LTPP North Central Regional Office
505 West University Avenue - Champaign, IL 61820-3915 - Tel 800 344-7477 - Fax 217 356-3088 - www.ncrco.com

June 12, 2001

Mr. Jack Springer, HRDI-13
FHWA-LTPP
Turner-Fairbank Highway Research Center
6300 Georgetown Pike
McLean, Virginia 22101-2296

Re: SPS Construction Report for SPS-6 near Potosi, Missouri

Dear Mr. Springer,

I have enclosed a copy of the construction report for the SPS-6 near Potosi, Missouri. This is the last of the SPS construction reports in Missouri. Please let me know if you have any comments or questions concerning this report. You may contact me at 217/356-4500.

Sincerely,

Brenda Bouché Mehnert

Brenda B. Mehnert
ERES Division of ARA, Inc.

Enclosures:

cc: M. Symons (FHWA-COTR)
J. Jiang (LTPP-DATS)

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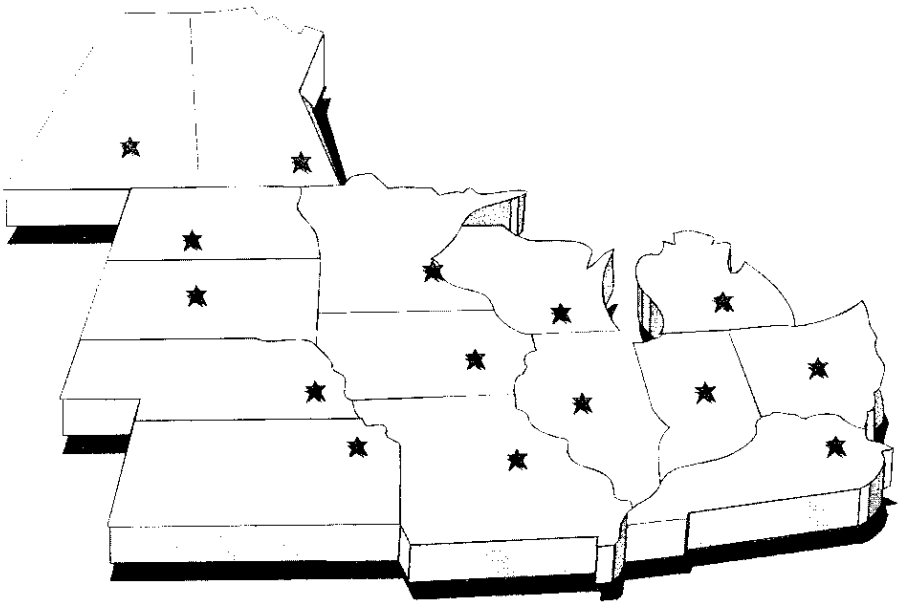
Construction Report for Missouri SPS-6

DTFH61-96-C-00013



June 12, 2001

LTPP

Submitted by

ERES CONSULTANTS

A Division of Applied Research Associates, Inc.

SPS-6 Construction Report
Washington County, Missouri
State Route 8 EB
East of Potosi, Missouri

Sections 29A601 through 29A608

Federal Highway Administration
LTPP Division
North Central Region

Report Prepared By
Brenda B Mehnert

ERES Consultants
A Division of Applied Research Associates, Inc
505 West University Ave
Champaign, Illinois 61820

June 12, 2001

TABLE OF CONTENTS

1 PROJECT OVERVIEW 1

1 1 EXPERIMENT CELL 2
1 2 PROJECT LOCATION 2
1 3 PROJECT LAYOUT 2
1 4 TRAFFIC CHARACTERISTICS 3
1 5 LIMITS OF TEST SECTIONS 3
1 6 WEATHER MONITORING 3
1 7 TRAFFIC MONITORING 4
1 8 PERSONNEL 4
1 9 KNOWN DEVIATIONS FROM GUIDELINES 5
1 10 SUMMARY OF KEY CONSTRUCTION EQUIPMENT 5

2 PROJECT DETAILS 6

2 1 DESIGN FEATURES 6
2 2 MATERIAL SAMPLING AND TESTING 6
2 3 REHABILITATION ACTIVITIES 7
2 4 ASPHALT PAVING 7
2 5 INITIAL PERFORMANCE 8

ATTACHMENTS

ATTACHMENT A PROJECT LOCATION

ATTACHMENT B SITE LAYOUT

ATTACHMENT C MATERIAL SAMPLING AND TESTING PLAN

ATTACHMENT D LAYER DESCRIPTION AND THICKNESS FOR EACH SECTION

ATTACHMENT E PROJECT DEVIATION REPORT

1 Project Overview

The Strategic Highway Research Program (SHRP) SPS-6 project investigates rehabilitation of jointed portland cement concrete (PCC) pavements Some of the primary factors considered in the selection of an appropriate overlay design and addressed on the long-term pavement performance of these pavements are

- Pavement condition
- Environment
- Traffic
- Pavement preparation (minimum vs extensive)
- Virgin or recycled asphalt concrete

For the SPS-6 sites only virgin asphalt concrete (AC) is used One of the factors that is varied is the level of pavement preparation There are three levels of pavement preparation, plus routine maintenance, which are applied to all test sections prior to the AC overlay for the SPS-6 sites The three levels of preparation are

- Minimal restoration level
- Intensive concrete pavement restoration (CPR) level
- Crack/break and seat

The minimal restoration level consists of routine maintenance including limited patching (filling potholes), crack repair and sealing, and stabilization of joints This level is typical of the current practice of the Missouri DOT prior to overlay

The intensive CPR level consists of several activities depending on the pavement distress and condition This intensive level represents a premium level of pavement preparation addressing grinding, sub-sealing, subdrainage, joint repair and sealing, full-depth patching with restoration of load transfer and shoulder rehabilitation Surface grinding and joint and crack sealing are not performed on test sections that will receive an AC overlay

The crack and seat process consists of using mechanical means to reduce slab size to minimize or eliminate reflective cracking in the asphalt concrete overlay Crack and seat is the process used with plain (nonreinforced) concrete pavement and break and seat is the process used with jointed reinforced concrete pavements

The study design includes three overlay thicknesses, (0, 102, and 203 mm) No overlay is used on the control section A 102-mm thick overlay is used on the test sections receiving the minimal restoration level of pavement preparation, the intensive CPR level of pavement preparation, and the crack and seat pavement preparation A 203-mm thick overlay is used on a test section that will involve crack and seat In addition, a 102-mm overlay in which joints are sawed above the existing joints and then seated will be applied to test sections receiving the minimum restoration treatment

The in-service tests performed in this study will quantify the influence of these parameters on pavement performance (life expectancy), and ultimately improve current design procedures The analysis of information developed will help highway agencies select more economical methods and strategies for the rehabilitation of existing PCC pavements

This is the second SPS-6 project in Missouri and therefore is noted as 29A600 Seven test sections and one control section were established Different pavement preparations, as well as varying asphalt concrete thicknesses, were used All the sections were constructed with the same type of base layer and subgrade—crushed stone over a fine-grained subgrade

This report summarizes the "as-built" pavement layers of the Missouri 29A600 site reconstructed in the summer of 1998 Field tests were performed, and laboratory samples obtained and analyzed, at different stages of construction from each test section All samples were taken from the eastbound lane

1 1 Experiment Cell

The Missouri 29A600 site is located in the wet-freeze environmental zone and was constructed on a fine-grained subgrade The primary reason for rehabilitation was the fair condition of the existing pavement due to cracking and faulting The faulting occurs primarily in cracks Joint and crack sealing of the existing pavement was part of the surface preparation prior to selection of this site

The existing pavement was originally opened to traffic in 1969 and consisted of the following structural layers

Table 1 Existing Missouri 29A600 structural layers

Layer	Material
Subgrade	Fine-grained material gravelly/sandy fat clay
Base	102 mm crushed stone
Surface	178 mm PCC

1 2 Project Location

The Missouri 29A600 project is located on the eastbound lane on State Route 8 (SR 8), 1 3 km east of the Route 21 intersection in Washington County This project is just east of Potosi Specifically, the eight sections are located on the eastbound lane of this two-lane undivided road Attachment A is a general project location map

Five sections are located entirely on fill, and three are located in cut sections The shortest transition between consecutive test sections is 122 meters The lanes are 3 7 m wide and have AC shoulders that are 2 4 m wide There are no subsurface edge drains used at this site

1 3 Project Layout

The Washington County 29A600 site incorporates eight SHRP sections Attachment B contains the test section layout that summarizes surface thickness and layer descriptions

1 4 Traffic Characteristics

This two-lane road is classified as a rural principal arterial road The nomination form submitted by the Missouri Department of Transportation indicated the traffic data at the time of construction shown in table 2

Table 2 Traffic data for Missouri 29A600

Annual Average Daily Traffic (two directions)	7250
% Heavy Trucks and Combinations (of AADT)	14
Count year of AADT Estimate	1995
Traffic Growth Rate Since Project Opened to Traffic (%/yr)	3 2%
18K ESAL Rate in Study Lane (1000 ESAL/YR)	200
Year of ESAL Rate Estimate	1996

ESAL = Equivalent single axle load
AADT = Annual average daily traffic

1 5 Limits of Test Sections

Table 3 shows the limits of the test sections at the SPS-A6 site Each test section includes a monitoring section of 152 meters (500 ft) or 305 meters (1000 ft) and a sampling area before and after the monitoring section

Table 3 Limits of Missouri 29A600 test sections

Test Section #	**Test Section**		**500-ft or 1000-ft* Monitoring Section**	
	Beginning Station	**End Station**	**Beginning Section**	**End Station**
29A602*	55+00	67+00	56+00	66+00
29A601**	73+00	80+00	74+00	79+00
29A606	87+00	94+00	88+00	93+00
29A604	94+00	101+00	95+00	100+00
29A605*	122+00	134+00	123+00	133+00
29A608	286+50	293+50	287+50	292+50
29A607	297+50	304+50	298+50	303+50
29A603	309+50	316+50	310+50	315+50

*305 meter section
** Control section

1.6 Weather Monitoring

There was no automatic weather station (AWS) unit installed specifically for this site The closest AWS unit, installed in February 2000, is located inside the Missouri DOT maintenance yard in Hannibal

1.7 Traffic Monitoring

There was no traffic-monitoring device installed near this site

1.8 Personnel

North Central Regional Coordination Office

ERES Consultants
Tom Wilson
Principal Investigator
505 West University Avenue
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Material Testing

Braun Intertec Corporation
Bruce M Thorson, PE or David Clauson
LTPP Testing Contractor
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Minneapolis, Minnesota 55439-0108 (612) 941-4151

Jason Blomberg
Research, Development and Technology
Missouri Dept of Transportation
105 West Capitol Avenue
Jefferson City, MO 65102 (573) 751-2551 and Fax (573) 751-6555
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Field Sampling and Testing

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LTPP Design Review

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2104 Indian Creek Court, Suite A
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State Department of Transportation

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Research, Development and Technology
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105 West Capitol Avenue
Jefferson City, MO 65102 (573) 751-2551 and Fax (573) 751-6555
www modot state mo us

Construction Contractor

Pace Construction Co
5000 Bussen Rd
St Louis, MO 63129 (314) 487-7489

1 9 Known Deviations from Guidelines

Attachment E contains project deviation reports filled out during and after construction

1.10 Summary of Key Construction Equipment

Surface Preparation Equipment

- Diamond grinding to eliminate faulting
- Air blast to clean cracks
- Backer rod to break bond under sealant
- Diamond blade saw to cut
- Hand-troweling for surface finishing
- Guillotine drop hammer to crack & seat PCC

Asphalt Concrete Pavement Placement

- Blawknox Model (PF-320) paver
- 11 7-ton double-drum vibrator roller
- 10 5-ton double-drum vibrator roller
- Asphalt concrete drum mix - Lead Belt #2

2 Project Details

Project meetings were held before construction began Representatives from the contractor, sub-contractors, and Missouri DOT attended these meetings Sampling of the existing pavement was performed in February 1998 Overlay operations began in late August 1998 and were completed by mid-September 1998 The new overlay was then sampled in late September 1998

2.1 Design Features

Table 4 summarizes the surface preparation, overlay asphalt concrete thickness, type of sub-drainage used and whether the section is predominantly in a cut or fill section

Table 4 Summary of surface preparation and minimum overlay thickness for each section

Test Section Number	Surface Preparation	Virgin AC Overlay Thickness (mm)	Cut or Fill	Shoulder Restoration	Sub-Drainage
29A602	Joint & crack sealing, diamond grinding and full-depth repair	none	Fill	none	none
29A601*	none	none	Cut	none	none
29A606	Full-depth repair, undersealing	102	Fill	gravel	Geocomposite Edge Drain
29A604	Full-depth repair, saw & seal PCC	102	Fill	gravel	none
29A605	Joint & crack sealing, diamond grinding, full-depth repair, undersealing	none	Fill	none	Geocomposite Edge Drain
29A608	Crack & seat	203	Fill	gravel	Geocomposite Edge Drain
29A607	Crack & seat	102	Cut	gravel	none
29A603	Full-depth repair	102	Cut	gravel	none

* Control section

2.2 Material Sampling and Testing

Material sampling before construction was completed in February 1998 Post-construction sampling was not performed until late September 1998 Locations of material sampling and field testing for each layer are given in attachment C LTPP sampling field testing procedures have been developed specifically for the SHRP SPS-6 program, and all activities were performed in accordance with these guidelines unless noted in attachment E Samples for laboratory testing

were sent to Braun Intertec and the Missouri Department of Transportation in Jefferson City, Missouri

2 3 Rehabilitation Activities

Full-depth repair consisted of diamond blade cutting the area needing repair, removing material and placing new concrete mixture The repair patch was then finished by hand troweling A visual inspection of the patch boundary was used to determine the extent of the area needing a patch Primary and secondary cracks needing repair were transverse and pumping, respectively The depth of a typical boundary saw cut was 191 mm There was no reinforcing steel placed in the patch and an epoxy filler was used for securing load-transfer The existing joints were not matched

Joint and crack sealing was performed by first removing any existing sealant with a diamond blade saw and then cleaning sidewalls with an air blast Typical new sealant reservoir dimensions were 15 mm wide and 51 mm deep that were filled with hot–poured elastic type sealer (D1190 ASTM- M173 AASHTO) The expansion joints and contraction joints had similar treatment

Diamond grinding was performed to eliminate the existing faulting The average depth of cut was 13 mm, with a cutting head width of 914 mm Both the average groove width and the spacing between blades were 2 5 mm

Areas needing undersealing were determined by using deflection data The depth of the undersealing hole from the top of the slab was typically 178 mm The average volume of material pumped per hole was 0 3 cubic meters A cement-pozzolan slurry was pumped with a maximum pressure of 1 kg/cm^2 To monitor lift during pumping a Benkelman beam deflection device was used Deflection measurements were taken before and after pumping

Subdrainage was placed to remove free water from pavement layer A geocomposite edge drain was placed 25+ mm from the outer edge of the pavement Graded aggregate was the primary filter with a maximum particle size of 13 mm The average outlet interval was 76 meters

Crack and seat operations were performed with a guillotine drop hammer One pass with a 50-ton seating roller followed the cracking operation Typical PCC breakage size was 914 x 457 mm The Missouri Department of Transportation took deflection measurements before breaking, after seating (prior to overlay) and after the AC overlay No deflection measurements were taken after breaking (prior to seating) The broken pavement surface was prepared with a tack coat

Outside shoulder restoration consisted of placing gravel on 2 4 m shoulders For sections 29A606, 29A604, 29A607, and 29A603, 102-mm thick gravel was used For section 29A608, gravel thickness was 203 mm

2.4 Asphalt Paving

Paving operations began August 20, 1998, and were completed by September 3, 1998 Those sections receiving an overlay had an AC binder placed before the final AC surface layer The optimum asphalt content (percent weight of total mix) was 4 4 for the surface layer and 4 2 for the binder layer The Lead Belt #2 Drum Mix Plant, located 13 minutes from the site, produced

the hot mix asphalt concrete for this site Placement of the asphalt concrete was performed with a Blawknox model PF-320 paver with a laydown width of 3 7 meter There was one longitudinal surface joint located between the lanes The mean laydown temperature of the asphalt was 152°C, and the air temperature was 30°C

The tack coat material was type SS-1 and was used as the minimum surface preparation before the overlay material was placed This tack coat material was applied at a rate of 0 06 gallon/sq yard Typically, for the AC surface layers, breakdown compaction was performed with an 11 7-ton double-drum vibrator roller using 8 coverages The intermediate compaction was obtained with a 10 5-ton double-drum roller using 6 coverages No final compaction was necessary Section 29A608 received a 203-mm overlay warranting a second lift with similar breakdown and intermediate compaction operations

2 5 Initial Performance

In February 2000, a manual distress survey found minimal distresses in those sections receiving the AC overlay Typical low-severity distress was of the transverse or reflective type and consisted of fewer than three cracks Only Section 29A604 had low-severity reflective cracks of the transverse type (32 of them)

The concrete sections that have had some type of rehabilitation are also performing well Only the control section, 29A601, appears to be have more distresses of the high-severity type

Attachment A

Project Location

Missouri (29)

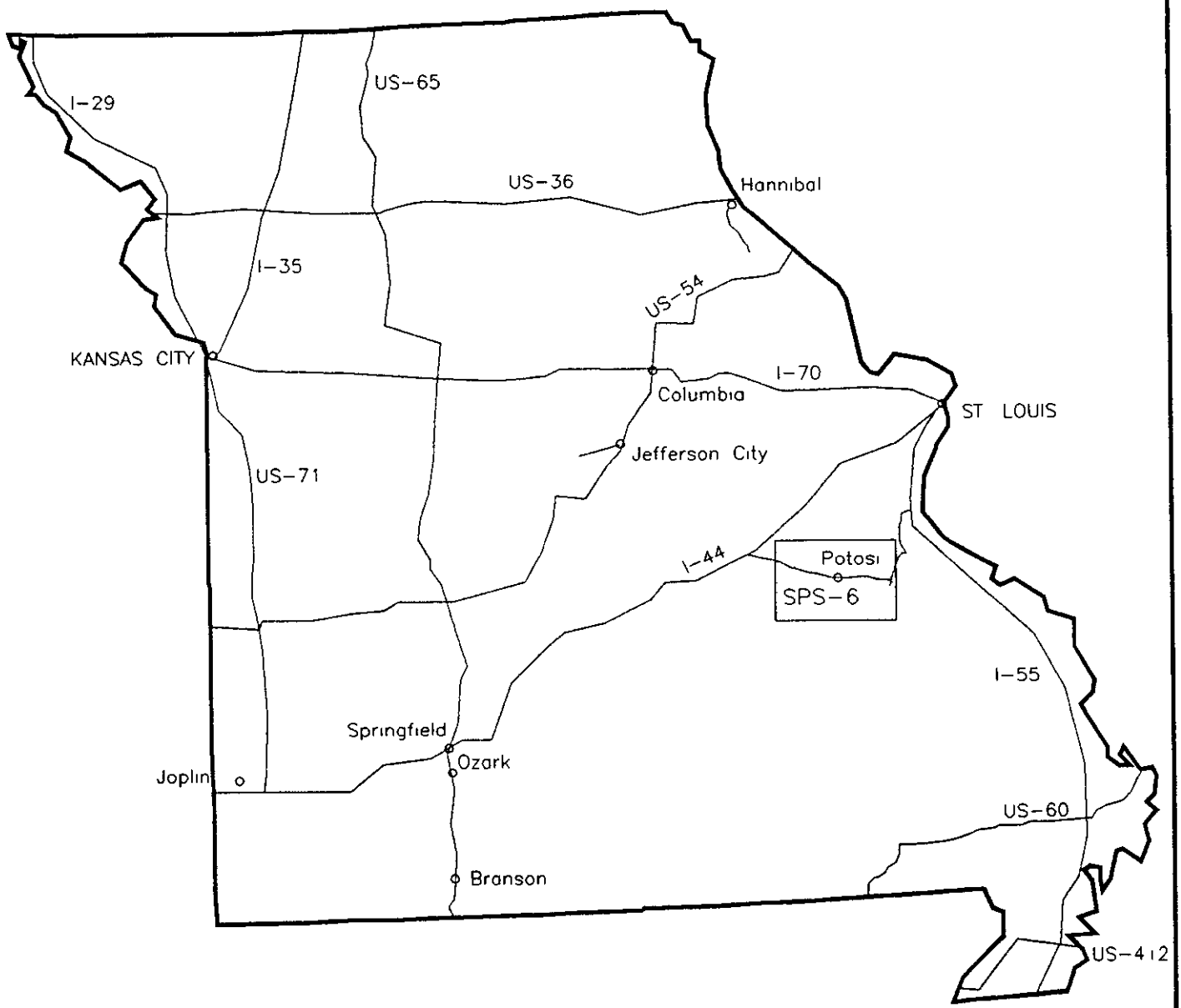
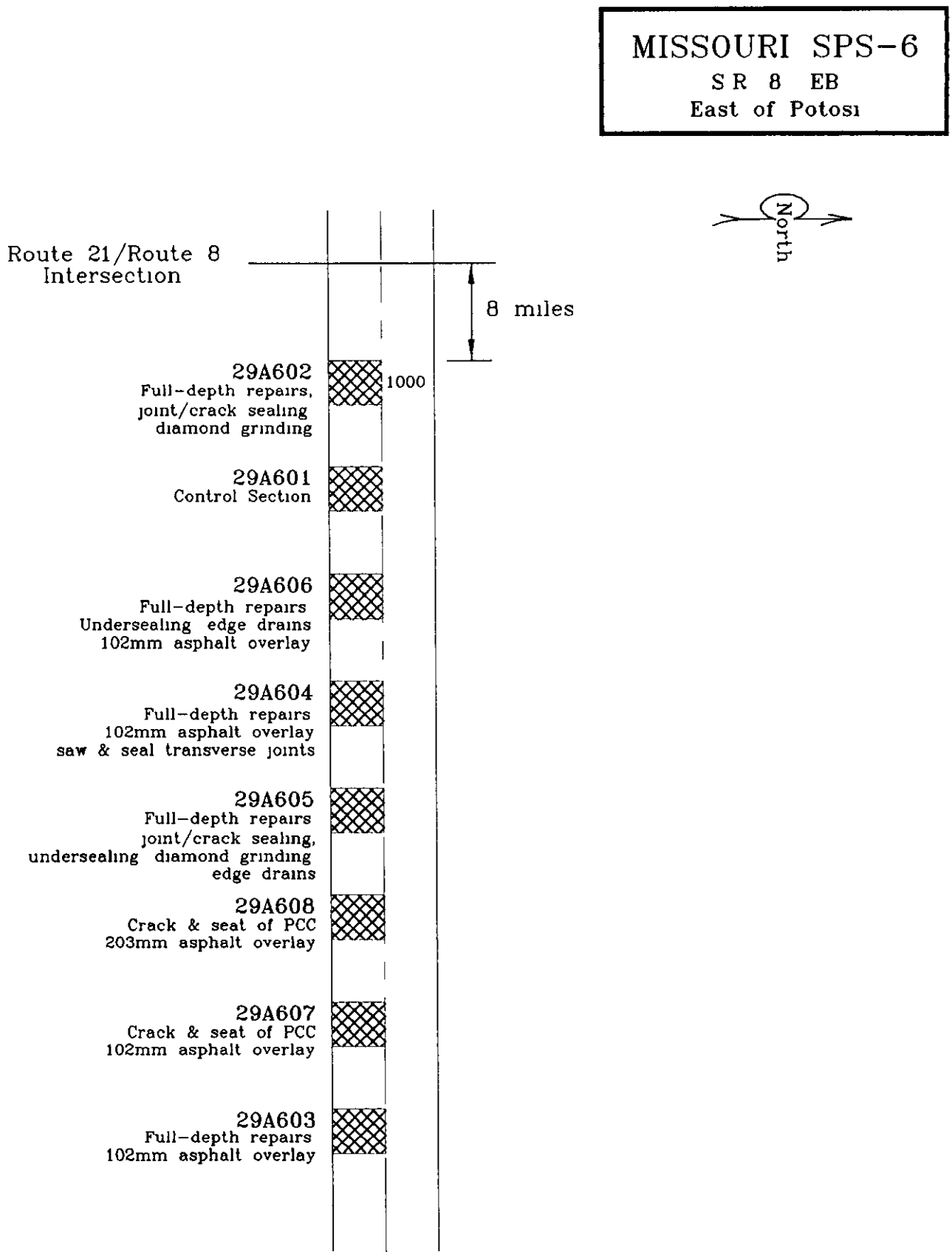


Figure A-1 General Project Location for 29A600

Attachment B

Site Layout



Revised 07-14-00

Figure B-1 Test site layout for 29A600 at Potosi, Missouri

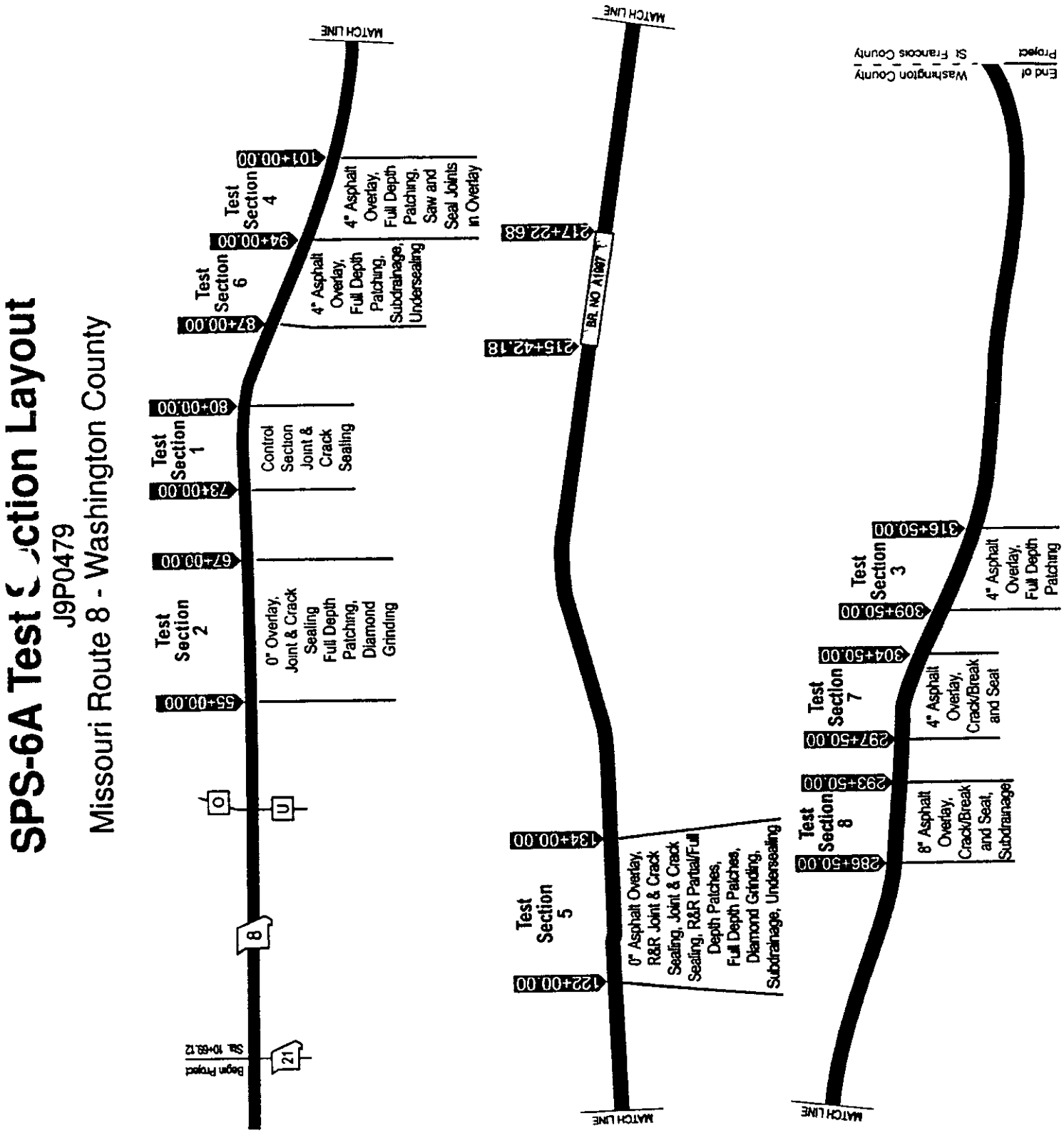


Figure B-2. Test section layout for 29A600.

Attachment C

Material Sampling and Testing Plan

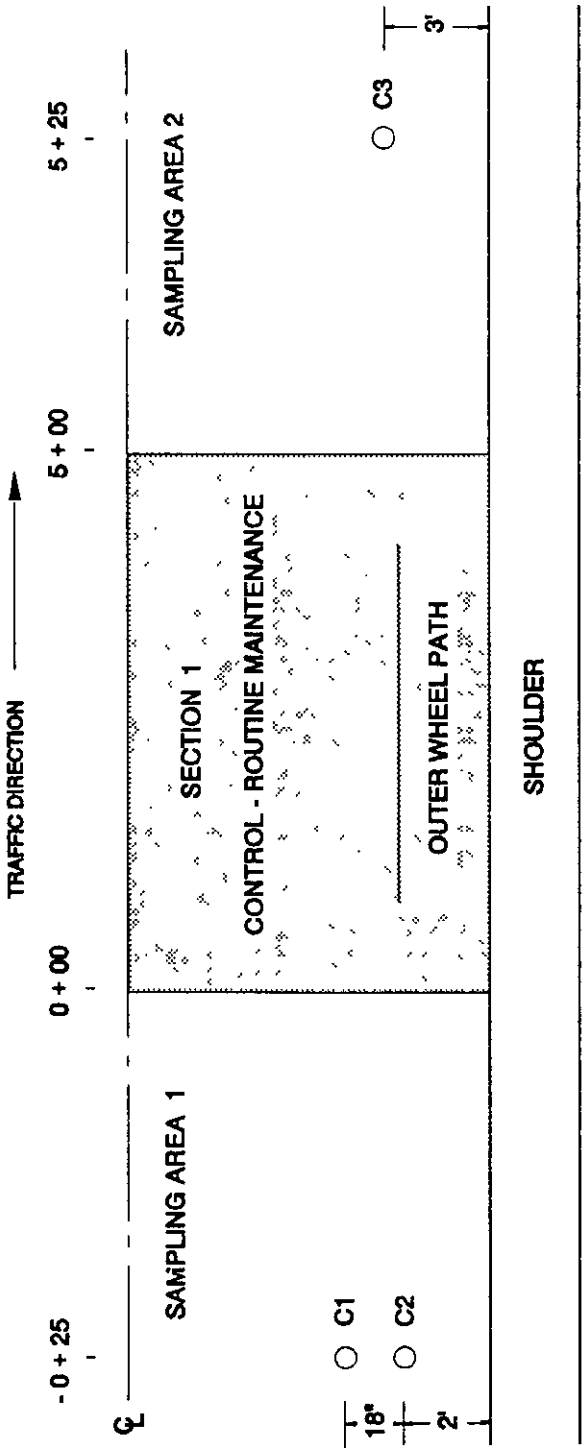


Figure A.2 Example of "Pre-Construction" Sampling Plan for Test Section 1

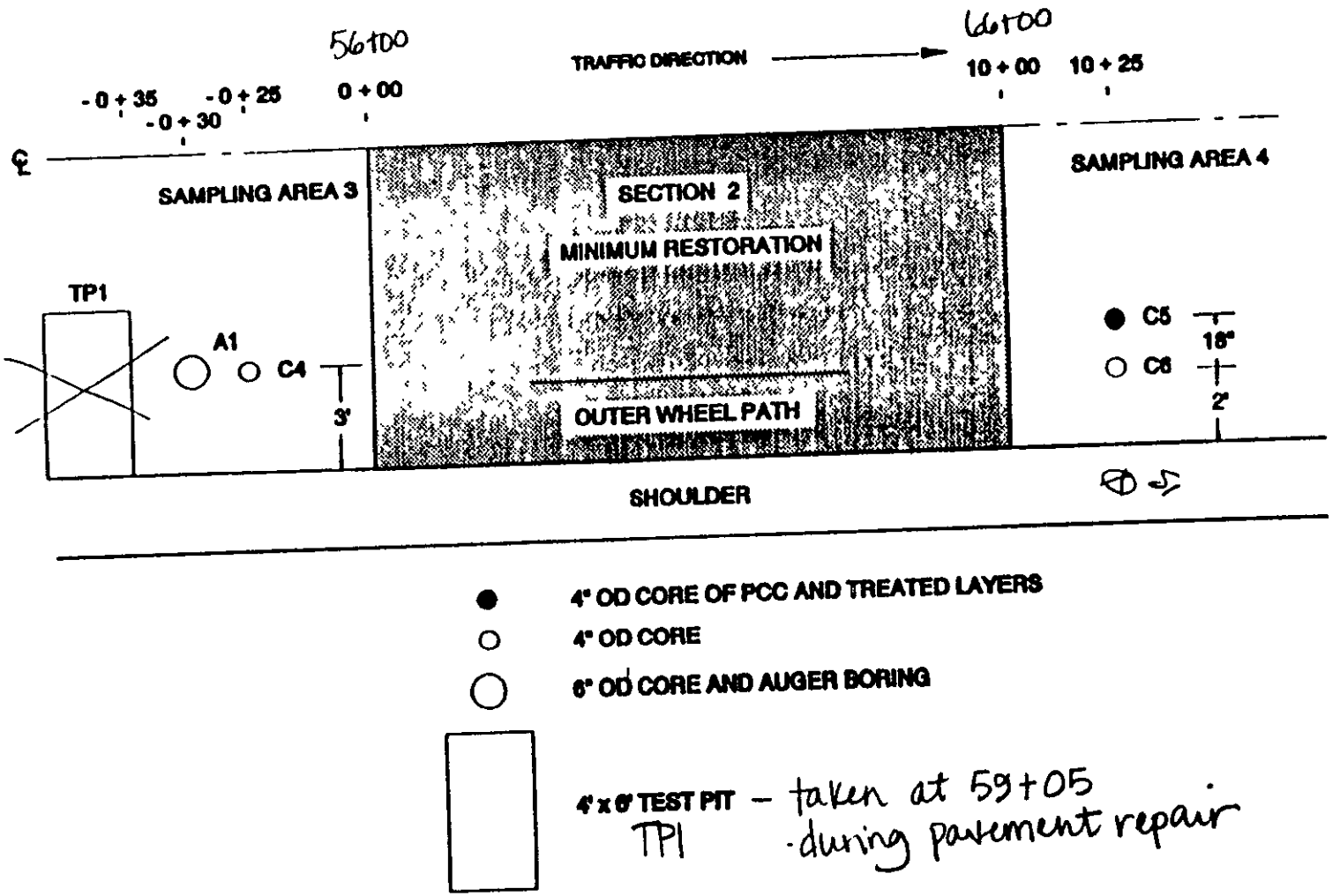
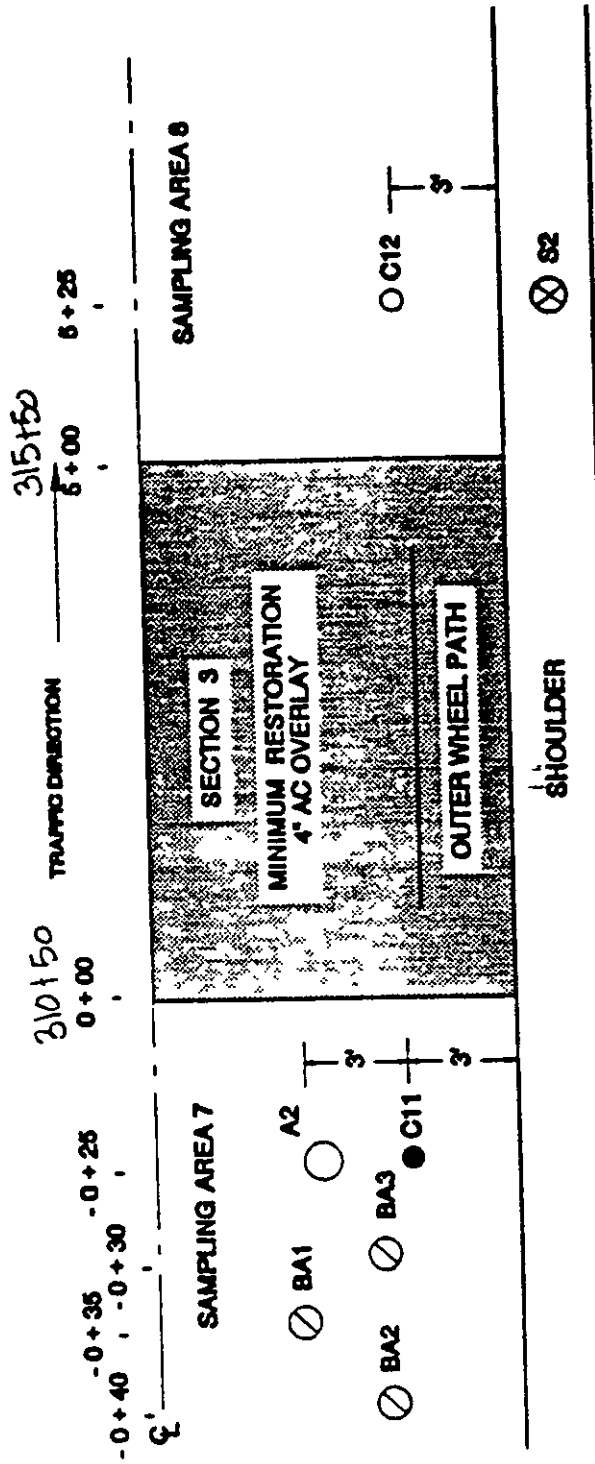


Figure A.3 Example of "Pre-Construction" Sampling Plan for Test Section 2

10 of 49



TP3 Test Pit taken @ 311+65

Figure A.6 Example of "Pre-Construction" Sampling Plan for Test Section 3

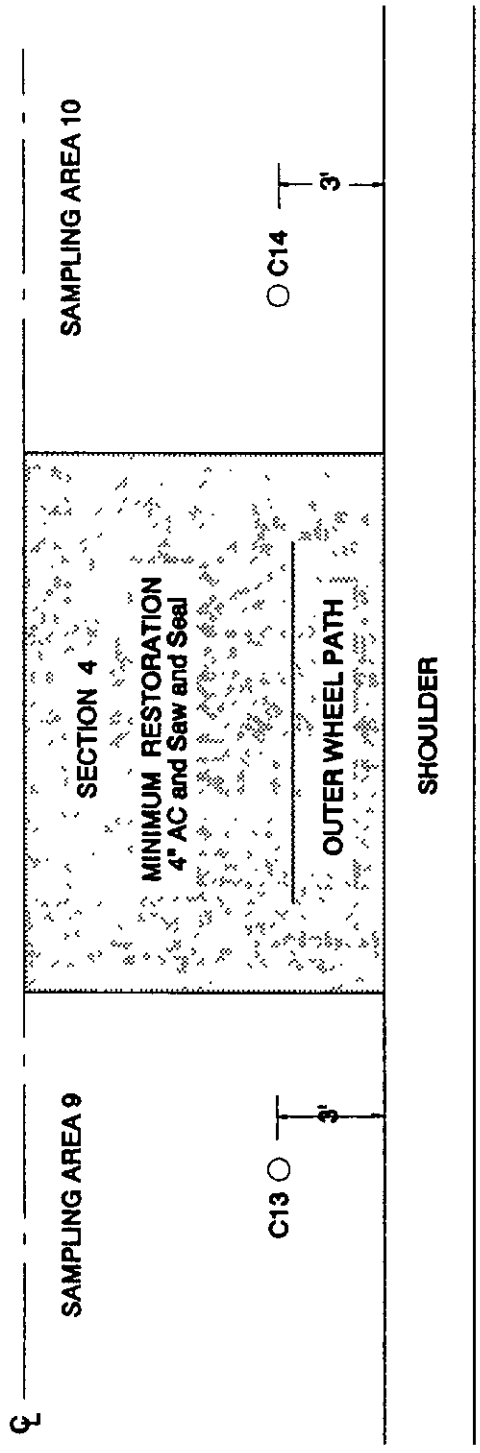


Figure A.6 Example of 'Pre-Construction' Sampling Plan for Test Section 4

21 of 49

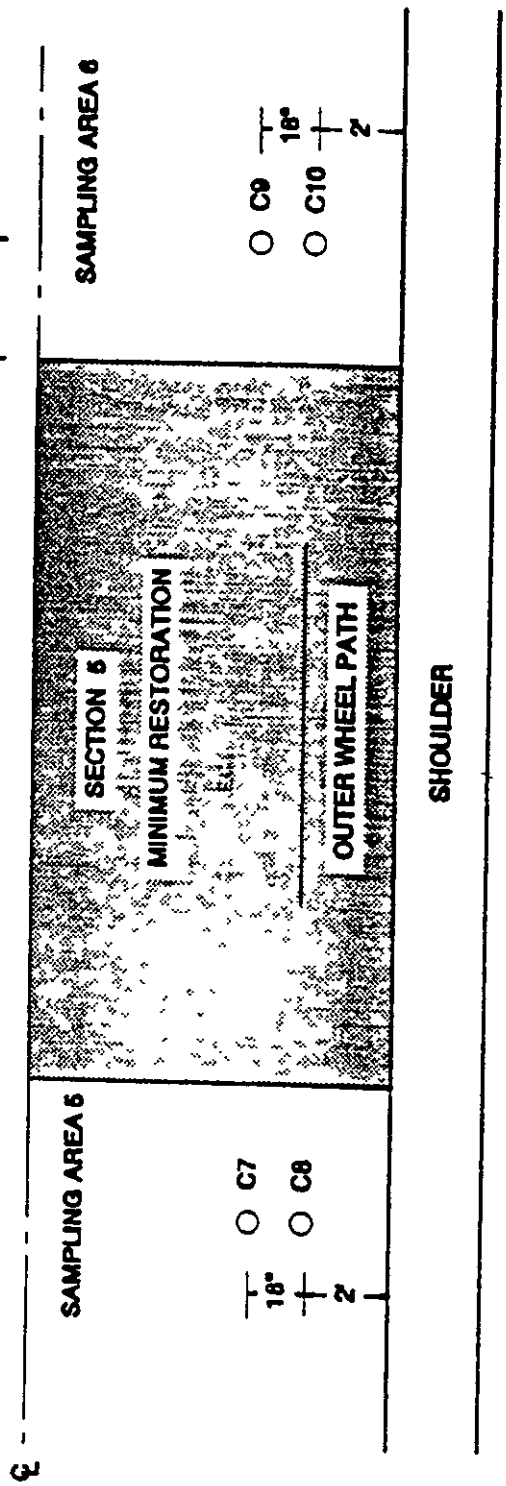


Figure A.4 Example of [redacted] Sampling Plan for Test Section 6

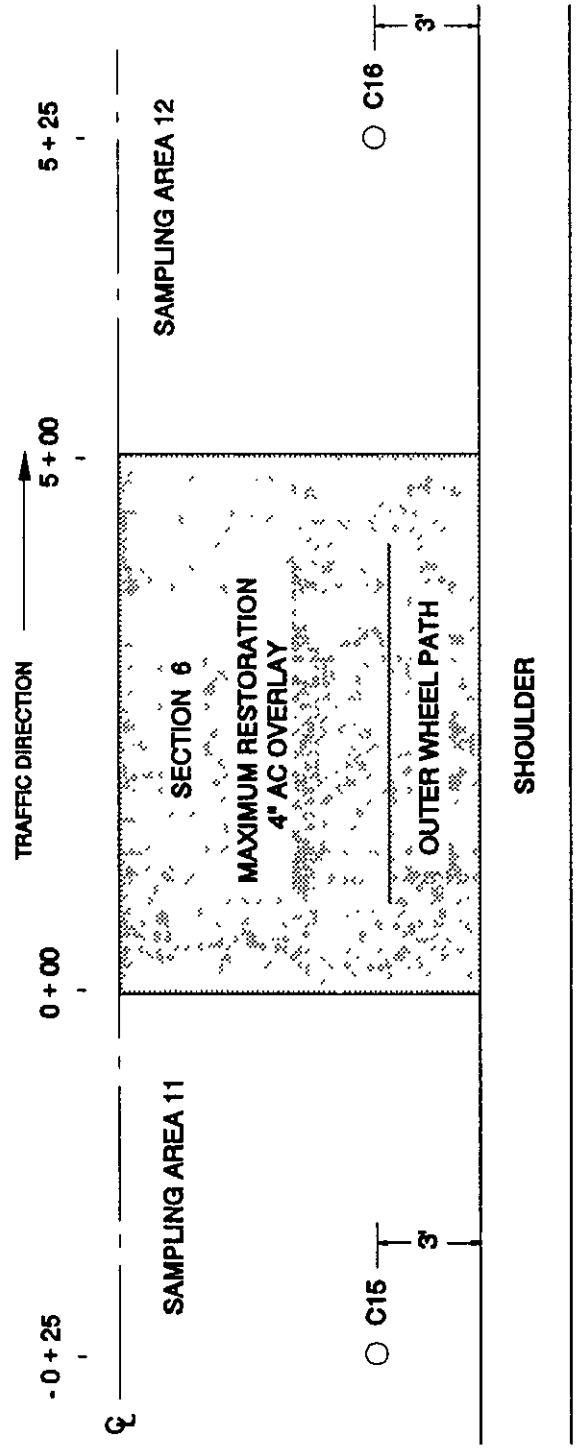


Figure A.7 Example of "Pre-Construction" Sampling Plan for test Section 6

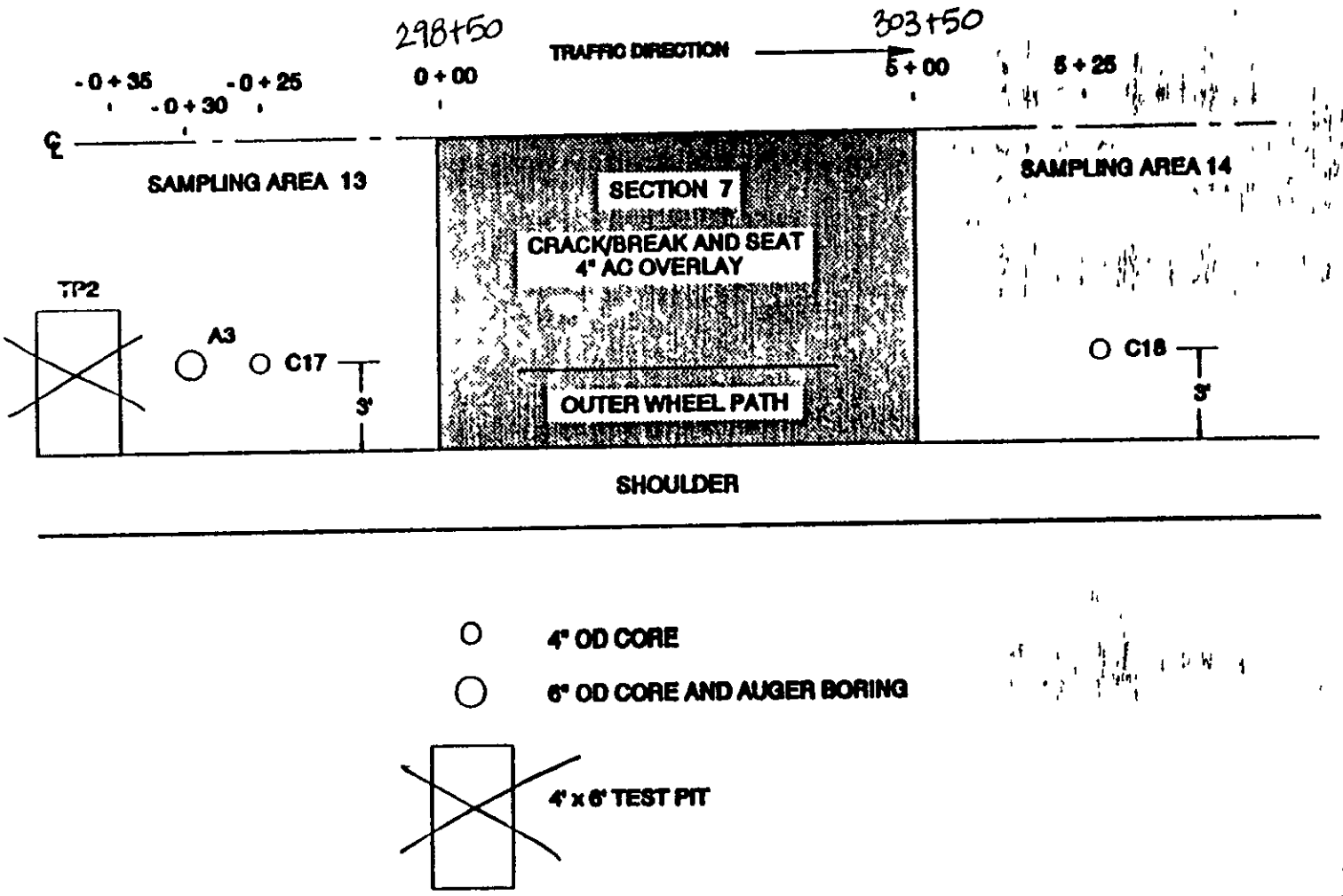


Figure A.6 E[illegible]mpling Plan for Test Section 7

26 of 46

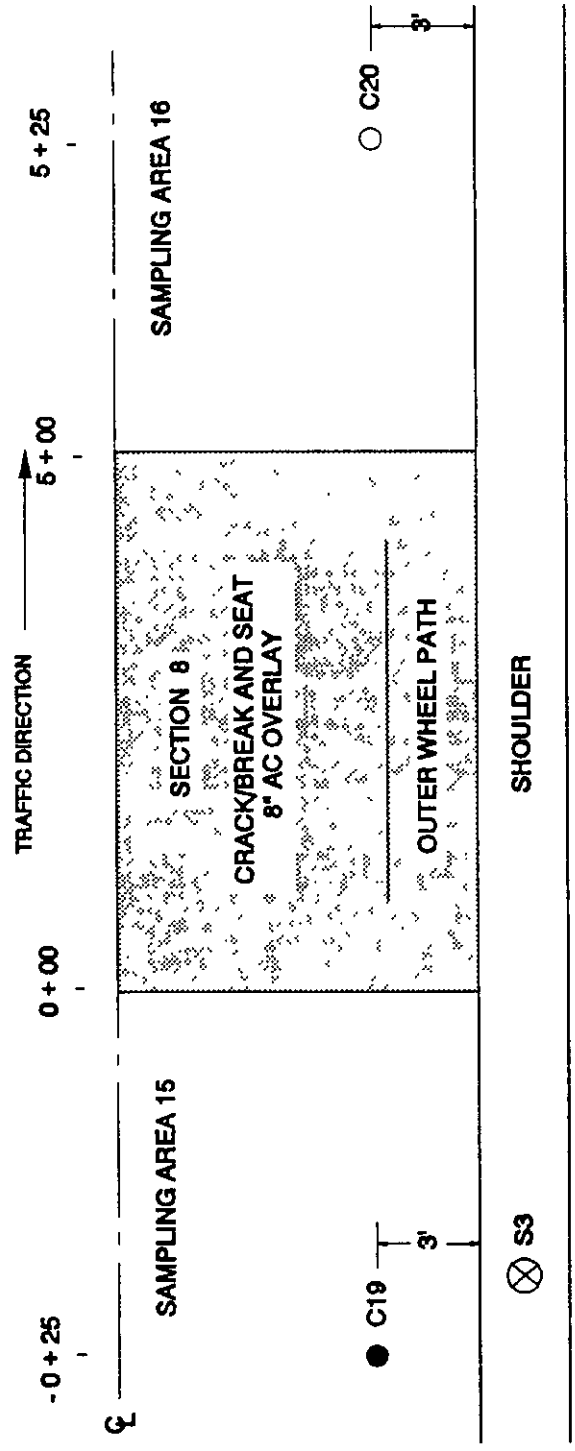


Figure A 9 Example of "Pre-Construction" Sampling Plan for Test Section 8

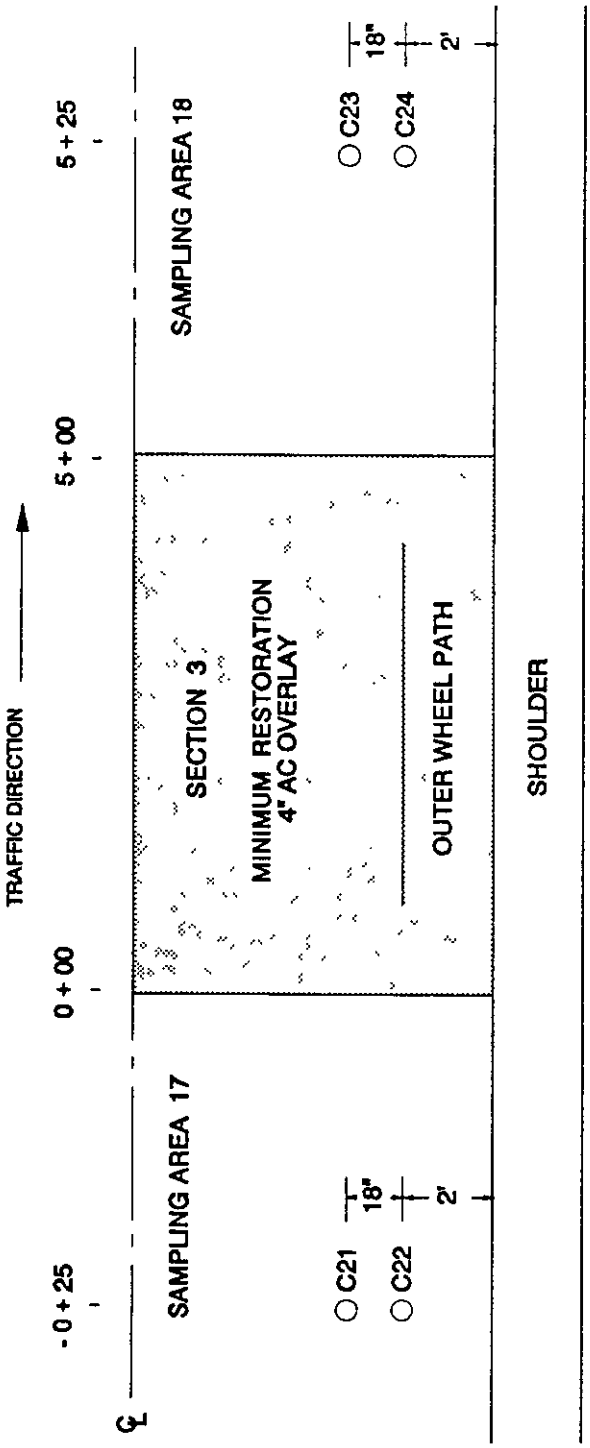


Figure B 2 Example of "Post-Construction" Sampling Plan for Test Section 3

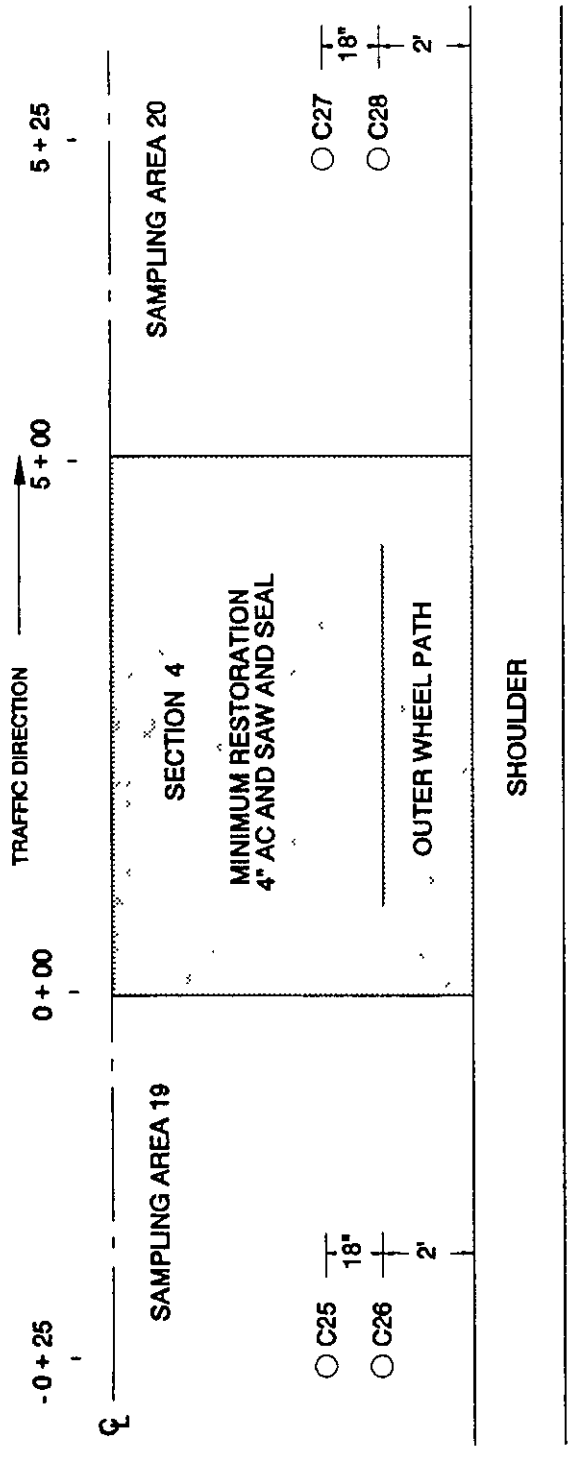


Figure B 3 Example of "Post-Construction" Sampling Plan for Test Section 4

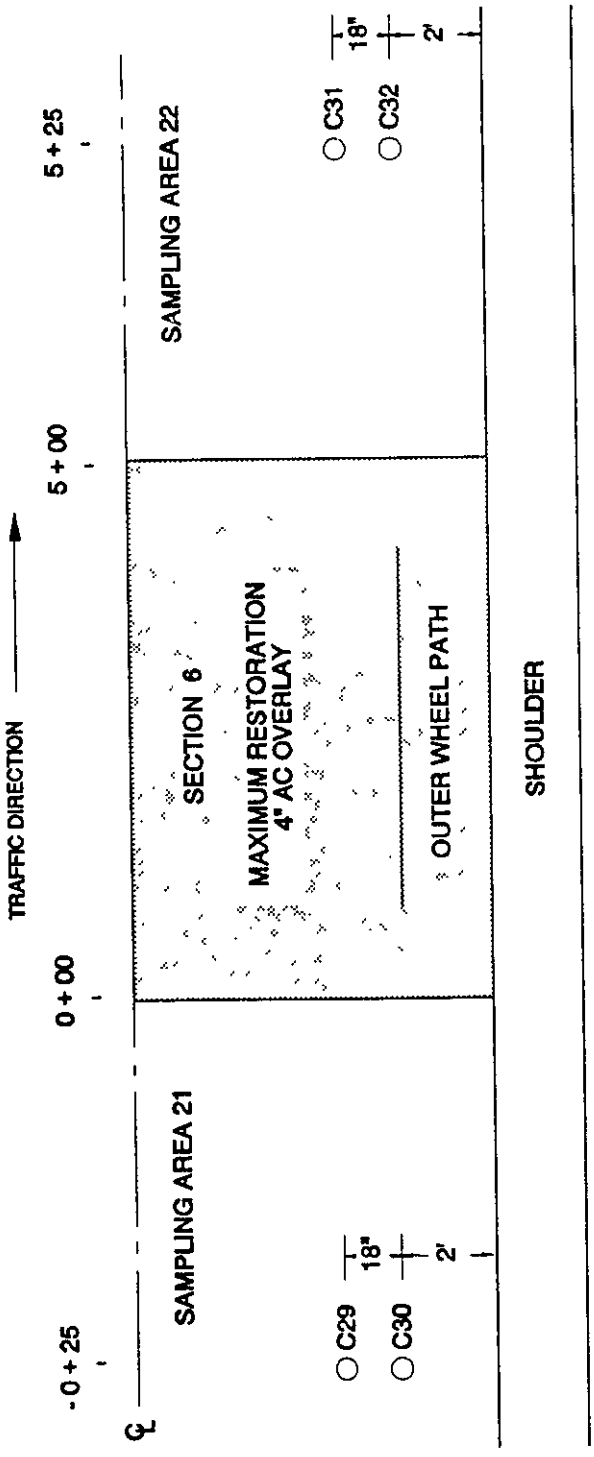


Figure B.4 Example of "Post-Construction" Sampling Plan for Test Section 6

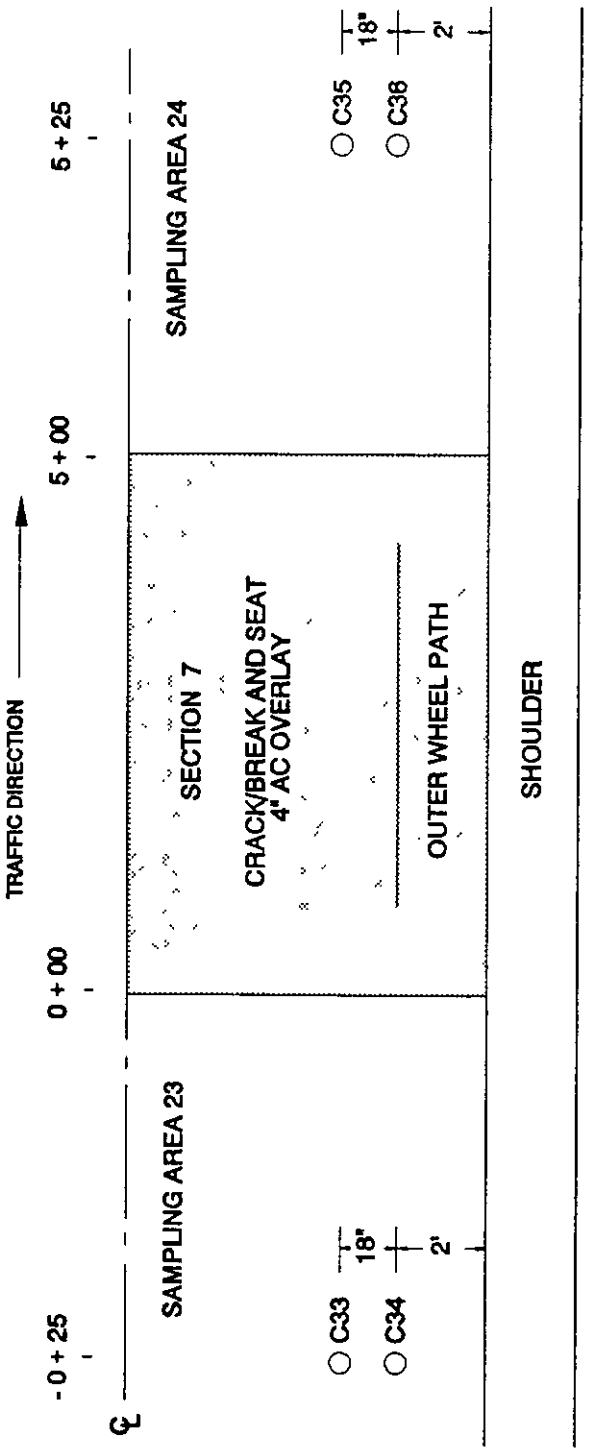


Figure B 5 Example of "Post-Construction" Sampling Plan for Test Section 7

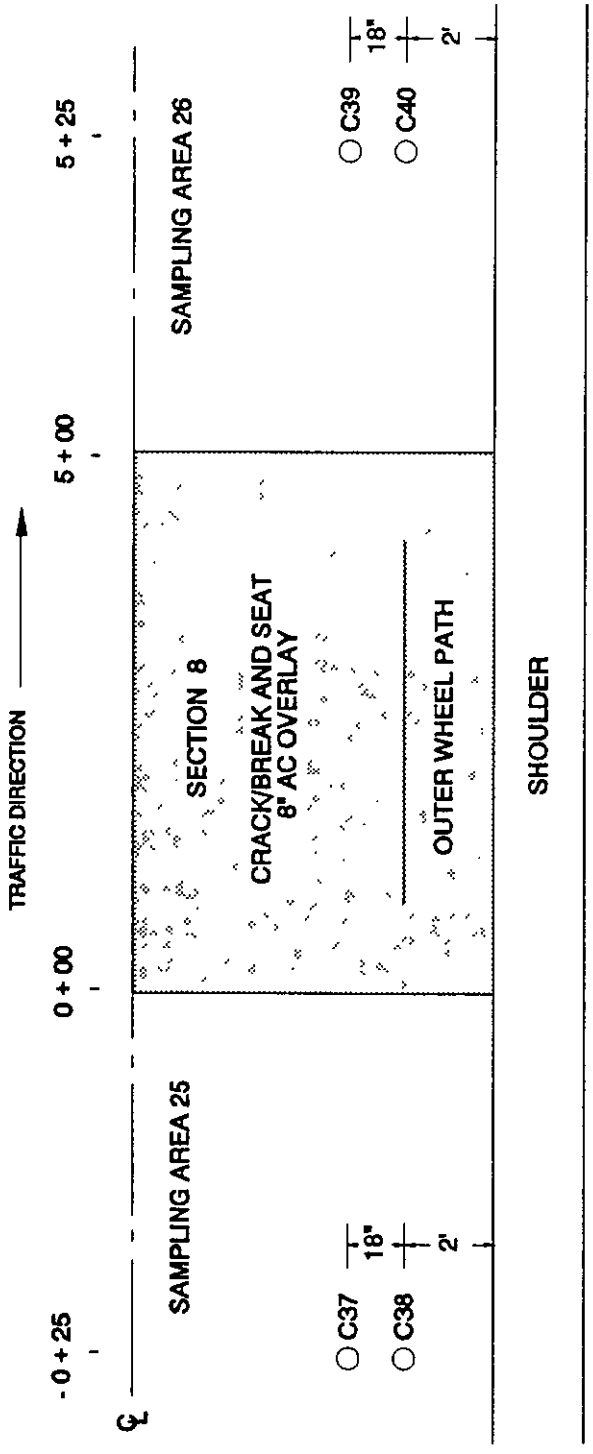


Figure B 6 Example of "Post-Construction" Sampling Plan for Tets section 8

Missouri
Department
of Transportation

MoDOT

Henry Hungerbeeler, Director

105 West Capitol Avenue
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Jefferson City, MO 65102
(573) 751-2551
Fax (573) 751-6555
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July 21, 2000

ERES Consultants
Attn Lynn Evans
505 West University Avenue
Champaign, IL 61820-3915

Dear ERES Consultants

Attached are the pre and post construction laboratory results from the SPS-6A SHRP, experiment on Route 8, Washington County, Missouri Also attached is a list containing all samples that were taken during the construction of the SPS-6A Note that the highlighted samples on the list and their results cannot be found in our laboratory

If there is other missing data from the SPS-6A, please contact me at (573) 526-4338 to discuss Thank you for your help

Sincerely,

Jason Blomberg
Research, Development and Technology

jb/ks
j \blombj\eres72500 doc
Attachments

28 JUL 2000

SPS	Number	Location	Type	Material	Lab	Sample Date		Tested Date		
A6	AP01	A1	CORE	PCCP	TURNE	02/23/1998				
A6	AP02	A2	CORE	PCCP	TURNE	02/24/1998				
A6	AP03	A3	CORE	PCCP	TURNE	02/25/1998				
A6	BG01	BA1	BAG	BASE	BRAUN	02/24/1998				
A6	BG01-1	TP1	BAG	BASE	BRAUN	06/17/1998				
	BG01-2	TP1	BAG	BASE	BRAUN	06/17/1998				
A6	BG02	BA2	BAG	BASE	BRAUN	02/24/1998				
A6	BG02-1	TP2	BAG	BASE	BRAUN	06/19/1998				
A6	BG02-2	TP2	BAG	BASE	BRAUN	06/19/1998				
A6	BG03	BA3	BAG	BASE	BRAUN	02/24/1998				
6	BG03-1	TP3	BAG	BASE	BRAUN	06/25/1998				
.6	BG03-2	TP3	BAG	BASE	BRAUN	06/25/1998				
A6	BO01	PLANT		OIL	SHRP	08/17/1998				
6	BO02	PLANT		OIL	SHRP	08/17/1998				
6	BO03	PLANT		OIL	SHRP	08/19/1998				
A6	BO04	PLANT		OIL	SHRP	08/19/1998				
A6	BO05	PLANT		OIL	SHRP	08/20/1998				
A6	BO06	PLANT		OIL	SHRP	08/20/1998				
A6	BO07	PLANT		OIL	SHRP	08/25/1998				
A6	BO08	PLANT		OIL	SHRP	08/25/1998				
A6	BO09	PLANT		OIL	SHRP	08/25/1998				
A6	BO10	PLANT		OIL	SHRP	08/25/1998				
A6	BO11	PLANT		OIL	SHRP	08/25/1998				
A6	BP01	BA1	CORE	PCCP	N/A	02/24/1998				
A6	BP02	BA2	CORE	PCCP	N/A	02/24/1998				
A6	BP03	BA3	CORE	PCCP	N/A	02/24/1998				
A6	BR01	PLANT		AGGREGATE	SHRP	08/13/1998				
A6	BR02	PLANT		AGGREGATE	SHRP	08/25/1998				
A6	BS01	BA3	BAG	SUBGRADE	MoDOT	02/24/1998	1	04/09/1998		
A6	BS01-1	TP1	BAG	SUBGRADE	BRAUN	06/17/1998				
A6	BS01-2	TP1	BAG	SUBGRADE	BRAUN	06/17/1998				
A6	BS02	BA3	BAG	SUBGRADE	MoDOT	02/24/1998	1	04/09/1998		
	BS02-1	TP2	BAG	SUBGRADE	BRAUN	06/19/1998				
	BS02-2	TP2	BAG	SUBGRADE	BRAUN	06/19/1998				
A6	BS03	BA3	BAG	SUBGRADE	MoDOT	02/24/1998	1	04/09/1998		
3	BS03-1	TP3	BAG	SUBGRADE	BRAUN	06/25/1998				
3	BS03-2	TP3	BAG	SUBGRADE	BRAUN	06/25/1998				
A6	BV01	PLANT	BA01	IB ASPHALT	MoDOT	08/17/1998			569	3 9
A6	BV02	PLANT	BA02	IB ASPHALT	MoDOT	08/17/1998			586	3 6
A6	BV03	PLANT	BA03	IB ASPHALT	SHRP	08/19/1998				
A6	BV04	PLANT	BA04	IB ASPHALT	SHRP	08/19/1998				
A6	BV05	PLANT	BA05	IB ASPHALT	MoDOT	08/20/1998			566	4 4
A6	BV06	PLANT	BA06	IB ASPHALT	SHRP	08/20/1998				
A6	BV07	PLANT	BA07	IC ASPHALT	SHRP	08/24/1998				
A6	BV08	PLANT	BA08	IC ASPHALT	MoDOT	08/24/1998			564	4
A6	BV09	PLANT	BA09	IC ASPHALT	SHRP	08/25/1998				
6	BV10	PLANT	BA10	IC ASPHALT	SHRP	08/25/1998				
6	BV11	PLANT	BA11	IC ASPHALT	SHRP	08/25/1998				
A6	BV12	PLANT	BA12	IC ASPHALT	MoDOT	08/25/1998			542	4 6
A6	CA21	C21	CORE	ASPHALT	BRAUN	09/21/1998				
16	CA22	C22	CORE	ASPHALT	BRAUN	09/21/1998				
16	CA23	C23	CORE	ASPHALT	BRAUN	09/21/1998				
A6	CA24	C24	CORE	ASPHALT	BRAUN	09/21/1998				
A6	CA25	C25	CORE	ASPHALT	BRAUN	09/22/1998				
16	CA26	C26	CORE	ASPHALT	MoDOT	09/22/1998				
A6	CA27	C27	CORE	ASPHALT	MoDOT	09/22/1998				
A6	CA28	C28	CORE	ASPHALT	MoDOT	09/22/1998				
	CA29	C29	CORE	ASPHALT	MoDOT	09/22/1998				
	CA30	C30	CORE	ASPHALT	BRAUN	09/22/1998				
A6	CA31	C31	CORE	ASPHALT	BRAUN	09/22/1998				
	CA32	C32	CORE	ASPHALT	BRAUN	09/22/1998				
A6	CA33	C33	CORE	ASPHALT	BRAUN	09/21/1998				
A6	CA34	C34	CORE	ASPHALT	BRAUN	09/21/1998				
A6	CA35	C35	CORE	ASPHALT	MoDOT	09/21/1998				
A6	CA36	C36	CORE	ASPHALT	BRAUN	09/21/1998				
16	CA37	C37	CORE	ASPHALT	BRAUN	09/21/1998				

cannot be found regarding its cover ltr

6	CA38	C38	CORE	ASPHALT	BRAUN	09/21/1998		
6	CA39	C39	CORE	ASPHALT	BRAUN	09/21/1998		
6	CA40	C40	CORE	ASPHALT	BRAUN	09/21/1998		
6	CG01	A1	BAG	BASE	BRAUN	02/23/1998		
6	CG02	A2	BAG	BASE	BRAUN	02/24/1998		
	CG03	A3	BAG	BASE	BRAUN	02/25/1998		
6	CP01	C1	CORE	PCCP	MoDOT	02/23/1998	03/26/1998	
6	CP02	C2	CORE	PCCP	MoDOT	02/23/1998	03/26/1998	
6	CP03	C3	CORE	PCCP	MoDOT	02/23/1998	03/26/1998	
6	CP04	C4	CORE	PCCP	MoDOT	02/23/1998	03/26/1998	
6	CP05	C5	CORE	PCCP	MoDOT	02/23/1998	03/26/1998	
6	CP06	C6	CORE	PCCP	MoDOT	02/23/1998	03/26/1998	
6	CP07	C7	CORE	PCCP	MoDOT	02/24/1998	03/26/1998	
6	CP08	C8	CORE	PCCP	MoDOT	02/24/1998	03/26/1998	
6	CP09	C9	CORE	PCCP	MoDOT	02/24/1998	03/26/1998	
6	CP10	C10	CORE	PCCP	MoDOT	02/24/1998	03/26/1998	
6	CP11	C11	CORE	PCCP	MoDOT	02/24/1998	03/26/1998	
6	CP12	C12	CORE	PCCP	MoDOT	02/24/1998	03/26/1998	
6	CP13	C13	CORE	PCCP	MoDOT	02/24/1998	03/26/1998	
6	CP14	C14	CORE	PCCP	MoDOT	02/24/1998	03/26/1998	
6	CP15	C15	CORE	PCCP	MoDOT	02/24/1998	03/26/1998	
6	CP16	C16	CORE	PCCP	MoDOT	02/24/1998	03/26/1998	
6	CP17	C17	CORE	PCCP	MoDOT	02/25/1998	03/26/1998	
6	CP18	C18	CORE	PCCP	MoDOT	02/25/1998	03/26/1998	
6	CP19	C19	CORE	PCCP	MoDOT	02/24/1998	03/26/1998	
6	CP20	C20	CORE	PCCP	MoDOT	02/24/1998	03/26/1998	
6	IWP	300+43	CORE	PCCP-CBS	N/A	08/14/1998		
6	MG01	TP1	JAR	BASE	BRAUN	06/17/1998		
6	MG02	BA2	JAR	BASE	BRAUN	02/24/1998		
6	MG03	BA3	JAR	BASE	BRAUN	02/24/1998		
6	MS01	BA1	JAR	SUBGRADE	MoDOT	02/24/1998	04/09/1998	
6	MS01-T	TP1	JAR	SUBGRADE	BRAUN	06/17/1998		
	MS02	BA2	JAR	SUBGRADE	MoDOT	02/24/1998	04/09/1998	
	MS02-T	TP2	JAR	SUBGRADE	BRAUN	06/19/1998		
6	MS03	BA3	JAR	SUBGRADE	MoDOT	02/24/1998	04/09/1998	
6	MS03-T	TP3	JAR	SUBGRADE	BRAUN	06/25/1998		
6	OWP	300+26	CORE	PCCP-CBS	N/A	08/14/1998		
6	TS01	A1	SHELBY	SUBGRADE	BRAUN	02/23/1998		
6	TS02	A2	SHELBY	SUBGRADE	BRAUN	02/24/1998		
6	TS03	A3	SHELBY	SUBGRADE	BRAUN	02/25/1998		

SPS-6

TABLE 3. PRE-CONSTRUCTION LABORATORY TESTING PLANS

Material Type and Properties	SHRP Designation	SHRP Protocol	Tests per Layer	Material Source/ Test Locations
I. PORTLAND CEMENT CONCRETE				
Compressive Strength	PC01	P61	10	C1 C3 C5 C7 C9 C11 C13 C15 C17 C19
Splitting Tensile Strength	PC02	P62	10	C2 C4 C6 C8 C10 C12 C14 C16 C18 C20
PCC Coefficient of Thermal Expansion	PC03	P63	3	A1 A2 A3
Static Modulus of Elasticity	PC04	P64	6	C3 C5 C7 C11 C15 C17
PCC Unit Weight	PC05	P65	10	C1 C3 C5 C7 C9 C11 C13 C15 C17 C19
Core Examination / Thickness	PC06	P66	23	C1-C20 A1 A2 A3
II. BOUND (TREATED) BASE AND SUBBASE				
Type and Classification of Material and Treatment	TB01	P31	3	C5 C11 C19
Pozzolanic/Cementitious: Compressive Strength	TB02	P32	3	C5 C11 C19
Asphalt treated: Dynamic Modulus (77F)	TB03	P33	3	C5 C11 C19
HMAC: Resilient Modulus	AC07	P07	3	C5 C11 C19
III. UNBOUND GRANULAR BASE AND SUBBASE				
Particle Size Analysis	UG01	P41	3	TP1 [BA1-3] TP2
Sieve Analysis (washed)	UG02	P41	3	TP1 [BA1-3] TP2
Atterberg Limits	UG04	P43	3	TP1 [BA1-3] TP2
Moisture-Density Relations	UG05	P44	3	TP1 [BA1-3] TP2
Resilient Modulus	UG07	P46	3	TP1 [BA1-3] TP2
Classification	UG08	P47	3	TP1 [BA1-3] TP2
Permeability	UG09	P48	3	TP1 [BA1-3] TP2
Natural Moisture Content	UG10	P49	3	TP1 [BA1-3] TP2
IV. SUBGRADE				
Sieve Analysis	SS01	P51	3	TP1 [BA1-3] TP2
Hydrometer to 0.001mm	SS02	P42	3	TP1 [BA1-3] TP2
Atterberg Limits	SS03	P43	3	TP1 [BA1-3] TP2
Classification	SS04	P52	6	TP1 [BA1-3] TP2 A1 A2 A3
Moisture-Density Relations	SS05	P55	3	TP1 [BA1-3] TP2
Resilient Modulus	SS07	P48	3	A1 A2 A3
Unit Weight	SS08	P56	6	TP1 [BA1-3] TP2 A1 A2 A3
Natural Moisture Content	SS09	P49	3	TP1 [BA1-3] TP2
Depth to Rigid Layer			3	S1 S2 S3

NOTE: 1 Samples within brackets are from the same sampling location.

TABLE 4. POST-CONSTRUCTION LABORATORY TESTING PLANS

Material Type and Properties	SHRP Designation	SHRP Protocol	Tests per Layer	Material Source/ Test Locations
A. ASPHALT CONCRETE:				
Core Examination/Thickness	AC01	P01	20	ALL CORES
Bulk Specific Gravity	AC02	P02	20	ALL CORES
Maximum Specific Gravity	AC03	P03	3	BV1 BV2 BV3
Asphalt Content (Extraction)	AC04	P04	3	BV1 BV2 BV3
Moisture Susceptibility	AC05	P05	3	BV1 BV2 BV3
Creep Compliance	AC06	P06	3	C25 C34 C36
Resilient Modulus	AC07	P07	3	[C21,C22,C23],[C31,C32,C33],[C38,C39,C40]
Tensile Strength	AC07	P07	3	C24 C30 C37
B. EXTRACTED AGGREGATE:				
Bulk Specific Gravity:				
Coarse Aggregate	AG01	P11	3	FROM UNCOMPACTED MIX
Fine Aggregate	AG02	P12	3	FROM UNCOMPACTED MIX
Type and Classification:				
Coarse Aggregate	AG03	P13	3	FROM UNCOMPACTED MIX
Fine Aggregate	AG03		3	FROM UNCOMPACTED MIX
Gradation of Aggregate	AG04	P14	3	FROM UNCOMPACTED MIX
Roundness Index of Coarse Aggregate	AG06	P14B	3	FROM UNCOMPACTED MIX
NAA Test for Fine Aggregate Particle Shape	AG05	P14A	3	FROM UNCOMPACTED MIX
C. ASPHALT CEMENT (FROM MIX):				
Abson Recovery	AE01	P21	3	FROM UNCOMPACTED MIX
Penetration at 50F,77F,90F	AE02	P22	3	FROM UNCOMPACTED MIX
Specific Gravity (60F)	AE03	P23	3	FROM UNCOMPACTED MIX
Viscosity at 77F	AE04	P24	3	FROM UNCOMPACTED MIX
Viscosity at 140F,275F	AE05	P25	3	FROM UNCOMPACTED MIX

Bulk sample of Asphalt concrete

NOTE: 1 Samples within brackets are from the same sampling location.

Attachment D

Layer Description and Thickness for Each Section

Table D-1 Material codes

Material Code	Layer Code	Material Description
112	A	Subgrade-Fine-Grained Gravelly Fat Clay
115	B	Subgrade-Fine-Grained Sandy Fat Clay
303	C	Base-Crushed Stone
730	D	Portland Cement Concrete
20	E	Tack Coat
700	F	Missouri DOT AC Binder
700	G	Missouri DOT AC Surface
730	H	Crack and Seat - Portland Cement Concrete

Table D-2 Final layer description and thickness for each section

Test Section	Layer Number	Layer Code	Material Code	Average Layer Thickness (mm)
29A602 EB	1	B	115	N/A
	2	C	303	102
	3	D	730	178
29A601 Control EB	1	B	115	N/A
	2	C	303	102
	3	D	730	183
29A606 EB	1	B	115	N/A
	2	C	303	102
	3	D	730	178
	4	E	20	0
	5	F	700	66
	6	G	700	56
29A604 EB	1	B	115	N/A
	2	C	303	102
	3	D	730	191
	4	E	20	0
	5	F	700	56
	6	G	700	58

Table D-2 Final layer description and thickness for each section (continued)

Test Section	Layer Number	Layer Code	Material Code	Average Layer Thickness (mm)
29A605 EB	1	A	112	N/A
	2	C	303	102
	3	D	730	191
29A608 EB	1	A	112	N/A
	2	C	303	102
	3	H	730	178
	4	E	20	0
	5	F	700	155
	6	G	700	51
29A607 EB	1	A	112	N/A
	2	C	303	102
	3	H	730	178
	4	E	20	0
	5	F	700	81
	6	G	700	56
29A603 EB	1	A	112	N/A
	2	C	303	97
	3	D	730	185
	4	E	20	0
	5	F	700	53
	6	G	700	56

Attachment E

Project Deviation Reports

LTPP SPS Project Deviation Report Project Summary Sheet	State Code 2 9 Project Code A 6 0 0

Project Classification Information	
SPS Experiment Number SPS-6	State or Province Missouri
LTPP Region	☐ North Atlantic ■ North Central ☐ Southern ☐ Western
Climate Zone	☐ Dry-Freeze ☐ Dry-No Freeze ■ Wet-Freeze ☐ Wet-No Freeze
Subgrade Classification	■ Fine Grain ☐ Coarse Grain ☐ Active (SPS-8 Only)
Project Experiment Classification Designation (SPS 1, 2, & 8) SPS-6	
Construction Start Date August 1998	Construction End Date September 1998
FHWA Incentive Funds Provided to Agency for this Project	■ Yes ☐ No

Deviation Summary	
Site Location Deviations	■ No Deviations ☐ Minor Deviations ☐ Significant Deviations
Construction Deviations	■ No Deviations ☐ Minor Deviations ☐ Significant Deviations

Data Collection and Processing Status Summary	
Inventory Data (SPS 5,6,7, & 9)	■ Complete Submission ☐ Incomplete ☐ Data Not Available
Materials Data	■ All Scheduled Samples Obtained and Tested ☐ Incomplete
Construction Data	■ All Required Data Obtained ☐ Incomplete / Missing Data Elements
Historical Traffic Data	■ All Required Historical Estimates Submitted (SPS 5, 6, 7, & 9) ☐ Required Estimates Not Submitted
Traffic Monitoring Equipment	☐ WIM Installed On-Site ☐ AVC Installed On-Site ☐ ATR Installed On-Site ■ No Equipment Installed
Traffic Monitoring	☐ Preferred ☐ Continuous ☐ Minimum ■ Below Minimum ☐ Site Related
Traffic Monitoring Data	☐ *Monitoring Data Submitted* ■ *No Monitoring Data Submitted*
FWD Measurements	■ Pre-construction Tests Performed ■ Construction Tests Performed ■ Post-construction Tests Performed
Profile Measurements	☐ Pre-construction Tests Performed ■ Post-construction Tests Performed
Distress Measurements	■ Pre-construction Tests Performed ■ Post-construction Tests Performed
Maintenance and Rehab Data	■ Complete Submission ☐ Incomplete ☐ Data Not Available
Friction Data	☐ Complete Submission ☐ Incomplete ■ Data Not Available

Report Status	
Materials Sampling and Test Plan	■ Document Prepared ■ Final Submitted To FHWA
Construction Report	■ Document Prepared ■ Final Submitted To FHWA
AWS (SPS 1, 2, & 8)	☐ AWS Installed ☐ AWS Installation Report Submitted to FHWA

Page 1 of 5 Prepared by Brenda B Mehnert Date 6-11-2001

LTPP SPS Project Deviation Report **Construction Guidelines Deviation**	State Code 2 9 Project Code A 6 0 0

■ Comments Pertain to All Test Sections on Project

□ Comments Pertain Only to Section(s) (Specify) _____

Construction Guidelines Deviation Comments

No deviations in construction noted

Page 2 of 5 Prepared by Brenda B Mehnert Date 6-11-2001

LTPP SPS Project Deviation Report Other Deviations	State Code Project Code	2 9 A 6 0 0

■ Comments Pertain to All Test Sections on Project

☐ Comments Pertain Only to Section(s) (Specify) _____

Other Deviation Comments

None known

Page 3 of 5 Prepared by Brenda B Mehnert Date 6-11-2001

LTPP SPS Project Deviation Report **Site Location Guidelines Deviations**	State Code 2 9 Project Code A 6 0 0

☐ Comments Pertain to All Test Sections on Project

■ Comments Pertain Only to Section(s) (Specify) see below

Site Location Guideline Deviation Comments

29A601, 29A607 and 29A603 are located in a cut sections

All other sections located in fill sections

Page 4 of 5 Prepared by Brenda B Mehnert Date 6-11-2001

LTPP SPS Project Deviation Report **Data Collection and Materials Sampling and Testing Deviations**	State Code 29 Project Code A 6 0 0

■ Comments Pertain to All Test Sections on Project

☐ Comments Pertain Only to Section(s) (Specify) _____

Data Collection & Material Sampling and Testing Deviation Comments

29A602- Test Pit 1 (post-construction) was relocated to the center of the monitoring section during pavement repair

Shoulder probe S1 (post construction) was taken after the monitoring test section

29A603-Test Pit 3 (pre-construction) was taken at the center of the monitoring section during pavement repair

29A605-Test Pit 2 (pre-construction) was taken at the center of the monitoring section during pavement repair

29A607-Test Pit 2 (pre-construction) was not done

Page 5 of 5 Prepared by Brenda B Mehnert Date 6-11-2001

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