

**U.S. Department of Transportation
Federal Highway Administration
Western Federal Lands Highway Division**

**Materials Sampling, Field Testing
and Laboratory Testing Plan**

Strategic Highway Research Program

SPS-8 Experimental Project

Project No. PFH 176-1(1) & RS-A070(002)

North Touchet Road

Columbia County

Washington

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Materials Sampling, Field Testing and Laboratory Testing Plan SPS-8 Experimental Project PFH 176-1(1) Project, Columbia County, Washington

This document presents the materials sampling and testing plan for the experimental Strategic Highway Research Program (SHRP) SPS-8 project planned for construction on North Touchet Road, project PFH 176-1(1), south of Dayton, Washington in Columbia County. The experimental test sections will be constructed in the north bound direction.

Background

The LTPP SPS-8 experiment entitled, "Strategic Pavement Studies of Environmental Effects In the Absence of Heavy Loads", consists of the construction of 2 test sections with asphalt concrete (AC) surface layers and base layers of varying thickness.

In the next portion of this document, tables of materials sampling, field tests and laboratory test quantities are presented. This is followed by a detailed presentation of the materials sampling, field testing, and laboratory testing plan and requirements of the Washington SPS-8 project.

Sampling and Testing Quantities

The estimated quantities for materials sampling, field testing, and laboratory testing for the SPS-8 experimental project are contained in Tables 1 and 2. It should be noted that the SHRP sampling and test procedures referenced in these tables and in other portions of this document must be followed in conducting this work. This includes completion and submission of all required data forms.

Table 1. Estimated quantities of laboratory materials testing for the SPS-8 experimental project, Washington.

	<u>SHRP TEST</u>	<u>SHRP</u>	<u>No.</u>
	<u>Designation</u>	<u>Protocol</u>	
SUBGRADE			
Sieve Analysis	SS01	Ship to FHWA lab	3
Hydrometer to 0.01 mm	SS02	Ship to FHWA lab	3
Atterberg Limits	SS03	Ship to FHWA lab	3
Classification and Type of Subgrade	SS04	Ship to FHWA lab	9
Moisture-Density Relations	SS05	Ship to FHWA lab	3
Resilient Modulus	SS07	Ship to FHWA lab	3
Unit Weight (if thin-wall tube is not available, test not conducted)	SS08	P56	6
Natural Moisture Content	SS09	Ship to FHWA lab	3
Unconfined Compressive Strength (if thin-wall tube is not available, test not conducted)	SS10	P54	2
Permeability	SS11	P57	1
In-Place Density		SHRP-LTPP Method	9
Depth to Rigid Layer		SHRP-LTPP Method	2
Expansion Index	SS12	P60 ¹	3
DENSE GRADED AGGREGATE BASE			
Particle Size Analysis	UG01	Ship to FHWA lab	3
Sieve Analysis (washed)	UG02	Ship to FHWA lab	3
Atterberg Limits	UG04	Ship to FHWA lab	3
Moisture-Density Relations	UG05	Ship to FHWA lab	3
Resilient Modulus	UG07	Ship to FHWA Lab	3
Classification	UG08	Ship to FHWA lab	3
Permeability	UG09	P48	3
Natural Moisture Content	UG10	Ship to FHWA lab	3
In-Place Density		SHRP-LTPP Method	6
ASPHALT CONCRETE SURFACE			
Core Examination/Thickness	AC01	P01 ²	16
Bulk Specific Gravity	AC02	P02 ²	16
Maximum Specific Gravity	AC03	P03	3
Asphalt Content (Extraction)	AC04	P04	3
Moisture Susceptibility	AC05	P05	3
Creep compliance	AC06	Ship to FHWA Lab	1
Resilient Modulus	AC07	Ship to FHWA Lab	3
Indirect Tensile Strength	AC07	Ship to FHWA Lab	3
In-Place Density		SHRP-LTPP Method	6

Notes 1. Will be based on ASTM D4829-88.
2. Perform test then ship to the FHWA Lab.

Table 1. Estimated quantities of laboratory materials testing for the SPS-8 experimental project, Washington (Continued).

	<u>SHRP TEST Designation</u>	<u>SHRP Protocol</u>	<u>No.</u>
Extracted Aggregate			
Specific Gravity of Coarse Aggregate	AG01	P11	3
Specific Gravity of Fine Aggregate	AG02	P12	3
Type and Classification of Fine Aggregate	AG03	P13	3
Aggregate Gradation	AG04	P14	3
NAA Test for Fine Aggregate Particle Shape	AG05	P14A	3
Asphalt Cement (from extraction)			
Abson Recover	AE01	P21	3
Penetration @ 50F, 77F, 90F	AE02	P22	3
Specific Gravity @ 60F	AE03	P23	3
Viscosity @ 77F	AE04	P24	3
Viscosity @ 140F, 275F	AE05	P25	3
Asphalt Cement (from plant)			
Penetration @ 50F, 77F, 90F	AE02	P22	3
Specific Gravity @ 60F	AE03	P23	3
Viscosity @ 77F	AE04	P24	3
Viscosity @ 140F, 275F	AE05	P25	3

Table 2. Estimated quantities for material sampling and other field tests on SPS-8 project, Washington.

	<u>Quantity</u>	<u>Units</u>
Asphalt Concrete		
Coring (4" diameter cores)	16	Cores
Bulk Sampling Mixture - LTPP ¹ (70 lbs samples)	3	Samples
Bulk Sampling Mixture - MRL ² (70 lbs samples)	3	Samples
Bulk Asphalt Cement - LTPP (5 gal. buckets)	3	Samples
Bulk Asphalt Cement - MRL (5 gal. buckets)	3	Samples
Bulk Aggregate for AC Mix - MRL (500 lbs sample)	1	Samples
Aggregate Base		
Bulk Samples (400 lbs samples)	3	Samples
Moisture Content (jars)	3	Samples
Subgrade		
Thin-walled tube sampling	12*	Samples
(* 2 tubes per hole)		
Bulk Sampling (400 lbs samples)	3	Samples
Moisture Content (jars)	9	Tests
Permeability	1	Tests
Expansion Index	3	Tests
Shoulder Auger Probes (20' maximum)	2	Lineal Feet
Elevation Surveys	30	Person-Hours
(5 person hours per section per layer, ~60 points/section/layer)		
Shipping to FHWA labs and SHRP Reference Library		
AC Cores	16	4" Cores
AC Bulk Mixture samples (5 gallon buckets)	6	50 lb Samples
Asphalt Cement samples	6	5 gal Pails
Bulk AC Aggregate sample	1	500 lb Drum
Bulk Dense Graded Aggregate samples	3	400 lb Samples
Subgrade Samples (Bulk)	3	400 lb Samples
Subgrade Samples (Shelby Tubes)	12	Tubes

- Notes
1. Samples for Long-Term Pavement Performance (LTPP)
 2. Samples for Materials Reference Library (MRL)

Sampling and Testing of SPS-8 Test Sections

Material sampling and testing on this project during construction includes the following measurements, tests and samples from the various construction stages:

Subgrade

- Bulk sampling and thin-walled tube sampling of the prepared subgrade surface.
- Moisture and density tests on the prepared subgrade surface.
- Auger probes through the shoulder to a depth of 20' below the prepared subgrade or embankment surface.
- Base line elevation surveys on the surface of the prepared subgrade or embankment to use as a reference in determining layer thickness.

Dense Graded Aggregate Base

- Bulk sampling of the Aggregate Base (DGAB).
- Moisture and density tests on the prepared DGAB.
- Elevation measurements on the prepared DGAB surface.

Asphalt Concrete Surface

- Bulk sampling of the Asphalt Concrete (AC) material.
- Coring of the AC for laboratory testing.
- Density tests on compacted AC.
- Elevation measurements on the prepared AC surface.

The details for these samples, tests, and measurements are presented in subsequent portions of this document organized by layer type.

The development of the materials sampling plan was based upon an assumed continuous construction sequencing. Significant time delays between the construction of the test sections may require changes to this sampling plan.

Referenced Documents

In addition to the appropriate AASHTO and ASTM standard methods and test referenced in this document, the following SHRP-LTPP documents serve as reference material which contain greater details on the sampling and testing requirements and data forms.

SHRP-LTPP Interim Guide for Laboratory Material Handling and Testing (AC, Bituminous Materials, Aggregates and Soils), Operational Guide No. SHRP-LTPP-OG-004, Strategic Highway Research Program, November, 1989, (Revised July, 1993).

Specific Pavement Studies, Materials and Testing Requirements for Experiment SPS-8, Study of Environmental Effects in the Absence of Heavy Loads, Operational Memorandum No. SHRP-LTPP-OM-030, Strategic Highway Research Program, August 1992.

SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling, Version 2.0, Operational Guide No. SHRP-LTPP-OG-006, Strategic Highway Research Program, May 1990.

Data forms and instructions for all field sampling and measurements described in this document are contained in "**Specific Pavement Studies, Material Sampling and Testing Requirements for Experiment SPS-8, Study of Environmental Effects in the Absence of Heavy Loads**" for the AC surface test sections. These data forms must be completed at the time of the work. Completed forms shall be submitted to the designated LTPP representative.

Test Section Layout

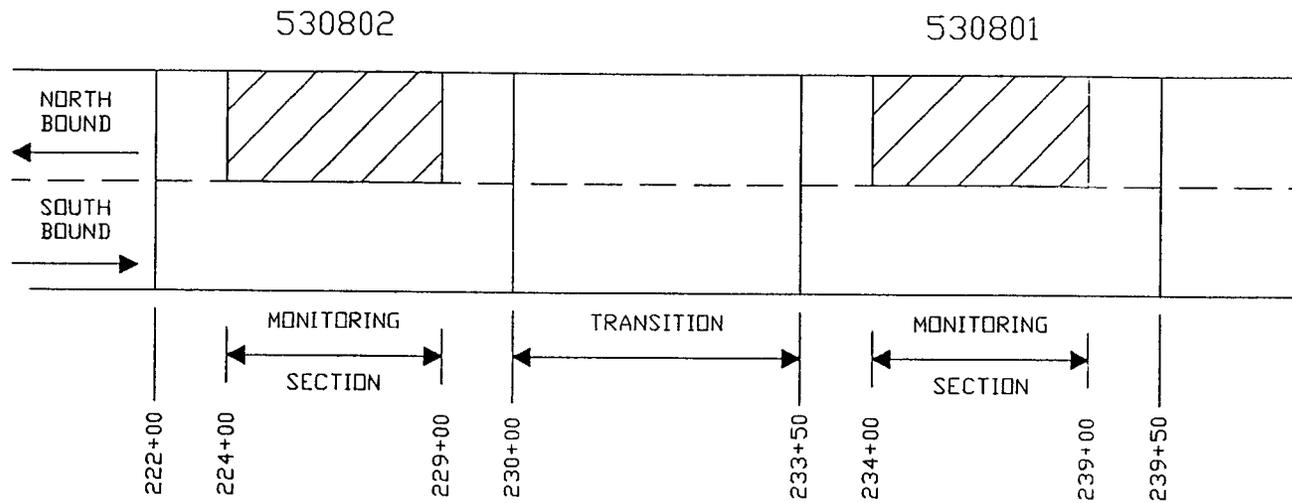
Figure 1 illustrates the ordering and combination of experimental test section pavement structures to be constructed. Construction stations are shown in this figure. Stylized transitions in the pavement structure are shown between the test sections. Transition details will depend upon construction sequence and practice.

The stationing for the location of the test sections are shown in Tables 3 and 4. In Table 3 the location of each section is specified in terms of the project's construction stationing. The relevant design features of each test section are also shown in this table.

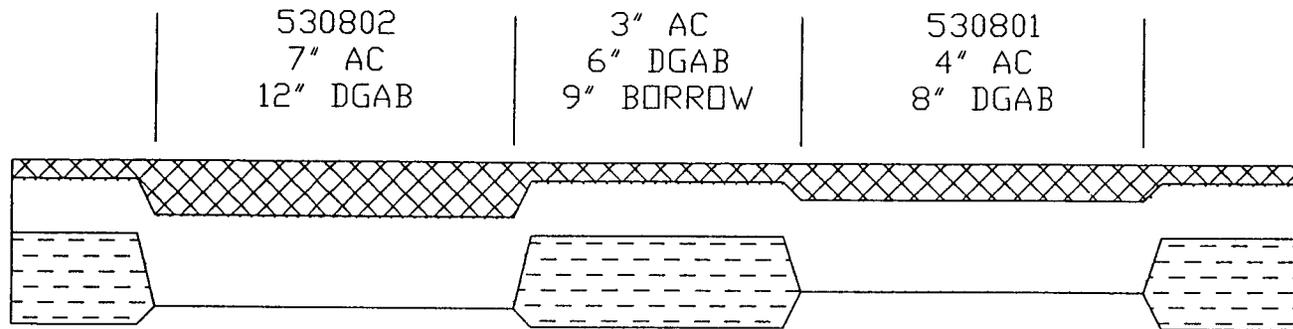
In Table 4, the location of each test section is specified in terms of the construction stationing, test section stationing, and LTPP reference project stations. Construction stations are the same as those shown on the construction plans. Test section stationing refers to the method LTPP uses to reference locations within and adjacent to the ends of individual test sections. The LTPP test section stations start with station 0+00 assigned to the beginning of the 500 foot monitoring portion of the test section, and station 5+00 at the end of the monitoring portion. The reference stationing system will be used by LTPP for future monitoring measurements.

In general, all sampling of compacted material should occur at the ends of the test section between the start of the test section and the start of the monitoring portion, or between the end of the monitoring portion and the end of the test section. The only samples and tests performed within the 500 feet monitoring portion are sampling of the subgrade material, elevation measurements and nuclear moisture-density tests.

PLAN



PROFILE



-  Monitoring Sections
-  Asphalt Concrete (AC)
-  Dense Graded Aggregate Base (DGAB)
-  Select Borrow

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Revised 12/21/93

Figure 1. Layout of experimental test sections, Washington SPS-8 project.

Table 3. Location of SPS-8 test sections, Washington.

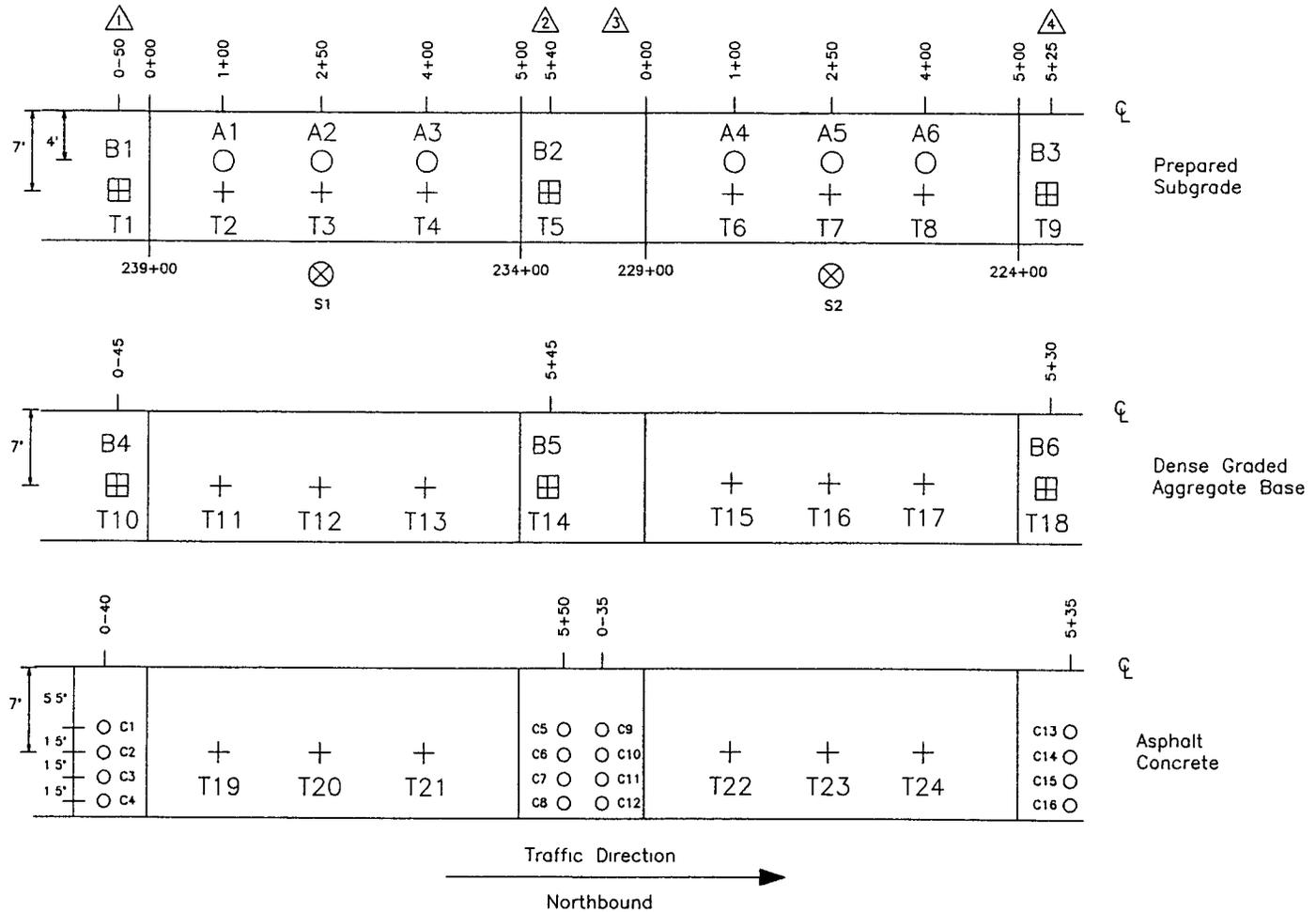
Section No.	Start Section	Start Monitor	End Monitor	End Section	Notes
530801	239+50	239+00	234+00	233+50	4"AC/8"DGAB
Trans	233+50			230+00	
530802	230+00	229+00	224+00	222+00	7"AC/12"DGAB

AC - Asphalt Concrete

DGAB - Dense Graded Aggregate Base

Table 4. Test section location table showing construction and project stations.

Test Section	Location	Construction Stationing	Test Section Stationing	SHRP Reference Project Station
530801	Begin	239+50	0-50	
	Begin Monitoring	239+00	0+00	0+00
	End Monitoring	234+00	5+00	5+00
	End	233+50	5+50	5+50
530802	Begin	230+00	-1-00	8+50
	Begin Monitoring	229+00	0+00	9+50
	End Monitoring	224+00	5+00	14+50
	End	222+00	7+00	16+50



- S1-S2 - 20' Shoulder probe
- A1-A6 - Thinwall tube samples of subgrade
- T1-T9 - Moisture-density tests on subgrade (Nuclear)
- B1-B3 - Bulk samples of subgrade
- T10-T18 - Moisture-density tests on DGAB (Nuclear)
- B4-B6 - Bulk samples of DGAB
- T19-T24 - Density tests on AC (Nuclear)
- C1-C16 - Cores of AC surface
- △ - Sample area numbers

Revised 12/21/93

Figure 2. Overview of sampling, testing and coring plan for Asphalt Concrete sections on SPS-8 Washington.

Subgrade

The subgrade layer measurements, tests and sampling should be performed prior to placement of the base layers. The objective is to characterize the properties of the prepared subgrade surface or embankment fill material immediately prior to the time the base layers are placed. It is therefore desired that the moisture-density tests, thin-walled tube samples, bulk samples, and elevation measurements be performed just prior to the time when the base course is placed. This is important in instances when the prepared subgrade will be left exposed to the elements for a significant period, 2-3 months depending on climatic events, which influence the properties of the upper layers of the subgrade.

A summary of the samples, laboratory and field tests on the subgrade materials is presented in Table 5. In this table, B-type samples are bulk samples and A-type samples are thin-wall (Shelby) tube samples of the subgrade materials. The T-type test locations are for nuclear moisture-density tests, and the S-type locations are for the 20' deep auger probes through the shoulder.

Thin-wall (Shelby) Tube Samples

Undisturbed samples of the natural subgrade or fill material shall be obtained to a depth of 4 feet below the top of the prepared subgrade or fill using thin-wall (Shelby) tube sampling at the locations listed in Table 6. Two samples should be obtained at each location. These operations shall be performed in accordance with **AASHTO T203 "Soil Investigation and Sampling by Auger Boring"** and **AASHTO M146 "Terms Relating to subgrade, Soil-Aggregate and Fill Materials"**. Shelby tube sampling shall be performed in accordance with **AASHTO T207**. If Shelby tube samples can not be obtained, split spoon samples may be obtained following Section 3.4.5 of the SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling.

Bulk Samples

Bulk samples of the subgrade or embankment material should be obtained from the locations listed in Table 7. In general, bulk sampling should consist of a single excavation, 2 feet by 2 feet in area and 12 inches deep. Approximately 400 lbs of material should be obtained from each sampling location. The sampling operation should be performed following similar procedures to those contained in Section 3.5 of the SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling as appropriate. Samples for gravimetric moisture tests should be obtained at each bulk sample location. **In-place density and moisture tests (nuclear) should be obtained at each bulk sampling location prior to sampling operations.**

Density and Moisture Measurements

In-place density and moisture measurements should be performed on the prepared subgrade or embankment material surface at the locations specified in Table 8. These test shall be performed using recently calibrated nuclear moisture-density gauges in accordance with the

procedures in AASHTO T238-86, Method B-Direct Transmission, AASHTO T239-86 and ASTM D2950-82. Each measurement shall be the result of the average of four readings made during each 90° rotation of the nuclear gauge through a full 360°.

Auger Probes

Auger probes to a depth of 20 feet from the surface of the prepared subgrade or embankment should be performed at the shoulder locations specified in Table 9. The purpose of these probes is to determine if bedrock or other significantly dense layers exist within 20 feet of the pavement surface elevation. Auguring shall be performed using a truck mounted drill rig using 4 or 6 inch, continuous flight, solid, helical augers.

Table 5. Field and laboratory test plan for **Subgrade** materials, SPS-8 Washington.

Test Name	SHRP Test Designation	SHRP Protocol	Number of Tests	Material Source / Test Location
Sieve Analysis	SS01	Ship to FHWA Lab	3	B1 - B3
Hydrometer to 0.01 mm	SS02	Ship to FHWA Lab	3	B1 - B3
Atterberg Limits	SS03	Ship to FHWA Lab	3	B1 - B3
Classification and Type of Subgrade	SS04	Ship to FHWA Lab	9	A1 - A6, B1 - B3 see Note 1
Moisture-Density Relations	SS05	Ship to FHWA Lab	3	B1 - B3
Resilient Modulus	SS07	Ship to FHWA Lab	3	A1, A3, A5 or B1 - B3
Unit Weight	SS08	P56	6	A1 - A6
Natural Moisture Content	SS09	Ship to FHWA Lab	3	B1 - B3
Unconfined Compression Strength	SS10	P54	2	A2, A4
Permeability	SS11	P57	1	A2
In-Place Density		SHRP-LTPP Method	9	B1-B3, T1-T6
Depth to Rigid Layer		SHRP-LTPP Method	2	S1, S2
Expansion Index	SS12	P60	3	B1-B3

Note 1. Visual-manual classification method ONLY.

Table 6. Locations for thin-wall (Shelby) tube sampling of **Subgrade**, SPS-8 Washington.

Sample Location Designation	Construction Stationing	Test Section Stationing	Offset, feet	Test Section
			Center Line, Rt	
A1	238+00	1+00	4	530801
A2	236+50	2+50	4	530801
A3	235+00	4+00	4	530801
A4	228+00	1+00	4	530802
A5	226+50	2+50	4	530802
A6	225+00	4+00	4	530802

Table 7. Locations for prepared **Subgrade** bulk sampling, SPS-8 Washington.

Sample Location Designation	Construction Stationing	Test Section Stationing	Offset, feet	Test Section	Sample Area
			Center Line, Rt		
B1	239+50	0-50	7	530801	1
B2	233+60	5+40	7	530801	2
B3	223+75	5+25	7	530802	4

Table 8. Locations for in-place density and moisture tests on prepared **Subgrade**, SPS-8 Washington.

Sample Location Designation	Construction Stationing	Test Section Stationing	Offset, feet	Test Section
			Center Line, Rt	
T1	239+50	0-50	7	530801
T2	238+00	1+00	7	530801
T3	236+50	2+50	7	530801
T4	235+00	4+00	7	530801
T5	233+60	5+40	7	530801
T6	228+00	1+00	7	530802
T7	226+50	2+50	7	530802
T8	225+00	4+00	7	530802
T9	223+75	5+25	7	530802

Table 9. Location of 20' deep shoulder probes, SPS-8 Washington.

Sample Location Designation	Construction Stationing	Test Section Stationing	Offset, feet	Test Section
			Center Line, Rt	
S1	236+50	2+50	18	530801
S2	226+50	2+50	18	530802

Dense Graded Aggregate Base

The measurements, tests and samples on the Dense Graded Aggregate Base (DGAB) layer should be performed prior to placement of the next layer. The objective is to characterize the properties of the prepared base at the time when the next pavement layer is placed. It is therefore desired that the moisture-density tests and elevation measurements be performed just prior to the time when the next pavement layer is placed. This is most important in instances when the aggregate base will be left exposed to the elements for a significant period, 2-3 months depending on climatic events, which might influence the properties of the material.

A summary of the samples to be taken from the DGAB material and tests to be conducted are presented in Table 10. Only bulk material samples of the DGAB material are taken. Field tests include in-place density and moisture measurements.

Bulk Samples

Bulk samples of the DGAB material should be obtained at the approximate locations specified in Table 11. Sampling may be performed prior to compaction to avoid interruptions to construction activities. Uncontaminated 200 lbs samples shall be obtained from each location. The procedures similar to those contained in section 3.5 of the SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling should be followed.

Density and Moisture Measurements

Nuclear density and moisture measurements shall be performed on top of the prepared DGAB at the location specified in Table 12. These measurements shall be performed following the same procedures used for subgrade soils.

Table 10. Field and laboratory test plan for **Dense Graded Aggregate Base** materials, SPS-8 Washington.

Test Name	SHRP Test Designation	SHRP Protocol	Number of Tests	Material Source / Test Location
Particle Size Analysis	UG01	Ship to FHWA lab	3	B4 - B6
Sieve Analysis (washed)	UG02	Ship to FHWA lab	3	B4 - B6
Atterberg Limits	UG04	Ship to FHWA lab	3	B4 - B6
Moisture-Density Relations	UG05	Ship to FHWA lab	3	B4 - B6
Resilient Modulus	UG07	Ship to FHWA lab	3	B4 - B6
Classification	UG08	Ship to FHWA lab	3	B4 - B6
Permeability	UG09	P48	3	B4 - B6
Natural Moisture Content	UG10	Ship to FHWA lab	3	B4 - B6
In-Place Density		SHRP-LTPP Method	6	T7 - T12

Table 11. Bulk sampling of uncompact **Dense Graded Aggregate Base**, SPS-8 Washington.

Sample Location Designation	Construction Stationing	Test Section Stationing	Offset, feet	Test Section	Sample Area
			Center Line, Rt		
B4	239+45	0-45	7	530801	1
B5	233+55	5+45	7	530801	2
B6	223+70	5+30	7	530802	4

Table 12. Locations for in-place moisture and density measurements on compacted
Dense Graded Aggregate Base, SPS-8 Washington.

Sample Location Designation	Construction Stationing	Test Section Stationing	Offset, feet	Test Section
			Center Line, Rt	
T10	239+45	0-45	7	530801
T11	238+00	1+00	7	530801
T12	236+50	2+50	7	530801
T13	235+00	4+00	7	530801
T14	233+55	5+45	7	530801
T15	228+00	1+00	7	530802
T16	226+50	2+50	7	530802
T17	225+00	4+00	7	530802
T18	223+70	5+30	7	530802

Asphalt Concrete Surface

The field and laboratory test plan for the Asphalt Concrete (AC) materials is presented in Table 13. Sampling of this material includes bulk samples of the asphalt, aggregate, and uncompacted mix and cores obtained after placement and compaction of the AC surface material. Nuclear density tests should also be performed on the compacted surface.

Bulk Samples

Bulk sampling of the uncompacted mix can be performed at the test site from a haul vehicle or near the paver. Care should be taken to obtain the designated samples of the materials to be placed in the test sections shown in Figure 2. These samples shall be obtained in accordance with **AASHTO T168** and shipped to the laboratory in suitable containers. If sampling at the test site is not feasible, then bulk sampling can be performed at the mix plant provided that the material sampled is the same material being placed in the designated test section. Three 100 pound samples of the mixture shall be collected.

Samples of the asphalt cement should consist of three 5 gallon pails obtained from the mix plant. Collect samples from the mix plant after asphalt has been heated for mixing. Three pails of each type of asphalt cement used on the project are needed.

In addition to the bulk samples described above for SPS LTPP testing purposes, the following bulk samples should be obtained for the SHRP Materials Reference Library:

- 55 gallons of asphalt cement used in the asphalt concrete mix. Collect from the mix plant after asphalt has been heated for mixing. Eleven 5-gallon pails will be provided by SHRP for storage and shipping.
- 1,000 lbs of the finished aggregate product (combined coarse and fine aggregate) used in the asphalt concrete mix. This material shall be sampled in accordance with applicable portions of AASHTO Designation T2. For drum plants, the aggregate should be obtained from the charging (inclined) conveyor using the bypass chute, if possible. Otherwise the material should be taken from the belt on the charging conveyor. The aggregates should be sampled from the inclined conveyor at the dryer on batch plants. This material should be collected in two 55-gallon drums supplied by SHRP.
- 200 lbs of the finished asphalt concrete mix material used on the test sections. This material shall be sampled at the plant or from the site in accordance with applicable sections of AASHTO T168. SHRP will provide 5-gallon containers for shipment and storage of this material.

Cores

Cores of the asphalt concrete shall have a 4" diameter. The core locations are listed in Table 14. All 16 cores of the AC material must be shipped to the designated FHWA laboratory after the core examination and bulk specific gravity tests have been performed. The resilient

modulus test, indirect tensile strength test, and creep compliance test will be performed under a separate contract with the Federal Highway Administration.

Care shall be taken to insure that all cores are obtained at a 90° angle to the pavement surface and that the edges are straight, intact, smooth and suitable for laboratory testing. Details on tolerance and quality control of coring operations are contained in Section 4 of the SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling.

Care shall be taken to package all cores for transport and shipping in suitable containers to prevent damage or degradation of the core during transport.

Density Measurements

Nuclear density measurements shall be performed on the surface of the prepared AC at the locations specified in Table 15. These measurements shall be performed using recently calibrated nuclear moisture-density gauges in accordance with the procedures in AASHTO T238-86, Method A-Backscatter.

Table 13. Field and laboratory test plan for Asphalt Concrete surface materials, SPS-8 Washington.

Test Name	SHRP Test Designation	SHRP Protocol	Number of Tests	Material Source / Test Location
Core Examination/Thickness	AC01	P01 ²	16	C1-C16 (Note 1)
Bulk Specific Gravity	AC02	P02 ²	16	C1-C16 (Note 1)
Maximum Specific Gravity	AC03	P03	3	BV01 - BV03
Asphalt Content (Extraction)	AC04	P04	3	BV01 - BV03
Moisture Susceptibility	AC05	P05	3	BV01 - BV03
Creep compliance	AC06	Ship to FHWA Lab	1	C9
Resilient Modulus	AC07	Ship to FHWA Lab	3	C1-C3, C5-C7, C13-C15
Indirect Tensile Strength	AC07	Ship to FHWA Lab	3	C4, C8, C16
In-Place Density		SHRP-LTPP Method	6	T13-T18
Asphalt Cement				
Abson Recovery	AE01	P21	3	BV01 - BV03
Penetration @ 50F, 77F, 90F	AE02	P22	3	BV01 - BV03
Specific Gravity @ 60F	AE03	P23	3	BV01 - BV03
Viscosity @ 77F	AE04	P24	3	BV01 - BV03
Viscosity @ 140F, 275F	AE05	P25	3	BV01 - BV03
Extracted Aggregate				
Specific Gravity of Coarse Aggregate	AG01	P11	3	BV01 - BV03
Specific Gravity of Fine Aggregate	AG02	P12	3	BV01 - BV03
Type and Class of Coarse Aggregate	AG03	P13	3	BV01 - BV03
Type and Class of Fine Aggregate	AG03	P13	3	BV01 - BV03
Aggregate Gradation	AG04	P14	3	BV01 - BV03
NAA Test for Fine Aggregate Particle Shape	AG05	P14A	3	BV01 - BV03
NAA Test for Coarse Aggregate Particle Shape	AG06	P14B	3	BV01 - BV03
Asphalt Cement (From Plant)				
Penetration @ 50F, 77F, 90F	AE02	P22	3	BC01 - BC03
Specific Gravity @ 60F	AE03	P23	3	BC01 - BC03
Viscosity @ 77F	AE04	P24	3	BC01 - BC03
Viscosity @ 140F, 275F	AE05	P25	3	BC01 - BC03

- Notes**
1. Core locations are shown in Table 15.
 2. Ship to FHWA Lab after completion of test.

Table 13. Field and laboratory test plan for **Asphalt Concrete** surface materials, SPS-8 Washington (Continued).

Test Name	SHRP Test Designation	SHRP Protocol	Number of Tests	Material Source/Test Locations
Asphalt Cement samples for SHRP Asphalt Research Program		Ship to SHRP Material Reference Library	15 gallons (Three 5-gal containers)	Obtain from asphalt concrete mix plant
Aggregate samples for SHRP Asphalt Research Program			500 lbs (One 55-gal drums)	
Bulk asphalt concrete sample for SHRP Asphalt Research Program			200 lbs (Three 5-gal containers)	

Table 14. Asphalt Concrete core locations, SPS-8 Washington.

Sample Location Designation	Construction Stationing	Test Section Stationing	Offset, feet	Test Section	Sample Area
			Center Line, Rt		
C1	239+40	0-40	5.5	530801	1
C2	239+40	0-40	7	530801	1
C3	239+40	0-40	8.5	530801	1
C4	239+40	0-40	10	530801	1
C5	233+50	5+50	5.5	530801	2
C6	233+50	5+50	7	530801	2
C7	233+50	5+50	8.5	530801	2
C8	233+50	5+50	10	530801	2
C9	229+35	0-35	5.5	530802	3
C10	229+35	0-35	7	530802	3
C11	229+35	0-35	8.5	530802	3
C12	229+35	0-35	10	530802	3
C13	223+65	5+35	5.5	530802	4
C14	223+65	5+35	7	530802	4
C15	223+65	5+35	8.5	530802	4
C16	223+65	5+35	10	530802	4

Table 15. Locations for in-place density measurements on compacted **Asphalt Concrete**, SPS-8 Washington.

Sample Location Designation	Construction Stationing	Test Section Stationing	Offset, feet	Test Section
			Center Line, Rt	
T19	238+00	1+00	7	530801
T20	236+50	2+50	7	530801
T21	235+00	4+00	7	530801
T22	228+00	1+00	7	530802
T23	226+50	2+50	7	530802
T24	225+00	4+00	7	530802

Elevation Measurements

Elevation measurements shall be made on the surface of each pavement layer (prepared subgrade or embankment, Dense Graded Aggregate Base, and AC surface) at the locations specified in Table 16. Measurements must be made to an accuracy of 0.01 foot. Care must be taken to re-establish the same points on the surface of each succeeding material layer to insure accurate determination of the thickness of each layer.

Table 16. Elevation survey locations, SPS-8 Washington.

Sample Location Designation	Construction Stationing	Rt Offset, Center Line, Feet					Test Section
		1	2	3	4	5	
E1	239+00	11	8.25	5.5	2.75	0	530801
E2	238+50	11	8.25	5.5	2.75	0	530801
E3	238+00	11	8.25	5.5	2.75	0	530801
E4	237+50	11	8.25	5.5	2.75	0	530801
E5	237+00	11	8.25	5.5	2.75	0	530801
E6	236+50	11	8.25	5.5	2.75	0	530801
E7	236+00	11	8.25	5.5	2.75	0	530801
E8	235+50	11	8.25	5.5	2.75	0	530801
E9	235+00	11	8.25	5.5	2.75	0	530801
E10	234+50	11	8.25	5.5	2.75	0	530801
E11	234+00	11	8.25	5.5	2.75	0	530801
E12	229+00	11	8.25	5.5	2.75	0	530802
E13	228+50	11	8.25	5.5	2.75	0	530802
E14	228+00	11	8.25	5.5	2.75	0	530802
E15	227+50	11	8.25	5.5	2.75	0	530802
E16	227+00	11	8.25	5.5	2.75	0	530802
E17	226+50	11	8.25	5.5	2.75	0	530802
E18	226+00	11	8.25	5.5	2.75	0	530802
E19	225+50	11	8.25	5.5	2.75	0	530802
E20	225+00	11	8.25	5.5	2.75	0	530802
E21	224+50	11	8.25	5.5	2.75	0	530802
E22	224+00	11	8.25	5.5	2.75	0	530802

Data Forms

Data forms and instructions for all field sampling and measurements described in this document are contained in "**Specific Pavement Studies, Materials Sampling and Testing Requirements for Experiment SPS-8, Study of Environmental Effects in the Absence of Heavy Loads**". These data forms must be completed at the time of the work. Completed forms shall be submitted to the designated LTPP representative.