-Nov-94		13.78	0	0	1.53
	22-Apr-96		166.01	0	0	18.45
	22-May-97	08/07/92	15.75	0	0	1.75
	17-Nov-98		291.99	0	0	32.44
	03-Nov-99		66.93	0	0	7.44
	14-Sep-00		11.81	0	0	1.31
400608	05-Nov-92		0.00	0	0	0.00
	10-Mar-93		0.00	0	0	0.00
	30-Mar-94		0.00	0	0	0.00
	02-Nov-94		0.00	0	0	0.00
	22-Apr-96	08/07/92	65.62	0	0	7.29
	22-May-97		48.88	0	0	5.43
	18-Nov-98		91.54	0	0	10.17
	03-Nov-99		223.43	0	0	24.83
	14-Sep-00		83.33	0	0	9.26
420608	14-Jun-94		0.00	0	0	0.00
	08-Aug-94		0.00	0	0	0.00
	19-Jul-96		0.00	0	0	0.00
	26-Aug-97	09/23/92	0.00	0	0	0.00
	22-Jul-99		0.00	0	0	0.00
	02-Aug-99		0.00	0	0	0.00
	08-Aug-00		0.00	0	0	0.00
	12-Jul-01		0.00	0	0	0.00

APPENDIX C

Input Data for the Calibration and Validation of the 2002 Design Guide for AC Overlay over JPCP Rehabilitated Pavement Sections

Table C-1a Analysis Conditions

Section	State	LTPP Project Type	Pavement Type	Base/Subgrade Construction Completion Date	Original AC Construction Completion Date	Traffic Opening Date	Rehab Date
183003	Indiana	GPS 7B	JPCP	11/01/74	01/01/75	01/01/75	07/29/93
295393	Missouri	GPS 7B	JPCP	08/01/57	10/01/57	10/01/57	07/16/90
393013	Ohio	GPS 7B	JPCP	01/01/70	03/01/70	07/01/70	06/29/93
501682	Vermont	GPS 7B	JPCP	07/01/63	09/01/63	11/30/63	09/24/91 7/29/1999
400603	Oklahoma	SPS 6	JPCP		11/01/62	01/01/63	7/12/1992 08/10/92
400604	Oklahoma	SPS 6	JPCP		11/01/62	01/01/63	7/12/1992 08/10/92
400606	Oklahoma	SPS 6	JPCP		11/01/62	01/01/63	7/13/1992 08/12/92

Table C-1b Rehabilitation Events

Section	Construction Number	Event	Source
183003	1		
	2	AC overlay	EXPERIMENT_SECTION
295393	1		
	2	AC overlay	EXPERIMENT_SECTION
	3		
393013	1		
	2	AC overlay	EXPERIMENT_SECTION
501682	1		
	2	AC overlay: Full depth patching of PCC pavement other than at joint	
	3	Crack sealing	MNT_IMP
400603	1		
	2	Full depth transverse joint repair patch	EXPERIMENT_SECTION
	3	AC overlay; AC shoulder restoration	EXPERIMENT_SECTION
400604	1		
	2	Full depth transverse joint repair patch	EXPERIMENT_SECTION
	3	AC overlay; AC shoulder restoration	EXPERIMENT_SECTION
400606	1		
	2	Full depth transverse joint repair patch	EXPERIMENT_SECTION
	3	Longitudinal subrains; AC overlay; AC shoulder restoration	EXPERIMENT_SECTION

Table C-2 Pavement Lane Properties

Section	Lane Width (ft)	Pavement Slope[1](%)	Initial IRI[2] (in/mile)	Thermal Conductivity[1] (BTU/hr-ft-°F)	Heat Capacity[1] (BTU/lb-°F)	Surface Short Wave Absorptivity[1]
183003	12	1.5	63	0.67	0.22	0.85
295393	11	1.5	63	0.67	0.22	0.85
393013	13	1.5	63	0.67	0.22	0.85
501682	12	1.5	63	0.67	0.22	0.85
400603	12	1.5	63	0.67	0.22	0.85
400604	12	1.5	63	0.67	0.22	0.85
400606	12	1.5	63	0.67	0.22	0.85

[1] Default value

[2] IRI: International Roughness Index. Assumed value

Table C-3 Environmental / Climatic Properties

Section	Latitude N (degrees)	Latitude N (min)	Longitude W (degrees)	Longitude W (min)	Elevation (ft)	Groundwater Table Depth[1] (ft)	Source of Information
183003	41	16	86	16	810		
295393	38	52	90	43	446	5.0	USGS: water.usgs.gov/nwis/gwlevels
393013	38	52	83	53	960	12.7	USGS: water.usgs.gov/nwis/gwlevels
501682	44	19	73	14	400	40.0	USGS: water.usgs.gov/nwis/gwlevels
400603	36	43	97	20	1005	22.0	USGS: water.usgs.gov/nwis/gwlevels
400604	36	43	97	20	1005	22.0	USGS: water.usgs.gov/nwis/gwlevels
400606	36	43	97	20	1005	22.0	USGS: water.usgs.gov/nwis/gwlevels

[1] From pavement surface

Table C-4 Pavement Structure

Section	Construction No.	Layer Number	Layer Type[1]	Representative Thickness (in)	Description	Comments
183003	1	1	SS		Subgrade	BR= Infinite (Assumed)
183003	1	2	TB	3.8	Base layer	
183003	1	3	PC	10.2	Original suface layer	
183003	2	1	SS		Subgrade	
183003	2	2	TB	3.8	Base layer	
183003	2	3	PC	10.2	Original suface layer	
183003	2	4	AC	3.5	Binder course	
183003	2	5	AC		Overlay	
295393	1	1	SS		Subgrade	BR= 30 ft
295393	1	2	GB	3.3	Base layer	
295393	1	3	PC	7.7	Original suface layer	
295393	2	1	SS		Subgrade	
295393	2	2	GB	3.3	Base layer	
295393	2	3	PC	7.7	Original suface layer	
295393	2	4	AC	1.8	Binder course	
295393	2	5	AC	1.2	Overlay	
295393	3	1	SS		Subgrade	
295393	3	2	GB	3.3	Base layer	
295393	3	3	PC	7.7	Original suface layer	
295393	3	4	AC	1.8	Binder course	
295393	3	5	AC	1.2	Overlay	
393013	1	1	SS		Subgrade	BR= Infinite (Assumed)
393013	1	2	TB	4	Base layer	
393013	1	3	PC	8.3	Original suface layer	
393013	2	1	SS		Subgrade	
393013	2	2	TB	4	Base layer	
393013	2	3	PC	8.3	Original suface layer	
393013	2	4	AC	1.9	Binder course	
393013	2	5	AC	1.2	Overlay	
501682	1	1	SS		Subgrade	BR= Infinite (Assumed)
501682	1	2	GS	21.6	Subbase layer	
501682	1	3	GB	9.6	Base layer	
501682	1	4	PC	8.1	Original suface layer	
501682	2	1	SS		Subgrade	
501682	2	2	GS	21.6	Subbase layer	
501682	2	3	GB	9.6	Base layer	
501682	2	4	PC	8.1	Original suface layer	
501682	2	5	AC	4.1	Overlay	
501682	3	1	SS		Subgrade	
501682	3	2	GS	21.6	Subbase layer	
501682	3	3	GB	9.6	Base layer	
501682	3	4	PC	8.1	Original suface layer	
501682	3	5	AC	4.1	Overlay	

Table C-4 (Cont'd) Pavement Structure

Section	Construction No.	Layer Number	Layer Type[1]	Representative Thickness (in)	Description	Comments
400603	1	1	SS		Subgrade	BR= Infinite (Assumed)
400603	1	2	GB	15.2	Base layer	
400603	1	2	GB	15.2	Base layer	
400603	1	3	PC	9	Original suface layer	
400603	2	1	SS		Subgrade	
400603	2	2	GB	15.2	Base layer	
400603	2	2	GB	15.2	Base layer	
400603	2	3	PC	9	Original suface layer	
400603	2	4	AC	4	Overlay	
400603	3	1	SS		Subgrade	
400603	3	2	GB	15.2	Base layer	
400603	3	2	GB	15.2	Base layer	
400603	3	3	PC	9	Original suface layer	
400603	3	4	AC	4	Overlay	
400604	1	1	SS		Subgrade	BR= Infinite (Assumed)
400604	1	2	GB	15.2	Base layer	
400604	1	2	GB	15.2	Base layer	
400604	1	3	PC	9	Original suface layer	
400604	2	1	SS		Subgrade	
400604	2	2	GB	15.2	Base layer	
400604	2	2	GB	15.2	Base layer	
400604	2	3	PC	9	Original suface layer	
400604	2	4	AC	3.8	Overlay	
400604	3	1	SS		Subgrade	
400604	3	2	GB	15.2	Base layer	
400604	3	2	GB	15.2	Base layer	
400604	3	3	PC	9	Original suface layer	
400604	3	4	AC	3.8	Overlay	
400606	1	1	SS		Subgrade	BR= Infinite (Assumed)
400606	1	2	GB	14.8	Base layer	
400606	1	2	GB	14.8	Base layer	
400606	1	3	PC	9.1	Original suface layer	
400606	2	1	SS		Subgrade	
400606	2	2	GB	14.8	Base layer	
400606	2	2	GB	14.8	Base layer	
400606	2	3	PC	9.1	Original suface layer	
400606	2	4	AC	4.3	Overlay	
400606	3	1	SS		Subgrade	
400606	3	2	GB	14.8	Base layer	
400606	3	2	GB	14.8	Base layer	
400606	3	3	PC	9.1	Original suface layer	
400606	3	4	AC	4.3	Overlay	

[1] AC=Asphalt Concrete; GB=Granular Base; ATB=Asphalt Treated Base; GS=Granular Subbase; TS= Treated Subbase; SS=Subgrade; BR=Bedrock

Table C-5 Overlay Aggregate Gradation

Section	Layer Number	Construction No.	Layer Type	% Retained 3/4" Sieve	% Retained 3/8" Sieve	%Retained #4 Sieve	% Passing #200 Sieve	Notes
183003	4	2	AC					
183003	5	2	AC					
295393	4	2	AC	4	38	56	3	
295393	5	2	AC	0	16	47	4	
393013	4	2	AC	8	31	55	4	Assumed same as Layer 5
393013	5	2	AC	0	3	46	4	
400603	4	3	AC	0	8	36	5	
400604	4	3	AC	0	8	36	5	
400606	4	3	AC	0	8	36	5	
501682	5	2	AC	1	26.5	38	3.25	

Table C-6 Overlay Air Voids

Section	Layer Number	Air Voids at Age = t (%)	Age t (months)	Maat (°C)	Maat (°F)	Pen 77 (dmm)	Vis 77°F (Mpoises)[1]	Original Air Voids (%)[2]	Total Unit Weight (pcf)	Comments
183003	4		216		49.9			9.00	148	Air voids and unit weight estimated
183003	5		216		49.9			9.00	148	Unit weight estimated
295393	4	6.7	396	77	54.3	77	1.78	10.5	148	Unit weight estimated
295393	5	6.6	396	75	54.3	75	1.89	10.4	148	Unit weight estimated
393013	4	4.5	396	74	53.3	74	1.95	8.3	148	Unit weight estimated
393013	5	5.9	396	74	53.3	74	1.95	9.7	148	Unit weight estimated
400603	4	6.6	0.73	70	48.2	70	2.21	7.5	141.54	
400604	4	8.1	0.73	70	48.2	70	2.21	9.0	139.29	
400606	4	8.1	0.67	70	48.2	70	2.21	8.9	139.31	
501682	5	4	336	97	44.4	97	1.06	8.3	148	Unit weight estimated

[1] Estimated from Penetration at 77°F

[2] Estimated based on Equation 5 on "Estimating Original Air Voids of GPS-LTPP Sections" report, June 2001

Table C-7 Overlay Binder Grades

Section	Layer Number	Construction No.	Layer Type	Viscosity Grade	Penetration Grade	Pen 77 °F (dmm)	Visc 140 °F (Poises)	Visc 275 °F (cstokes)	Comments
183003	4	2	AC	Emulsified Asphalts HFMS-2					
183003	5	2	AC	Emulsified Asphalts HFMS-2					
295393	4	2	AC	AC-20		77	1516	356.93	
295393	5	2	AC	AC-20		75	1562	348.1	
393013	4	2	AC	AC-20		74	1988	434	
393013	5	2	AC	AC-20		74	1988	434	
400603	4	3	AC	AC-10		70	1916	400	AR-4000
400604	4	3	AC	AC-10		70	1916	400	AR-4000
400606	4	3	AC	AC-10		70	1916	400	AR-4000
501682	5	2	AC	AC-20		97	2435	510	

Table C-8 Overlay Effective Binder Content

Section	Layer Number	Pb (%)	Original Air Voids (%)[1]	Gb	Gmb Database	Gmb[2]	Gmm	Gsb[3]	Gse	Vbe[4]
183003	4			2.156						
183003	5			2.156						
295393	4	4.6	10.50	1.035		2.23	2.489	2.7	2.67	10.8
295393	5	5.2	10.37	1.035		2.20	2.459	2.7	2.66	12.2
393013	4	5.1	8.27	1.022		2.29	2.493	2.7	2.70	11.4
393013	5	5.7	9.67	1.022		2.23	2.468	2.7	2.70	12.5
400603	4	5.5	7.50	1.01		2.25	2.429	2.7	2.65	13.9
400604	4	5.5	8.99	1.01		2.21	2.429	2.7	2.65	13.6
400606	4	5.5	8.91	1.01		2.21	2.429	2.7	2.65	13.6
501682	5	4.9	8.32	1.023		2.34	2.5515	2.7	2.76	9.3

[1] From Table C-6

[2] Calculated from air voids and Gmm

[3] Assumed

[4] Estimated

Table C-9 PCC Data

Section	Layer No.	Layer Type	Unit Weight (pcf)	Poisson's Ratio	Coefficient Thermal Expansion (mm/mm/°F)	Thermal Conductivity (Btu/hr-ft-oF)[1]	Heat Capacity (Btu/lb-oF)[1]	Cement Type	Cement Content (lb/yd^3)	Water/ Cement Ratio	Aggregate Type
183003	2	TB									
183003	3	PC	142	0.22	6.39E-06	1.25	0.28	Type IA	564	0.310	Siliceous gravel
295393	3	PC	150	0.16	5.33E-06	1.25	0.28	Type I	588	0.408	Crushed limestone
393013	2	TB									
393013	3	PC	155	0.2	6.44E-06	1.25	0.28	Type I	600[1]	0.42[1]	Limestone[1]
400603	3	PC	148[2]	0.19[2]	6.0E-6[1]	1.25	0.28	Type I[1]	564[2]	0.488[2]	Limestone[1]
400603	3	PC	148	0.19	6.0E-6[1]	1.25	0.28	Type I[1]	564	0.488	Limestone
400604	3	PC	144[2]	0.23[2]	6.0E-6[1]	1.25	0.28	Type I[1]	564[2]	0.488[2]	Limestone[1]
400604	3	PC	144	0.23	6.0E-6[1]	1.25	0.28	Type I	564	0.488	Limestone
400606	3	PC	150[2]	0.19[2]	6.0E-6[1]	1.25	0.28	Type I[1]	564[2]	0.488[2]	Limestone[1]
400606	3	PC	150	0.19	6.0E-6[1]	1.25	0.28	Type I	564	0.488	Limestone
501682	4	PC	150	0.15	6.0E-6[1]	1.25	0.28	Type IA	611	0.434	Limestone

[1] Default value
[2] Assumed

Table C-10 PCC Strength Data

Section	Layer No.	Layer Type	Modulus of Rupture (psi)[1]	Compressive Strength (psi)	Elastic Modulus (psi)	Tensile Strength (psi)
183003	2	TB				
183003	3	PC	650	8940	4950000	639
295393	3	PC	650	7340	4050000	600
393013	2	TB				
393013	3	PC	650	13100	6300000	699
400603	3	PC	650			
400603	3	PC	650	5245	2930000	
400604	3	PC	650			
400604	3	PC	650	5245	3138000	
400606	3	PC	650			
400606	3	PC	650	5245	3862000	
501682	4	PC	650	9840	5250000	860

[1] Default value

Table C-11 Unbound Materials Data

Section	Layer Type	Layer Number	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)	Diameter D_{60} (mm)	AASHTO Soil Class.	Notes
183003	SS	1	9.5	6.5	3	----	A-2-4	
295393	SS	1	43.5	19.5	24	----	A-7-6	
295393	GB	2	21	16.5	4.5	----	A-2-4	
393013	SS	1	34.5	18	16.5	----	A-6	
400603	SS	1	57	18	39	----	A-7-6	Assumed same as Section 400604
400603	GB	2	21	16	5	----	A-2-4	
400604	SS	1	57	18	39	----	A-7-6	
400604	GB	2	21	16	5	----	A-2-4	
400606	SS	1	32	17	15	----	A-6	
400606	GB	2	20	16	4	----	A-2-4	
501682	SS	1	17.5	14.5	3	----	A-2-4	
501682	GS	2	0	NP	0	0.64	A-2-4	
501682	GB	3	0	NP	0	8.00	A-1-b	

Table C-12 Unbound Materials Gradation Data

Section	Layer Number	Layer Type	Passing 3"	Passing 2"	Passing 1 1/2"	Passing 1"	Passing 3/4"	Passing 1/2"	Passing 3/8"	Passing #4	Passing #10	Passing #40	Passing #80	Passing #200
183003	1	SS	100	100	100	100	100.0	99	98	95.5	91.5	73.5	43	31.7
295393	1	SS	100	100	100	100	100.0	100	100	100	99	97	96	94.7
295393	2	GB	100	100	100	99	94.0	85	77.5	61	49.5	39	35.5	32.85
393013	1	SS	100	100	100	100	100.0	100	100	99	98.5	95	89.5	82.8
400603	1	SS	100	100	100	100	100.0	100	100	100	99	98	96	94
400603	2	GB	100	100	100	100	100.0	100	100	100	100	98.5	61.8	25.6
400604	1	SS	100	100	100	100	100.0	100	100	100	99	98	96	94
400604	2	GB	100	100	100	100	100.0	100	100	100	100	98.5	61.8	25.6
400606	1	SS	100	100	100	100	100.0	100	100	100	100	97	90	85.9
400606	2	GB	100	100	100	100	100.0	100	100	100	100	97	51.4	16.8
501682	1	SS	100	100	99.5	99	98.0	94.5	92	85	77	58.5	41	34.85
501682	2	GS	100	98	96.5	95	92.5	90	88	83	77	59.5	30.5	14.55
501682	3	GB	100	96.5	90.5	82	76.5	68.5	63	53.5	46.5	33.5	18	8.9

Table C-13 Distress Data - Rutting

Section	Survey Date	Rehab. Date	Construction No.	LLH Mean Depth (mm)	RLH Mean Depth (mm)	Max Mean Depth (mm)	LLH Mean Depth (in)	RLH Mean Depth (in)	Max Mean Depth (in)
183003	6/28/89		1	6	4	6	0.236	0.157	0.236
	10/13/90	07/29/93	1	5	4	5	0.197	0.157	0.197
	5/24/94		2	4	3	4	0.157	0.118	0.157
	7/4/96		2	4	3	4	0.157	0.118	0.157
295393	6/22/89	07/16/90	1	5	3	5	0.197	0.118	0.197
	5/13/91		2	6	4	6	0.236	0.157	0.236
	3/28/93		2	3	3	3	0.118	0.118	0.118
	8/10/94		2	2	1	2	0.079	0.039	0.079
	10/8/94		2	2	1	2	0.079	0.039	0.079
	3/25/96		2	4	3	4	0.157	0.118	0.157
	11/19/00		3	6	4	6	0.236	0.157	0.236
393013	4/30/91		1	6	6	6	0.236	0.236	0.236
	3/11/93	06/29/93	1	6	6	6	0.236	0.236	0.236
	10/26/93		2	2	2	2	0.079	0.079	0.079
	7/31/94		2	3	5	5	0.118	0.197	0.197
	2/14/95		2	2	2	2	0.079	0.079	0.079
	3/18/96		2	5	5	5	0.197	0.197	0.197
	3/17/99		2	2	2	2	0.079	0.079	0.079
400603	10/28/91	09/24/91	1	3	4	4	0.118	0.157	0.157
	3/10/93	7/29/99	3	3	2	3	0.118	0.079	0.118
	4/22/96		3	4	3	4	0.157	0.118	0.157
	5/22/97		3	5	3	5	0.197	0.118	0.197
	11/17/98		3	6	2	6	0.236	0.079	0.236
	11/3/99		3	5	2	5	0.197	0.079	0.197
	9/14/00		3	6	3	6	0.236	0.118	0.236
400604	10/28/91	07/12/92	1	4	7	7	0.157	0.276	0.276
	3/10/93	08/10/92	3	4	3	4	0.157	0.118	0.157
	4/22/96		3	4	3	4	0.157	0.118	0.157
	11/17/98		3	7	4	7	0.276	0.157	0.276
	11/3/99		3	5	4	5	0.197	0.157	0.197
	9/14/00		3	8	4	8	0.315	0.157	0.315
400606	10/28/91	07/12/92	1	2	5	5	0.079	0.197	0.197
	3/10/93	08/10/92	3	2	2	2	0.079	0.079	0.079
	4/22/96		3	4	4	4	0.157	0.157	0.157
	11/18/98		3	7	2	7	0.276	0.079	0.276
	11/3/99		3	3	2	3	0.118	0.079	0.118
501682	8/9/89		1	5	5	5	0.197	0.197	0.197
	8/8/90	07/13/92	1	6	7	7	0.236	0.276	0.276
	4/27/93	08/12/92	2	5	6	6	0.197	0.236	0.236
	10/12/95		2	5	4	5	0.197	0.157	0.197
	6/4/98		2	8	3	8	0.315	0.118	0.315

Table C-14 Distress Data – Alligator Cracking

Section	Survey Date	Rehab Date	Construction No.	Low Severity Cracking (ft^2)	Medium Severity Cracking (ft^2)	High Severity Cracking (ft^2)	Total Sum(ft^2)
183003	10/29/93	07/29/93	2	0	0	0	0.00
	05/24/94		2	0	0	0	0.00
	07/04/96		2	0	0	0	0.00
	08/06/99		2	0	0	0	0.00
295393	02/11/92	07/16/90	2	0	0	0	0.00
	03/28/93		2	6.456	0	0	6.46
	08/10/94		2	0	0	0	0.00
	03/25/96		2	6.456	0	0	6.46
	02/16/99		2	23.672	0	0	23.67
	11/19/00		3	0	0	0	0.00
393013	10/26/93	06/29/93	2	0	0	0	0.00
	07/31/94		2	0	0	0	0.00
	03/18/96		2	0	0	0	0.00
	03/17/99		2	0	0	0	0.00
	08/30/00		2	0	0	0	0.00
400603	11/05/92	09/24/91	3	0	0	0	0.00
	03/10/93	7/29/99	3	0	0	0	0.00
	03/30/94		3	0	0	0	0.00
	11/02/94		3	0	0	0	0.00
	04/22/96		3	0	0	0	0.00
	05/22/97		3	0	0	0	0.00
	11/17/98		3	0	0	0	0.00
	10/30/99		3	0	0	0	0.00
	09/14/00		3	206.592	0	0	206.59
400604	11/05/92	07/12/92	3	0	0	0	0.00
	03/10/93	08/10/92	3	0	0	0	0.00
	03/30/94		3	0	0	0	0.00
	11/02/94		3	0	0	0	0.00
	04/22/96		3	2.152	0	0	2.15
	05/22/97		3	0	0	0	0.00
	11/17/98		3	0	0	0	0.00
	11/03/99		3	0	0	0	0.00
	09/14/00		3	85.004	0	0	85.00
400606	11/05/92	07/12/92	3	0	0	0	0.00
	03/10/93	08/10/92	3	0	0	0	0.00
	03/30/94		3	0	0	0	0.00
	11/02/94		3	0	0	0	0.00
	04/22/96		3	0	0	0	0.00
	05/22/97		3	10.76	0	0	10.76
	11/18/98		3	9.684	0	0	9.68
	11/03/99		3	0	0	0	0.00
	09/14/00		3	9.684	0	0	9.68
501682	04/27/93	07/13/92	2	0	0	0	0.00
	10/12/95	08/12/92	2	0	0	0	0.00
	06/04/98		2	0	0	0	0.00

Table C-15 Distress Data – Longitudinal Cracking

Section	Survey Date	Rehab. Date	Construction No.	Low Severity (ft)	Medium Severity (ft)	High Severity (ft)	Total Sum(ft^2)
183003	5/2/91		1	0	0	0	0.00
	4/28/92		1	6.56	0	0	6.56
	9/15/92		1	0	0	0	0.00
	10/29/93	07/29/93	2	0	0	0	0.00
	05/24/94		2	0	0	0	0.00
	07/04/96		2	0	0	0	0.00
	08/06/99		2	0	0	0	0.00
295393	02/11/92	07/16/90	2	0	0	0	0.00
	03/28/93		2	18.70	0	0	18.70
	08/10/94		2	41.67	0	0	41.67
	03/25/96		2	0	0	0	0.00
	02/16/99		2	0	0	0	0.00
	11/19/00		3	0	0	0	0.00
393013	3/11/93		1	0	0	0	0.00
	6/16/93		1	0	0	0	0.00
	10/26/93	06/29/93	2	0	0	0	0.00
	07/31/94		2	0	0	0	0.00
	03/18/96		2	0	0	0	0.00
	03/17/99		2	0	0	0	0.00
	08/30/00		2	0	0	0	0.00
400603	10/28/91		1	0	2.95	0	2.95
	7/28/92	09/24/91	2	24.93	0	0	24.93
	11/05/92		3	0	0	0	0.00
	03/10/93	7/29/99	3	0	0	0	0.00
	03/30/94		3	0	0	0	0.00
	11/02/94		3	0	0	0	0.00
	04/22/96		3	5.25	0	0	5.25
	05/22/97		3	119.09	0	0	119.09
	11/17/98		3	119.09	0	0	119.09
	10/30/99		3	100.07	0	0	100.07
	09/14/00		3	0	0	0	0.00
400604	10/28/91		1	0	0	0	0.00
	7/28/92	07/12/92	2	43.64	0	0	43.64
	11/05/92	08/10/92	3	0	0	0	0.00
	03/10/93		3	0	0	0	0.00
	03/30/94		3	0	0	0	0.00
	11/02/94		3	0	0	0	0.00
	04/22/96		3	11.81	0	0	11.81
	05/22/97		3	45.93	0	0	45.93
	11/17/98		3	53.15	0	0	53.15
	11/03/99		3	270.67	0	0	270.67
	09/14/00		3	24.61	0	0	24.61
400606	10/28/91		1	27.56	3.28	0	30.84
	7/27/92	07/12/92	2	48.56	0	0	48.56
	11/05/92	08/10/92	3	0	0	0	0.00
	03/10/93		3	0	0	0	0.00
	03/30/94		3	0	0	0	0.00
	11/02/94		3	0	0	0	0.00
	04/22/96		3	63.32	0	0	63.32
	05/22/97		3	0	0	0	0.00
	11/18/98		3	0	0	0	0.00
	11/03/99		3	124.02	0	0	124.02
	09/14/00		3	0	0	0	0.00
501682	5/2/91		1	0.98	0	0	0.98
	04/27/93	07/13/92	2	0	0	0	0.00
	10/12/95	08/12/92	2	0	0	0	0.00
	06/04/98		2	0	0	0	0.00

Table C-16 Distress Data - Transverse Cracking

Section ID	Survey Date	Rehab. Date	Construction No.	Low Severity (ft)	Medium Severity (ft)	High Severity (ft)	Weighted Average (ft^2)
183003	5/2/91		1	0	0	0	0.00
	4/28/92		1	12.14	0	0	1.35
	9/15/92		1	0	12.14	0	4.05
	10/29/93	07/29/93	2	0	0	0	0.00
	5/24/94		2	0	0	0	0.00
	7/4/96		2	11.48	0	0	1.28
	8/6/99		2	12.14	0	0	1.35
295393	2/11/92	07/16/90	2	---	---	---	---
	3/28/93		2	27.23	57.41	0	22.16
	8/10/94		2	0	0	0	0.00
	3/25/96		2	0	0	0	0.00
	2/16/99		2	80.71	122.70	44.62	74.66
	11/19/00		3	76.12	11.48	0	12.28
393013	3/11/93		1	0	0	0	0.00
	6/16/93		1	0	0	0	0.00
	10/26/93	06/29/93	2	0	0	0	0.00
	7/31/94		2	1.31	0	0	0.15
	3/18/96		2	0	0	0	0.00
	3/17/99		2	0	0	0	0.00
	8/30/00		2	12.14	0	0	1.35
400603	10/28/91		1	0	0	0	0.00
	7/28/92	09/24/91	2	0	0	0	0.00
	11/5/92		3	0	0	0	0.00
	3/10/93		3	0	0	0	0.00
	3/30/94		3	0	0	0	0.00
	11/2/94		3	0	0	0	0.00
	4/22/96		3	52.82	0	0	5.87
	5/22/97		3	0	0	0	0.00
	11/17/98		3	0	0	0	0.00
	10/30/99	7/29/99	3	40.35	0	0	4.48
	9/14/00		3	4.59	0	0	0.51
400604	10/28/91		1	23.62	0	4.27	4.99
	7/28/92	07/12/92	2	36.75	0	0	4.08
	11/5/92	08/10/92	3	0	0	0	0.00
	3/10/93		3	0	0	0	0.00
	3/30/94		3	0	0	0	0.00
	11/2/94		3	0	0	0	0.00
	4/22/96		3	36.09	3.61	0	5.21
	5/22/97		3	0	0	0	0.00
	11/17/98		3	0	0	0	0.00
	11/3/99		3	55.12	0	0	6.12
	9/14/00		3	23.95	0	0	2.66
400606	10/28/91		1	12.80	0	12.14	8.17
	7/27/92	07/12/92	2	0.00	0	11.81	6.56
	11/5/92	08/10/92	3	0	0	0	0.00
	3/10/93		3	0	0	0	0.00
	3/30/94		3	0	0	0	0.00
	11/2/94		3	10.83	23.95	0	9.19
	4/22/96		3	48.23	0	0	5.36
	5/22/97		3	36.42	36.42	12.14	22.93
	11/18/98		3	12.14	48.56	24.28	31.02
	11/3/99		3	38.39	0	0	4.27
	9/14/00		3	24.28	48.56	12.14	25.63
501682	5/2/91		1	40.03	0.00	12.14	11.19
	4/27/93	07/13/92	2	0	0	0	0.00
	10/12/95	08/12/92	2	0	0	0	0.00
	6/4/98		2	0	0	0	0.00

APPENDIX D

Groundwater Table Depth Information Obtained from the U.S. Geological Survey.

Table D-1 GWT Depths

Section	USGS GWT Depth (ft)	Date Measure Taken	Latitude N. (degrees)	Latitude N. (minutes)	Longitude W. (degrees)	Longitude W. (minutes)	Distance from Section (miles)
014127	**29.10**	4/15/2001	34	45	87	25	5.91
	27.90	6/22/1956	34	53	87	17	5.01
	39.70	6/15/1956	34	53	87	19	3.95
014129	25.08	10/21/1968	33	2	86	9	1.55
	31.66	11/20/1968	33	3	86	8	0.98
062041	**33.66**	1951/1963	40	35	124	9	10.65
124135	No wells found within 30 miles						
134420	No wells found within 30 miles						
231026	No wells found within 30 miles						
231028	**9.69**	1978/1990	44	25	70	48	0.58
283094	No wells found within 30 miles						
295403	**10.77**	1975/1977	36	6	90	9	0.76
295413	8.12	1976/1977	36	11	90	5	0.74
	8.13	1975/1977	36	11	90	5	0.61
	10.23	1975/1977	36	12	90	4	1.32
316700	219.48	3/26/1981	40	22	99	24	2.12
	202.80	1947/1999	40	23	99	27	1.35
	214.32	1997/2002	40	24	99	26	0.82
371802	**20.00**	1968	36	18	78	31	0.21
	15.00	1968	36	20	78	32	2.66
404164	**20.00**	4/26/1967	36	19	98	26	2.55
481093	No wells found within 30 miles						
481113	No wells found within 30 miles						
481116	No wells found within 30 miles						
511419	**40.00**	9/1/1965	36	56	81	58	3.40
	59.00	5/5/1964	37	1	81	55	3.89
531005	**352.00**	1983/1985	47	4	118	36	1.59
	8.24	3/18/1967	47	5	118	37	0.57
	170.00	3/28/1974	47	7	118	39	2.03
	222.00	6/5/1974	47	7	118	39	2.75
	195.10	3/5/1969	47	7	118	39	2.84
836450	Canadian data not available						
836451	Canadian data not available						
906410	Canadian data not available						
906412	Canadian data not available						
040500	248.00	2/19/1952	32	50	111	59	1.07
	698.80	1/12/1994	32	50	111	59	1.07
	230.00	6/7/1951	32	50	112	0	1.28
060500	**11.60**	11/26/1919	34	48	116	36	0.11
080500	No wells found within 30 miles						
230500	10.20	9/1/1962	44	55	68	41	8.18
	7.00	9/6/1956	44	55	68	41	7.62
	6.32	9/26/1962	44	55	68	44	8.08
	10.50	7/30/1963	44	56	68	37	7.83
	8.54	9/23/1963	44	57	68	36	7.38
240500	30.00	9/17/1952	39	17	77	31	0.48
	355.00	6/16/1959	39	18	77	31	1.36
	190.00	6/16/1969	39	18	77	31	1.38
270500	**30.00**	4/6/1992	47	31	95	7	0.23
	33.00	5/13/1985	47	31	95	7	0.53
280500	40.00	8/4/1989	32	53	90	1	2.82
	65.00	7/22/1990	32	52	90	2	1.98
	100.00	12/28/1988	32	53	90	1	2.75
	30.00	5/1/1970	32	53	90	3	3.67
300500	**70.00**	7/22/1981	45	48	109	59	0.53
340500	12.55	11/30/1998	40	10	74	29	2.02
	5.99	10/21/1993	40	10	74	32	1.02
350502	184.06	2/12/1998	32	8	108	28	11.69
	147.27	2/18/1997	32	10	108	4	13.00
	165.67	average					
48A500	**439.48**	2/15/1997	32	44	96	44	20.93

Table D-1 (Cont'd) GWT Depths

Section	USGS GWT Depth (ft)	Date Measure Taken	Latitude N. (degrees)	Latitude N. (minutes)	Longitude W. (degrees)	Longitude W. (minutes)	Distance from Section (miles)
810500	Canadian data not available						
830500	0.60	6/25/1954	48	59	96	16	20.30
183003	No wells found within 30 miles						
295393	**5.00**	4/29/1969	38	52	90	43	0.12
	2.00	4/29/1969	38	52	90	43	0.15
	9.00	9/11/1970	38	52	90	43	0.60
393013	**12.70**	4/11/1964	38	51	83	54	1.27
501682	10.00	3/12/1973	44	18	73	13	1.22
	0.00	11/5/1971	44	18	73	13	1.09
	50.00	7/16/1971	44	18	73	14	0.65
	2.00	6/20/1975	44	19	73	14	0.51
	30.00	9/30/1970	44	19	73	14	0.43
	30.00	6/30/1974	44	19	73	14	0.18
	40.00	3/8/1977	44	19	73	14	0.25
400600	**22.00**	3/4/1947	36	44	97	21	1.24