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STRATEGIC HIGHWAY RESEARCH PROGRAM

SPECIFIC PAVEMENT STUDIES
DATA COLLECTION GUIDELINES
FOR EXPERIMENT SPS-1
STRATEGIC STUDY OF STRUCTURAL FACTORS
FOR FLEXIBLE PAVEMENTS

STRATEGIC HIGHWAY RESEARCH PROGRAM
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SPECIFIC PAVEMENT STUDIES
DATA COLLECTION GUIDELINES FOR EXPERIMENT SPS-1,
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INTRODUCTION

This document provides guidelines and instructions for collection of data for the Specific Pavement Studies SPS-1 experiment, Strategic Study of Structural Factors for Flexible Pavements. Forms for recording and reporting this data are also included.

This report should be used in conjunction with the following reports:

- Operational Memorandum No. SHRP-LTPP-OM-017, "Specific Pavement Studies: Construction Guidelines for Experiment SPS-1, Strategic Study of Structural Factors for Flexible Pavements", December 1990

- Operational Memorandum No. SHRP-LTPP-OM-021, "Specific Pavement Studies: Materials Sampling and Testing Requirements for Experiment SPS-1, Strategic Study of Structural Factors for Flexible Pavements", February 1991

- Operational Guide No. SHRP-LTPP-OG-001, "Data Collection Guidelines for the Long Term Pavement Performance Studies"

- Operational Guide No. SHRP-LTPP-OG-006, "SHRP-LTPP Guide for Field Materials Sampling, Testing, and Handling", May 1990

- Operational Guide No. SHRP-LTPP-OG-004, "SHRP-LTPP Interim Guide for Laboratory Material Handling and Testing", February 1991

- Other SHRP-related guides and operational memoranda

Data elements that will be collected for this experiment are classified into the following groups:

Test Section Location Reference Table
Construction
Field Materials Sampling and Testing
Laboratory Materials Testing
Deflection
Profile
Distress
Skid Resistance
Traffic
Climate
Maintenance
Rehabilitation

The data collection and reporting process for SPS test sites requires the completion of specific data sheets from the Data Collection Guide for Long-Term Pavement Performance Studies which were developed for the General Pavement Studies (GPS) and data sheets developed specifically for Specific Pavement Studies (SPS). The SPS project-specific data sheets address construction data and aspects of the materials sampling and testing activities.

This report addresses the data to be collected during site construction. Data obtained from monitoring activities performed after construction will be reported on data forms similar to those used for the GPS test sections.

PROJECT VERSUS SECTION SPECIFIC DATA

In contrast to the General Pavement Studies test sections, each SPS site includes several test sections. Several data items including traffic, climate and some inventory data elements will be applicable to all test sections of an SPS site. Also, some construction data items such as asphalt concrete mix design data and surface thickness will apply to more than one test section

However, a large portion of the data elements will be specific to each test section. Data items common to all test sections will be referred to as "project level data" while data items specific to each test section will be referred to as "section specific data."

SPS TEST SECTION NUMBERING SCHEME

The structure of the SPS test section numbering scheme will differ from that used for the GPS test sections to help identify project and test section specific data. Each GPS test section is identified with a six digit code consisting of a two digit STATE CODE and a four digit SHRP SECTION ID number. Also, each SPS test section will be identified with a six digit code that will consist of a two digit STATE CODE and a four digit SHRP SECTION ID number. However, this SHRP SECTION ID number will consist of a two digit SPS PROJECT CODE and a two digit TEST SECTION NUMBER.

The far left two digits are the STATE CODE designator. The same STATE CODE used for GPS test sections will be used for the SPS experiments. Table A.1 of the LTPP Data Collection Guide lists the STATE CODE for all states and provinces, District of Columbia, and Puerto Rico.

The middle two digits are the SPS PROJECT CODE. The first digit of this code is the multiple site designator to distinguish between multiple sites of the same SPS experiment constructed in the same state or province. A zero "0" is assigned to the first site of a specific SPS experiment constructed in a state or province. An "A", "B", "C", etc. is assigned to the second, third, fourth, etc. project of the same SPS experiment constructed in the same state or province. The second digit of this code designates the SPS experiment number, i.e., "1" for SPS-1 test sites.

The far right two digits are the TEST SECTION NUMBER. A different two digit number is assigned for each test section on a test site. The test section numbers for the SPS-1 test sections are specified in Operational Memorandum No. SHRP-LTPP-OM-017, "Specific Pavement Studies: Construction Guidelines for

Experiment SPS-1, Strategic Study of Structural Factors for Flexible Pavements", December 1990. Test section numbers for supplemental test sections on the SPS project should be specified by the SHRP regional office in coordination with the participating highway agency.

Thus, the combination of the STATE CODE and SPS PROJECT CODE uniquely identifies each SPS test site. For "section specific data", the assigned TEST SECTION NUMBER in combination with the STATE CODE and SPS PROJECT CODE numbers will be used. However, for "project level data" "00" will be used as the TEST SECTION NUMBER to differentiate these data from the "section specific data", for which a test section number (01 through 24, or higher for supplementary test sections) should be used.

FIELD MATERIALS SAMPLING AND TESTING

Field materials sampling and testing shall be performed following the guidelines outlined in Operational Memorandum No. SHRP-LTPP-OM-021, "Specific Pavement Studies: Materials Sampling and Testing Requirements for Experiment SPS-1, Strategic Study of Structural Factors for Flexible Pavements", February 1991. This operational memorandum incorporates by reference the material included in Operational Guide No. SHRP-LTPP-OG-006, "Field Materials Sampling, Testing, and Handling" which was developed for the General Pavement Studies. This Guide will form the basis for the conduct of a substantial portion of the field materials sampling and testing activity for the SPS-1 experiment. The operational memorandum for the SPS-1 experiment includes revised field data forms and new data sheets for recording data from materials sampling and testing activities performed during construction.

REVISED FIELD DATA FORMS

As the requirements for the materials sampling of SPS projects differ from those for GPS sections, the field materials sampling and testing data forms used in the GPS program were modified. The primary changes common to each form relate to test section number, sampling location referencing, and sampling area number.

Test Section Number. The six digit test section identification numbers on the data forms have been subdivided into three, two digit fields representing the state code, SPS project code, and test section number. The structure of this number is described in the section entitled, "SPS Test Section Numbering Scheme," of this report.

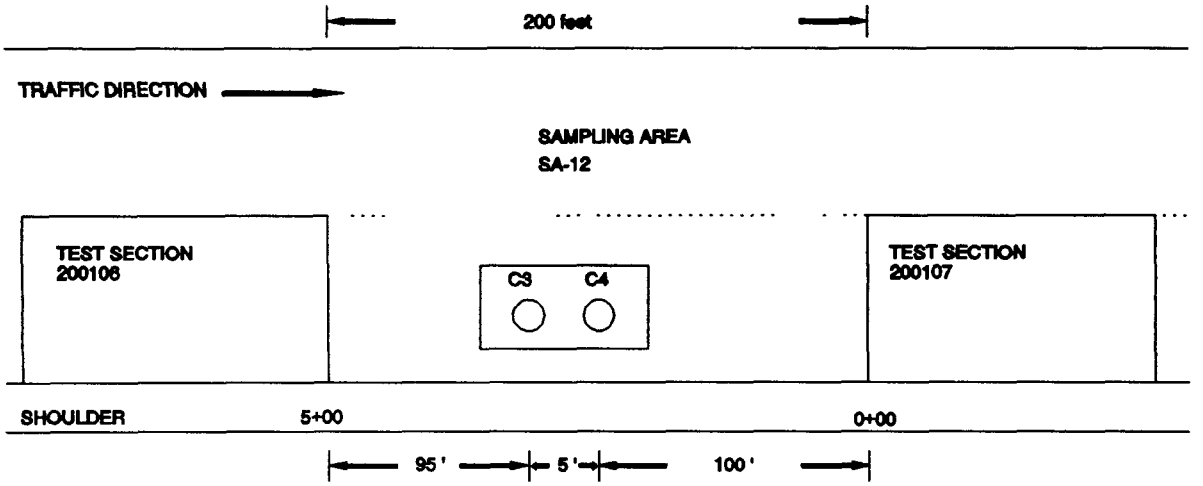
Sample Location Reference System. All material sampling and field testing data forms which reference the location of a sample or test use a station, offset and sampling area number. The sampling area number is a two digit number used to reference all of the samples taken from one area of the project. These sampling numbers are developed as part of the materials sampling plan for the test site and should run in sequential order in the direction of traffic.

The station to be specified on these data forms is referenced from either the beginning or end of the test sections adjacent to the sampling area. For expediency in the field, the station number designated on the form is relative to the test section number designated on the data form. Thus, if the sampling area occurs after the referenced test section, the station number should be greater than 5+00. If the sampling area occurs in front of the designated test section, the station number should be negative. This station number should not be the reference project station number, as outlined in the section entitled, "Construction Data" of this report. Thus, the relative test section station number and the reference project station number will be the same only on the first test section of a project, since the beginning point of the first test section is defined as the project station 0+00. The offset distance is measured from the outside edge of the test section lane to the core location.

Figure 1 illustrates the location referencing system to be used for SPS material samples. In this example, a sampling area, designated SA-12, is situated between sections 200106 and 200107. In this sampling area, two 4-inch diameter C-Type cores, C3 and C4, are located 5 feet apart and three feet from the edge of the lane. The location of these two cores can be specified relative to either test section 200106 (alternative 1) or test section 200107 (alternative 2). In alternative 1, the station number of core C3 is 5+95 since it is 95 feet past the end of section 200106. Core C4 is located at station 6+00. In alternative 2, the station numbers of cores C3 and C4 are -1+05 and -1+00, respectively since they occur in advance of test section 200107. Thus when specifying the sampling locations on the field data form, the station number written on the form must correspond to the test section.

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING DATA SHEETS

Most of the LTPP-SPS Material Sampling and Field Testing data sheets use the same top block of information related to the test section and project.



	Alternative 1 Location referenced to test section 200106	Alternative 2 Location referenced to test section 200107
CORE C3 LOCATION		
STATE CODE	20	20
SPS PROJECT CODE	01	01
TEST SECTION NO	06	07
STATION	5+95	-1+05
OFFSET	03	03
CORE C4 LOCATION		
STATE CODE	20	20
SPS PROJECT CODE	01	01
TEST SECTION NO	06	07
STATION	6+00	-1+00
OFFSET	03	03

In this example of the location referencing system, designated sampling area SA-12 is situated between sections 200106 and 200107. In SA-12, two 4" C-type cores are specified, C3 and C4, to be 5 feet apart and three feet from the edge of the lane. The location of these two cores can be specified relative to either test section 200106 (alternative 1) or test section 200107 (alternative 2). In alternative 1, the station number of core C3 is 5+95 since it is 95 feet past the end of section 200106. Core C4 is at station 6+00. In alternative 2, the station number of core C3 is -1+05 and C4 is -1+00 since they occur in advance of test section 200107. Thus, when specifying the sampling locations on the field data form, the station number written on the form must correspond to the test section indicated on the form.

Figure 1. Illustration of Location Referencing System

SHEET NUMBER. Since several data sheets will be required to record the samples and test data from each sampling areas on the project, room is provided on all data forms to sequentially number the data sheets. The first field is the sequential number of the data sheet and the second field is the total number of data sheets completed.

SHRP REGION. Indicate the SHRP-LTPP region in which the state or province is located, i.e. North Atlantic, North Central, Southern, or Western.

STATE. Indicate the name of the state, District of Columbia, Puerto Rico, or the Canadian Province in which the project is located. Alternatively, use the two letter abbreviation shown in Table A.1 of the LTPP Data Collection Guide.

STATE CODE. Enter the two-digit numeric code corresponding to the state or province as shown in Table A.1 of the LTPP Data Collection Guide.

SPS PROJECT CODE. The two digit SPS project code. The first digit (from the left) of this code should either be a 0 (zero) for the first SPS-1 project constructed in a state, or a letter starting with A, B, etc. for the second, third, etc. project of the same SPS experiment constructed in the same state. The second digit corresponds to the SPS experiment number.

TEST SECTION NO. The two digit number assigned to the test section (refer to Operational Memorandum No. SHRP-LTPP-OM-017).

SPS EXPERIMENT NO. The SPS experiment number for the project. This should be "1" for projects in the SPS-1 experiment, "Strategic Study of Structural Factors for Flexible Pavements".

ROUTE/HIGHWAY. Record the designation for the route or highway on which the project is located.

LANE. Record a "1" if sampling occurs on the outside lane and a "2" if sampling occurs on the inside lane. Drilling and sampling shall always occur on the outside lane for the SPS experiments.

DIRECTION. Record the direction of travel at the project site. Use the following abbreviations:

E for eastbound traffic direction
W for westbound traffic direction
N for northbound traffic direction
S for southbound traffic direction

SAMPLE/TEST LOCATION. Check "Before Section" if the sampling area is located before the beginning of the test section indicated under TEST SECTION NUMBER on the form (station 0-). Check "After Section" if the sampling are located after the end of the test section indicated on the form (station 5+). Check "Within Section" for testing locations within the test sections, such as density testing and auger probes in the shoulder.

FIELD SET NO. The field set number is a sequentially assigned number to indicate the different time periods in which material samples and field testing were conducted on the project. These time periods usually refer to different stages in the pavement life, such as prior to overlay construction, after overlay construction, end of test, etc. A field set number can apply to more than one day since sampling of the test site usually requires more than one day. As a general rule, the same field set number should be applied to all material samples and field tests conducted in a continuous 30-day period, unless a construction event occurs between the two sampling sessions. Enter 1 for the first material sampling and field testing activity conducted on the test site. Enter 2, 3, etc. for the second, third and subsequent sampling and field testing activities conducted on the site. For SPS-1 projects, the first sampling should occur after subgrade preparation.

The following Sampling Data Sheets must be completed for SPS-1 test sections:

SAMPLING DATA SHEET 2.	PAVEMENT CORE LOG AT C-TYPE CORE LOCATIONS
SAMPLING DATA SHEET 4-1.	A-TYPE BORE HOLE LOG
SAMPLING DATA SHEET 8-1.	IN SITU DENSITY AND MOISTURE TESTS
SAMPLING DATA SHEET 9.	SHOULDER PROBE LOG
SAMPLING DATA SHEET 10-1.	SAMPLING UNCOMPACTED BITUMINOUS PAVING MIXTURES
SAMPLING DATA SHEET 12.	BULK SAMPLING OF SUBGRADE AND UNBOUND GRANULAR MATERIALS

Also, the following Field Operation Information Forms must be completed:

FIELD OPERATION INFORMATION FORM 1.	LABORATORY SHIPMENT SAMPLES INVENTORY
FIELD OPERATION INFORMATION FORM 2-1.	SUMMARY OF MATERIAL SAMPLES SENT TO EACH LABORATORY

A description of items to be entered in each sampling data sheet and information form follows.

SAMPLING DATA SHEET 2. PAVEMENT CORE LOG AT C-TYPE CORE LOCATIONS

This form is similar to Form S01A used for GPS test sections and is used to log data from the 4-inch diameter pavement cores extracted from C-Type core locations. Each sheet can be used to record data for cores taken from six different core hole locations in one sampling area. A separate sheet should be used to record core data from each sampling area. Space is provided in each column to record data for up to 4 layers from one core hole. The pavement surface layer core should be recorded first, followed by other layers in the column. The first column from the left should always start with the lowest numbered core hole in the sampling area.

OPERATOR. Record the coring equipment operator's name.

EQUIPMENT USED. Indicate the generic type of the coring equipment used.

CORING DATE. Record the month, date, and year the core was taken.

SAMPLING AREA NO. The sampling area number is a two digit number used to reference all of the samples taken from one area of the project. It has the form SA-##. This number is developed as part of the materials sampling plan for the project.

CORE BARREL. Record the rated inside diameter of the core barrel to the nearest tenth of an inch.

COOLING MEDIUM. Record the material used for cooling during the coring operation.

CORE HOLE NO. Enter the core hole sample code number following the sample coding system as specified in the materials sampling plan developed for the project.

LOCATION: STATION. This is the station number of the core, relative to the test section specified under TEST SECTION NO. on the form. This number should be greater than 5+00 for sampling locations that occur after the test section specified, and less than 0+00 for sampling locations which occur before the test section specified. (See discussion under Sample Location Reference System in this report.)

LOCATION: OFFSET. This is the distance from the interface of the pavement lane and the outside shoulder to the core location (generally measured from the outside edge of the white pavement edge stripe). This distance should be indicated to the nearest tenth of a foot.

CORE RECOVERED. Circle the appropriate response to indicate if an intact and suitable core was recovered from the indicated core hole.

REPLACEMENT CORE HOLE NO. Record the sample number of the core that will replace a core which was deemed unacceptable during field sampling operations. This entry should only be used when a "No" was recorded in the "Core Recovered" data entry space of this form.

CORE SIZE. Circle the appropriate response to indicate the diameter of recovered core.

CORE SAMPLE NO. Record the core sample number for the recovered core. Separate sample numbers should be assigned to HMAC and bound base layers from the same core hole, even if the bound base adheres to the HMAC surface layer.

DEPTH. Depth should be measured from the pavement surface to the bottom of the material interface in the core and expressed to the nearest tenth of an inch.

MATERIAL DESCRIPTION. Enter the appropriate material description based on the generic material type. These material descriptions are contained in Table C.2, Appendix C, of the SHRP-LTPP Guide for Field Materials Sampling, Handling and Testing.

MATERIAL CODE. Enter the appropriate material code number from Table C.2 in the SHRP-LTPP Guide for Field Materials Sampling, Handling and Testing corresponding to the described type of material.

SAMPLING DATA SHEET 4-1. A-TYPE BORE HOLE LOG

This form is similar to Form S02A used for GPS test sections and is designed to record logs of A-Type Shelby tube and splitspoon sampling. The following data is recorded on this form.

OPERATOR. Record the boring equipment operator's name.

EQUIPMENT USED. Indicate the generic type of the drilling equipment used.

BORING DATE. Record the month, date, and year the operation was performed.

SAMPLING AREA NO. The sampling area number is a two digit number used to reference all the samples taken from one area of the project. It has the form SA-##. This number is developed as part of the materials sampling plan for the project. A-Type sampling performed within the test section monitoring length will not require a sampling number.

LOCATION: STATION. This is the station number of the bore, relative to the test section specified under TEST SECTION NO. on the form. This number should be greater than 5+00 for sampling locations that occur after the test section, less than 0+00 for sampling locations which occur before the test section, and between 0+00 and 5+00 for sampling locations that occur within the monitoring length. (See discussion under Sample Location Reference System in this document.)

LOCATION: OFFSET. This is the distance from the interface of the pavement lane and the outside shoulder to the bore location (generally measured from the outside edge of the white pavement edge stripe). This distance should be indicated to the nearest tenth of a foot.

BORE HOLE NO. Enter the core hole sample code number following the sample coding system specified in the material sampling plan developed for the project.

BORE HOLE SIZE. Record the borehole size (diameter) in inches to the nearest 0.1 inch.

STRATA CHANGE. Record the depth of strata changes to the nearest tenth of an inch. The depth of strata changes should always be measured from the top of the pavement surface. Draw a horizontal line across the form which indicates the depth of each strata change.

Also, record the depth of sampling for each sample taken. For example, if a thin-walled tube sample was obtained at a depth from 18 inches to 36 inches, a line should be drawn at the 18 inch mark and the 36 inch mark along with the appropriate sample code number, material description, etc. See example data sheets in the SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling for further clarification.

SAMPLE NUMBER. Record the sample number for thin-walled tube samples or splitspoon samples (if thin-walled tube samples cannot be obtained from the subgrade).

BLOWS. The next four columns (*# Blows, Refusal?, DLR (Driving Length to refusal, IOP (Inches of Penetration)*) shall be used only if a splitspoon sample recovery was attempted. Standard practice for recording the blow count for splitspoon samples requires the following format: A - B - C, where:

A = number of blows for first 6 inches of penetration by the splitspoon sampler. This is considered a seating drive.

B = number of blows for second 6 inches of penetration by the splitspoon sampler.

C = number of blows for third 6 inches of penetration by the splitspoon sampler.

Record the blow count from the first 6 inches of seating penetration by the splitspoon sampler in the left most column under number of blows. ("A" from above example of blow count record). Record the blow count from the second 6 inches of penetration by the splitspoon sampler in the middle column under number of blows ("B" from above example of blow count record). Record the blow count from the third 6 inches of penetration by the splitspoon sampler in the right most column under number of blows. ("C" from above example of blow count record).

Refusal of the splitspoon sampler is defined as having advanced less than one inch with 100 blows (or no observed advance of the sampler during the application of 10 blows) or the test is aborted at the discretion of the SHRP Representative to avoid damage to the splitspoon sampler.

If refusal of the splitspoon sampler occurs in the first 6 inches indicate the blow count to refusal in the left most column, place a "Y" in the ***Refusal?*** column and indicate in the ***DLR*** (Driving Length to Refusal) column, the distance, measured to the nearest tenth of an inch, from the top of the pavement surface to refusal. Also, record the penetration depth of the splitspoon sampler in the ***IOP*** column (distance penetrated in "A").

If refusal of the splitspoon occurs during the second 6 inches of penetration, indicate the blow count to refusal in the middle column, place a "Y" in the ***Refusal?*** column and indicate in the ***DLR*** column the distance, measured to the nearest tenth of an inch, from the top of the pavement surface to refusal. Also, record the penetration depth of the splitspoon sampler in the ***IOP*** column (distance penetrated in "A" + "B").

If the total blow count ("A" + "B") reaches 100 before penetrating deeper than 12 inches, the splitspoon sampling procedure should be stopped and the blow count for the second 6 inch increment should be recorded in the middle column and the total depth of penetration recorded under the ***IOP*** column (the depth of penetration shall be measured from the beginning of penetration of the splitspoon sampler.)

In the case of refusal during the third 6 inch increment, the same instructions outlined previously for the left and middle columns will be followed. The penetration depth of the splitspoon sampler will be recorded in the ***IOP*** column (distance penetrated in "B" + "C").

If the second and third 6 inch increment blow count ("B" + "C" only) reaches 100 before prior to penetrating 18 inches, the splitspoon sampling procedure should be stopped and the blow count for the third 6 inch increment

recorded in under number of blows. The total depth of penetration ("B" + "C" only) should be recorded under the ***IOP*** column (measured from the beginning of penetration of the splitspoon sampler minus the 6 inch seating drive).

(REF)USAL. Record a "Y" if splitspoon sampler is refused (see explanation under ***# Blows*** above). Record a "N" if the full 18 inch sample is recovered and the splitspoon is not refused. This column is only used if a splitspoon sampler is utilized.

Refusal is defined as occurring when the splitspoon sampler advances less than one inch in 100 blows (or no observed advance of the sampler during the application of 10 blows) or when the test is aborted at the discretion of the SHRP Representative to avoid damage to the splitspoon sampler.

DLR. Driving Length to Refusal - Record the penetration of the splitspoon sampler to refusal to the nearest tenth of an inch. This value is measured from the top of the pavement surface. This column is only used if a splitspoon sampler is utilized and refused. In the case of refusal, an entry is made in the ***DLR*** and ***IOP*** columns.

IOP. Inches of Penetration - Record the distance of penetration of the splitspoon sampler after 100 blows is reached in the first 6 inches ("A"), the first and second 6 inches of penetration ("A" and "B") or the second and third 6 inches of penetration ("B" and "C") (See explanation under # Blows above). This column is only used if a splitspoon sampler is utilized.

MATERIAL DESCRIPTION. Enter the appropriate material description for each strata based on the generic material type. These material descriptions are contained in Table C.2, Appendix C, of the SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling.

MATERIAL CODE. Enter the appropriate material code number for each strata from Table C.2 in the SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling corresponding to the described type of material.

SAMPLING DATA SHEET 8-1. IN SITU DENSITY AND MOISTURE TESTS

This sheet is similar to Form S04 used for GPS test sections and is designed to record data from the in situ density and moisture tests performed on all unbound layers and density tests performed on bound layers with a nuclear moisture and density gauge. The following data is recorded on this form.

OPERATOR. Record nuclear density gauge operator's name.

NUCLEAR DENSITY GAUGE I.D.. Record the identification number of the nuclear density gauge.

TEST DATE. Record the month, date, and year the test was performed.

SAMPLING AREA NO. The sampling area number is a two digit number used to reference all of the samples taken from one area of the project. This number is developed as part of the materials sampling plan for the project and has the form SA-##. Test locations within the monitoring length will not require a sampling area number.

LOCATION: STATION. This is the station number of the sampling area, relative to the test section specified under TEST SECTION NO. on the form. This number should be greater than 5+00 for sampling locations that occur after the test section specified, and less than 0+00 for sampling locations which occur before the test section specified. (See discussion under Sample Location Reference System in this document.)

LOCATION: OFFSET. This is the distance from the edge of the pavement lane and the outside shoulder to the location at which the test was performed (generally measured from the edge of the white pavement edge stripe). This distance should be indicated to the nearest tenth of a foot.

SAMPLING LOCATION NUMBER. Enter the sampling location number shown in the material sampling plan developed for the project.

DATE OF LAST MAJOR CALIBRATION. Record the date of the last major calibration of the nuclear density gauge. All dates should be recorded as mm-dd-yy. A major calibration is defined as that calibration/verification performed as directed in Section 4 of the SHRP-LTPP Guide for Field Materials Sampling, Handling and Testing. Daily calibrations performed in the field do not constitute a major calibration.

DEPTH FROM SURFACE TO THE TOP OF THE LAYER. This information is obtained from construction plans and measurements taken during pavement construction. Record to the nearest tenth of an inch and measure from the top of the pavement surface for each test performed.

LAYER NUMBER. Write in the project specified layer number for the layer being tested.

MATERIAL TYPE. Report a "G" if the material is unbound (granular) and a "T" if the material is other than unbound (treated). In practice, all entries should be a "G" since nuclear density testing is not required on bound materials.

IN SITU DENSITY. For each unbound layer, record four nuclear density gauge results. These measurements should be taken at the top of each unbound layer using the direct transmission test method if possible. Record to one decimal place in pounds per cubic foot (pcf).

AVERAGE. Calculate and record the average in situ densities for each unbound layer. Record to one decimal place.

METHOD (A,B,or C). Record the test method used to perform the in situ density test as per AASHTO T238-86, "A" - Backscatter, "B" - Direct Transmission, or "C" - Air Gap. The direct transmission method ("B") should almost always be used. However, there may be some extenuating circumstances necessitating the use of methods "A" or "C".

ROD DEPTH. Record the depth of the nuclear density gauge probe to the nearest tenth of an inch.

IN SITU MOISTURE CONTENT. For each unbound layer, record four in situ moisture content test results. These tests should be conducted at the top of each layer. Record the moisture content as a percentage to one decimal place. The backscatter method should always be used for this measurement.

AVERAGE. Calculate and record the average of the four in situ moisture content test results for each unbound layer. Record to one decimal place.

SAMPLING DATA SHEET 9. SHOULDER PROBE LOG

This data sheet is similar to Form S05 used for the GPS test sections and is used to record the results of the shoulder auger probe to determine the depth to a rigid layer.

OPERATOR. Record the auger equipment operator's name.

EQUIPMENT USED. Indicate the generic type of the auguring equipment used.

AUGURING DATE. Record the month, date, and year the operation was performed.

SAMPLING AREA NO. The sampling area number is a two digit number used to reference all of the samples taken from one area of the project. This number is developed as part of the materials sampling plan for the project and has the form SA-##. No sampling area number is required for probes conducted within the monitoring length.

LOCATION: STATION. This is the station number of the bore relative to the test section specified under TEST SECTION NO. on the form. This number should be greater than 5+00 for probes located after the test section, less than 0+00 for probes located before the test section, and between 0+00 and 5+00 for probe

locations within the monitoring length (See discussion under Sample Location Reference System in this document).

LOCATION: OFFSET. This is the distance from the edge of the pavement lane and the outside shoulder to the auger location (generally measured form the outside edge of the white pavement edge stripe. For shoulder probes, this distance will be measured toward the outside edge of the shoulder. This distance should be indicated to the nearest tenth of a foot.

AUGER PROBE NUMBER. Record the auger probe number; an S1 for the first auger and increasing numbers for subsequent auger probes.

TOP OF ROCK BASED ON. Enter "Auger Refusal" if auger is refused. If the top of rock is based on some other observation, indicate the type of observation.

DEPTH FROM SURFACE. Record the depths of strata changes to the nearest tenth of a foot.

MATERIAL DESCRIPTION. Enter the appropriate material description for each strata based on the generic material type. These material descriptions are contained in Table C.2, Appendix C, of the SHRP-LTPP Guide for Field Materials Sampling, Handling and Testing.

MATERIAL CODE. Enter the appropriate material code number for each strata from Table C.2 in the SHRP-LTPP Guide for Field Materials Sampling, Handling and Testing corresponding to described type of material.

REFUSAL WITHIN 20 FEET (Y/N). Record a "yes" or a "no" as appropriate to indicate if a rigid layer was encountered within 20 feet from the pavement surface.

DEPTH TO REFUSAL. Record the depth to refusal to the nearest tenth of a foot if the auger refused.

SAMPLING DATA SHEET 10-1. SAMPLING UNCOMPACTED BITUMINOUS PAVING MIXTURES

This data sheet is used to record information concerning sampling of uncompacted bituminous paving mixtures (asphalt concrete and asphalt-treated materials) for LTPP material testing purposes. Sampling shall be performed according to AASHTO T-168, except that a 100-lb sample should be used.

If the plant-sampled material is known to be of the same batch used on a specific test section, the number of this test section should be entered on the form. However, if specific test sections corresponding to the plant sampled material cannot be identified, enter "00" on the test section number to indicate "project level data."

PERSON PERFORMING SAMPLING. Record the name, title and affiliation of the person performing the sampling.

PLANT NAME. Record the common name or operator of the mix plant facility which produced the sampled material.

PLANT LOCATION. Record the location of the mix plant, including street address, town, and state.

PLANT TYPE. Indicate the general type of mix plant used to produce the mix. If a plant other than a batch or drum plant was used, indicate other and provide a description of the plant on the next line.

DESCRIPTION OF ASPHALT PLANT. Provide a brief description of the type of mix plant noting any special features of traditional types of batch or drum plants, or a description of other mix plant types.

MANUFACTURER OF MIX PLANT. Enter the name of the mix plant manufacturer.

MODEL NUMBER. Enter the model number or model designation of the mix plant.

BATCH SIZE. Record the size of the batch the sample from which the sample was obtained.

SAMPLING LOCATION. Enter the code number shown on the data form corresponding to the location from which the sample was taken. If the sample was taken from the roadway prior to compaction, indicate the station and offset of the sample and the respective test section number.

MIX TYPE. Enter the code number corresponding to the generic type of material (virgin asphalt concrete, recycled asphalt concrete, asphalt dense graded or permeable asphalt treated). For SHRP test sections, recycled asphalt concrete should not be used.

LAYER NUMBER. Enter the layer number for which plant-sampled material will be used (see discussion on layering structure in this report).

LAYER TYPE. Enter the code number, as shown on the form, which corresponds to the type of layer in which the material is used.

SAMPLE TYPE DESIGNATOR. Enter the sample type designation for the sample. This is a 4 digit code which identifies the generic type of material, virgin, recycled, or treated and a sequential number for each sample of each material type obtained. For materials incorporating all virgin materials, the sample type designation shall begin with the letters BV (Bulk Virgin). For materials incorporating recycled materials, the designator shall begin with BR (Bulk Recycled). For treated materials, the designator shall begin with the letters BT (Bulk Treated). These letter designations are followed with a two digit number sequentially assigned to each sample, for each type of material.

SAMPLE NUMBER. This is a 4 digit code starting with the letters BA (Bulk Asphalt Concrete) or BT (Bulk Asphalt Treated material) and followed with a sequentially assigned two digit number, which uniquely designates each bulk asphalt concrete sample.

APPROXIMATE SAMPLE SIZE. Enter the approximate weight of the sample obtained, to the nearest pound.

DATE SAMPLED. Enter the date the material sample was obtained.

LOCATION SAMPLE SHIPPED TO. Record the location to which the sample was shipped. In many cases this location should be the laboratory which will perform the testing.

DATE SHIPPED. Enter the date on which the material was shipped to the location indicated on the form.

GENERAL REMARKS. Provide any general remarks concerning the obtained sample, comments concerning the quality or uniformity of the mix, or any other pertinent miscellaneous comments.

SAMPLING DATA SHEET 12. BULK SAMPLING OF SUBGRADE AND UNBOUND GRANULAR MATERIALS

This form is similar to Form S03 used for GPS test sections and is designed to record data from the field sampling of materials from shallow excavations made in prepared subgrade and uncompacted graded layers during construction. The following data is recorded on this form:

TECHNICIAN. Record the name of the technician who retrieved the samples and recorded the information on the data form.

EQUIPMENT. Indicate the generic type of the equipment used to excavate the material.

EXPLORATION DATE. Record the month, date, and year the operation was performed.

SAMPLING AREA NO. The sampling area number is a two digit number used to reference all of the samples taken from one area of the project. It has the form SA-##. This number is developed as part of the materials sampling plan for the project.

LOCATION: STATION. This is the station number of the sampling area, relative to the test section specified under TEST SECTION NO. on the form. This number should be greater than 5+00 for sampling locations that occur after the test section specified, and less than 0+00 for sampling locations which occur before the test section specified. (See discussion under Sample Location Reference System in this document.)

LOCATION: OFFSET. This is the distance from the edge of the pavement lane and the outside shoulder to the outside edge of the sampling area (generally measured from the outside edge of the white pavement edge stripe). This distance should be indicated to the nearest tenth of a foot.

SAMPLING LOCATION NUMBER. Enter the sampling location number shown in the material sampling plan developed for the project.

EXCAVATION SIZE. Record the length and width of the excavation to the nearest half foot.

LAYER NUMBER. Enter the layer number from which the sample was obtained.

STRATA CHANGE. Record the depth of strata changes to the nearest tenth of an inch. The depth of strata changes should always be measured from the top of the pavement surface. Draw a line across the form to indicate strata changes.

MOISTURE SAMPLE NUMBER. Record sample numbers for samples taken from unbound base, subbase and subgrade for moisture content testing.

BULK SAMPLE NUMBER. Record the sample number for bulk samples taken from the unbound pavement layers and the subgrade.

MATERIAL DESCRIPTION. Enter the appropriate material description for each strata based on the generic material type. These material descriptions are contained in Table C.2, Appendix C, of the SHRP-LTPP Guide for Field Materials Sampling, Handling and Testing.

MATERIAL CODE. Enter the appropriate material code number for each strata from Table C.2 in the SHRP-LTPP Guide for Field Materials Sampling, Handling and Testing corresponding to the described type of material.

FIELD OPERATION INFORMATION FORM 1. LABORATORY SHIPMENT SAMPLES INVENTORY

This form is intended to provide a record of field activity and no information from this form will be included in the data base. This form is similar to Form S06 used for GPS test sections and provides the necessary information on where each sample was shipped for testing. Also, it provides a detailed inventory of material samples shipped to each materials testing laboratory. At least one form should be completed for each sampling area on the project. The inventory should be made in the following sequence of sample location numbers, starting from the pavement surface layer in each case:

1. Samples from C-Type locations, starting from cores of pavement surface layers.
2. Samples from A-Type bore holes and any additional similar bore holes.
3. Samples from shallow excavations.

Sample location numbers, sample numbers and sampling area numbers should be obtained from the appropriate Sampling Data Sheets. "Sample size" should be used to record the number of bags of bulk samples or the number of jar samples bearing a single sample number in each case. The bulk sample from one layer can be placed in more than one bag, if necessary. However, the sample number should be the same on all of these bags with an indication of the number of bags on the labels and in the column of the "Sample size." For core samples, record only diameter of the core in the "Sample size" column in inches.

Enter core, bulk, moisture, tube or splitspoon in the "Sample type" column as appropriate. Enter AC, PCC, Base, Subbase or Subgrade in the "Sample material" column as appropriate. The "Sample condition" should indicate a brief description as to the overall quality of the sample - cores: good, poor, fractured; bulk samples: satisfactory, wet, insufficient quantity, contaminated.

Since more than one laboratory may be used to test samples in the SPS program, room is provided on this form to indicate up to three laboratories to receive samples from each sampling area. Enter the laboratory number, as noted at the bottom of the form, each sample is sent to under the LAB column.

Typically, samples will include:

- All AC cores from C-Type locations.
- Bulk samples and jar samples of granular (untreated) layers and subgrade from BA-Type locations and test pits.
- Thin-walled tube samples and splitspoon samples from the subgrade.

FIELD OPERATION INFORMATION FORM 2-1. SUMMARY OF MATERIAL SAMPLES SENT TO EACH LABORATORY

This form provides a summary of the information provided on Field Operations Information Form 1 by testing laboratory. It is similar to Form S06A used for GPS test sections. A separate form should be completed for each set of samples sent to each separate laboratory.

This form requires the samples to be aggregated into layers designated with a layer number. The layer number assigned to each layer (1 for subgrade, 2 for subbase, 3 for unbound base, etc.) is shown in the left hand column. A description of the pavement layer material and sample type is provided in the next column on the right, followed by the total number of samples by sample type.

CONSTRUCTION DATA

Construction data for the SPS-1 experiment primarily includes items related to project and section "as-built" construction inventory, and preparation and placement of the subgrade, unbound aggregate materials, and asphalt bound materials. In addition, this data includes material properties determined as part of the mix design and construction control operations.

A number of data sheets must be completed to report data obtained during construction. A set of 17 Construction Data Sheets was developed specifically for the SPS-1 experiment. These Construction Data Sheets should also be completed for supplemental sections constructed at each SPS-1 project site. Table 1 lists the construction related data sheets that are to be completed for the different test sections.

The following Construction Data Sheets shall be completed, as appropriate, for the SPS-1 experiment following the guidelines outlined in this report.

CONSTRUCTION DATA SHEET 1.	PROJECT AND SECTION IDENTIFICATION
CONSTRUCTION DATA SHEET 2.	GEOMETRIC, SHOULDER AND DRAINAGE INFORMATION
CONSTRUCTION DATA SHEET 3.	REFERENCE PROJECT STATION TABLE
CONSTRUCTION DATA SHEET 4.	LAYER DESCRIPTIONS
CONSTRUCTION DATA SHEET 5.	PLAN-MIXED ASPHALT BOUND LAYERS - AGGREGATE PROPERTIES
CONSTRUCTION DATA SHEET 6.	PLANT-MIXED ASPHALT BOUND LAYERS - ASPHALT CEMENT PROPERTIES
CONSTRUCTION DATA SHEET 7.	PLANT-MIXED ASPHALT BOUND LAYERS - MIXTURE PROPERTIES
CONSTRUCTION DATA SHEET 8.	PLANT-MIXED ASPHALT BOUND LAYERS - MIXTURE PROPERTIES (CONTINUED)
CONSTRUCTION DATA SHEET 9.	PLANT-MIXED ASPHALT BOUND LAYERS - PLACEMENT DATA

Table 1. Guide to completion of SPS-1 Construction Data Sheets

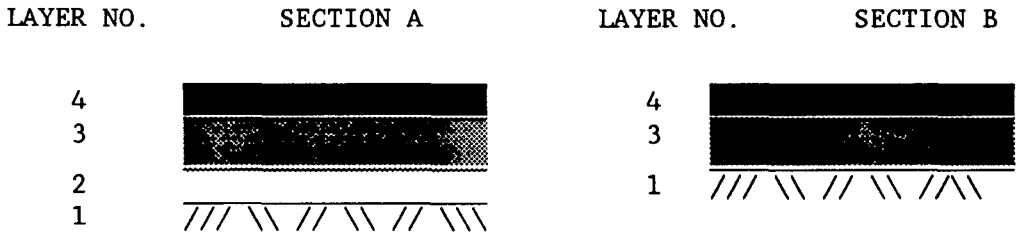
SECTION	SPS-1 CONSTRUCTION DATA SHEETS																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
PROJECT	✓		✓														*
1 (13)		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	*
2 (14)		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	*
3 (15)		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	*
4 (16)		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	*
5 (17)		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	*
6 (18)		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	*
7 (19)		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	*
8 (20)		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	*
9 (21)		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	*
10 (22)		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	*
11 (23)		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	*
12 (24)		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	*

✓ Always complete indicated data sheet for this section.
* Complete when necessary.

CONSTRUCTION DATA SHEET 10.	PLANT-MIXED ASPHALT BOUND LAYERS - COMPACTION DATA
CONSTRUCTION DATA SHEET 11.	PLANT-MIXED ASPHALT BOUND LAYERS - DENSITY DATA
CONSTRUCTION DATA SHEET 12.	LAYER THICKNESS MEASUREMENTS
CONSTRUCTION DATA SHEET 13.	UNBOUND AGGREGATE BASE MATERIAL PLACEMENT
CONSTRUCTION DATA SHEET 14.	SUBGRADE PREPARATION
CONSTRUCTION DATA SHEET 15.	CUT-FILL SECTION LOCATIONS
CONSTRUCTION DATA SHEET 16.	SUBGRADE EXCAVATION AND BACKFILLING SKETCH
CONSTRUCTION DATA SHEET 17.	MISCELLANEOUS CONSTRUCTION NOTES AND COMMENTS

A layer description table should be completed for each test section to note any differences in the layer structure and thicknesses. A project level layering structure should be developed in which a unique layer number is assigned to every layer present on the project. The layer number for each material must be kept the same across all test sections. This is needed since the detailed inventory and materials information is keyed to layer number. On test sections uniformly on cut or fill, the same layer structure should exist for all test sections, with differences between test sections due to embankment thicknesses or layer thicknesses. For test sites in which some sections are on cut and others on fill (embankment), the project layer structure should include an embankment (fill) layer. The thickness of this layer would be coded as zero on test sections which are located in cut.

The project layering concept is illustrated in Figure 2 for two hypothetical test sections (Sections A and B) located on the same project. Section A is located on a 4-foot deep fill (embankment) and Section B is located in a cut. To keep the layer number for each material the same across all test sections, the embankment layer is shown in the layer structure for Section B with a zero thickness. In this manner, all data sheets can be completed for each section on the test site in a consistent manner.



EXAMPLE LAYER STRUCTURE CODING FOR SECTION A

LAYER NO.	LAYER DESCRIPTION	MATERIAL TYPE CLASS	THICKNESS
1	SUBGRADE (7)	52 - SANDY CLAY	N A
2	11 - EMBANKMENT	26 - SOIL-AGG MIX	48.0
3	05 - BASE LAYER	23 - CRUSHED STONE	12.0
4	03 - SURFACE	01 - AC	7.0

EXAMPLE LAYER STRUCTURE CODING FOR SECTION B

LAYER NO.	LAYER DESCRIPTION	MATERIAL TYPE CLASS	THICKNESS
1	SUBGRADE (7)	52 - SANDY CLAY	N A
2	11- EMBANKMENT	26 - SOIL - AGG MIX	0
3	05 - BASE LAYER	23 - CRUSHED STONE	12.0
4	03 - SURFACE	01 - AC	4.0

Figure 2. Example of project layering scheme for coding test section layer tables.

The data sheets stipulate the entry of numerous data elements. Available data should be entered and every effort should be made to obtain those data indicated by an asterisk (*). When a data element is not applicable or does not pertain to the test section, enter an "N" to indicate that the data element is not applicable. However, if the data element is applicable, but the value is unknown, enter a "U" to indicate that the value is unknown. Many items will require codes to be entered. These codes are generally listed in the data sheets.

DATA COMMON FOR ALL SPS-1 CONSTRUCTION DATA SHEETS

A common set of project identification data appears in the upper right hand corner of each SPS-1 Construction Data Sheet. These data items are described below.

STATE CODE. Enter the two digit state code which is a number used to identify the state or Canadian province in which the pavement section is located (see Table A.1, Appendix A of the LTPP Data Collection Guide or Appendix B of this report).

SPS PROJECT CODE. Enter the two digit SPS project code. The structure of this number is described in the section entitled, "SPS Test Section Numbering Scheme" of this report.

TEST SECTION NUMBER. Enter the two digit SPS test section number. The structure of this number is described in the section entitled, "SPS Test Section Number Scheme" of this report.

CONSTRUCTION DATA SHEET 1: PROJECT IDENTIFICATION

1. DATE OF DATA COLLECTION OR UPDATE. Enter the month and year in which the "as-built" construction inventory data was collected. The number to identify the month is in numerical sequence of the months as they occur

during the year (enter 03 for March, etc.). The two digits identifying the year are the last two digits of the year (91 for 1991, etc.).

2. STATE HIGHWAY AGENCY (SHA) DISTRICT NUMBER. Enter the number used to identify the SHA district in which the pavement test section is located.

3. COUNTY OR PARISH. Enter the number used to identify the county or parish where the pavement section is located. County codes may be found in Federal Information Processing Standards Publications 6, "Counties of the States of the United States."

4. FUNCTIONAL CLASS. Enter the number used to identify the functional classification of the highway for which the pavement section is a sample (see Table A.2, Appendix A of the LTPP Data Collection Guide or Appendix A of this report for codes).

5. ROUTE SIGNING. Enter the code to identify the letter designation that precedes the number of the highway where the SHA project is located.

6. ROUTE NUMBER. Enter the number assigned to the highway where the SHA project is located (e.g., I-280).

7. TYPE OF PAVEMENT. Enter the code identifying the general type of pavement structure (such as asphalt concrete pavement with granular base). The valid pavement type codes for SPS-1 are 01 and 02 for asphalt concrete pavement with granular base and bound base, respectively.

8 NUMBER OF THROUGH LANES. Enter the number indicating the total number of through lanes (exclusive of ramps and access roads) in the djrection of travel.

9. DATE CONSTRUCTION COMPLETION. Enter the month and year in which the test section construction was completed.

10. DATE OPENED TO TRAFFIC. Enter the month and year in which the test section was opened to traffic.

11. CONSTRUCTION COSTS PER LANE MILE. Enter the total average construction cost in thousands of dollars per lane mile for the test section, exclusive of non-pavement costs such as bridges, culverts, lighting, and guard rails.

12. DIRECTION OF TRAVEL. Enter the number indicating the general direction of traffic flow along the entire route which includes the test section.

13-17 PROJECT STARTING POINT LOCATION. The location of the starting point of the project is to be identified by milepoint, elevation, latitude, and longitude.

13. MILEPOSTS are to be determined by adjusting the value posted on the nearest milepost to the starting point. For example, if the direction of travel (preceding data element) is in the same direction as increasing mileposts for a given roadway, and the starting point was 0.29 miles from the preceding milepost (Mile 114), the milepoint for the starting point of the test section would be 114.29. Milepoints are to be given to the nearest 0.01 mile.

14. ELEVATIONS are to be entered to the nearest foot. Survey measurements are not required - the intent is to obtain a reasonable estimate. In many cases, the elevations can be taken off the construction plans.

15&16 LATITUDE AND LONGITUDE (North and West, respectively) are to be given in degrees, minutes, and seconds to the nearest 0.01 second when this type of accuracy is possible. This value may be determined at a later date through the use of advanced photogrammetric methods.

17. ADDITIONAL LOCATION INFORMATION (SIGNIFICANT LANDMARKS). Enter additional information regarding the location of the section's starting point

location. This type of information will be useful for field crews locating the project during monitoring activities.

18. HPMS SAMPLE NUMBER. Enter the twelve-digit "Section/Grouped Data Identification" assigned to any section of highway in the Highway Performance Monitoring System (HPMS). It provides a unique identification for a test section and may be obtained from those SHA personnel servicing the HPMS.

19. HPMS SECTION SUBDIVISION. Enter the single digit code used to identify a further subdivision of an original HPMS section, generally included as a thirteenth digit to the HPMS sample number.

CONSTRUCTION DATA SHEET 2: GEOMETRIC, SHOULDER AND DRAINAGE INFORMATION

1. LANE WIDTH. Enter the width of the lane to be monitored, to the nearest whole number of feet.

2. MONITORING SITE LANE NUMBER. Enter the number that identifies which lane is to be monitored. Lanes are identified as indicated on the data sheet. Although a highway agency may wish to monitor more than one lane, each lane should be considered as a separate "test section," with its own data (although much data may actually be common such as environmental, materials, and thickness design data). For the LTPP Studies, only the outside lane will be studied, so the code "1" should be entered.

3. SUBSURFACE DRAINAGE LOCATION. Enter the code indicating whether the subsurface drainage is continuous along the section or was provided at intermittent locations or was not provided.

4. SUBSURFACE DRAINAGE TYPE. Enter the code indicating the type of subsurface drainage provided. A space is provided for describing another type of subsurface drainage if different from those for which codes are provided.

Where present, drainage features for SPS-1 projects will be limited to drainage blanket with longitudinal drains.

SHOULDER DATA. Spaces are provided to enter data describing both the outside and inside shoulder. If there are no inside shoulders, enter "N" for those spaces pertaining to inside shoulders.

5. SHOULDER SURFACE TYPE. Enter the codes indicating the type of shoulder surfaces for the outside and inside shoulders. The inside and outside shoulder surfaces should be asphalt concrete for SPS-1 sites.

6. TOTAL WIDTH. Enter the total (paved and unpaved) widths of the outside and inside shoulders to the nearest whole number of feet.

7. PAVED WIDTH. Enter the paved widths of the outside and inside shoulders to the nearest whole number of feet.

8. SHOULDER BASE TYPE. Enter the codes identifying the types of base material used in the shoulders (see Table A.6, Appendix A of the Data Collection Guide for codes).

9. SHOULDER SURFACE THICKNESS. Enter the average thicknesses of the inside and outside shoulder surfaces to the nearest 0.1 inch.

10. SHOULDER BASE THICKNESS. Enter the average base thicknesses along the shoulders to the nearest 0.1 inch.

11. DIAMETER OF LONGITUDINAL DRAINPIPES. Enter the inside diameter to the nearest 0.1 inch of the longitudinal drainpipes used for subsurface drainage. If there is no longitudinal drainage, leave blank.

12. SPACING OF LATERALS. Enter the average spacing in feet for subdrainage laterals. Leave blank if there are no subdrainage laterals.

CONSTRUCTION DATA SHEET 3: REFERENCE PROJECT STATION TABLE

A reference project station system must be established for each project. This station referencing system starts with station 0+00 assigned to the starting point of the first test section encountered on the project. The station number of the beginning and end of all test sections on the project will be referenced to this point to provide a relative distance measure of the beginning, end, and distance between test sections on the site. This continuous system is used to avoid compounding measurement error within test sections since test sections are not precisely marked to 500 feet when laid out. This information will be used to process profile data collected from continuous measurements over the test sites and to identify the locations of the materials sampling and testing operations on the test sections for the entire site. In addition, this information will indicate the ordering and distance between test sections.

Field measurements should be used to locate the start and end point of each test section with an accuracy of $\pm$ 1 foot. A manual rolling wheel distance measurement device or a calibrated vehicle mounted DMI of the required accuracy may be used for this purpose. These measurements should be made prior to construction, e.g. during initial construction layout. This data can then be used as a check against the repositioning of the start and end of the test sections during construction.

The relative SPS project station location information is recorded on Construction Data Sheet 3. The starting point of the first test section encountered on the project in the direction of traffic is assigned station 0+00. Station numbers for the start and end of all test sections on each SPS test site should run continuous from this point with no equations and measured factor nearest one foot. This station numbering system is independent from the station numbering used on the construction plans to avoid complications due to mid-project station equations. A space is provided for the station number of the end of the first test section since it may not always occur precisely at station 5+00.

The test section ID numbers and relative station numbers of the beginning and end of each section should be entered on Sheet 3, in the order in which the test sections are encountered in the direction of traffic.

1. TEST SECTION ID NUMBER. The six digit test section ID number, consisting of the STATE CODE, SPS PROJECT CODE, and TEST SECTION NUMBER, should be entered for each SPS test section. If a GPS test section is located on the project, then the six digit GPS test section identification number, consisting of the STATE CODE and SHRP SECTION NUMBER, should be entered in the test section ID column.

2. START STATION NUMBER. The station number of the starting point of the test section relative to the starting point of the first test section on the project, to the nearest one foot.

3. END STATION NUMBER. The station number of the ending point of the test section relative to the starting point of the first test section on the project, to the nearest one foot.

4. SUBGRADE STRUCTURE TYPE. Enter the code number shown under note 1 on the form to indicate if the test section is located entirely on fill, cut, at-grade or is located on both cut and fill. If the test section is located on both cut and fill, the approximate location of the cut-fill transition within the test section should entered using a test section relative station number (0+00 to 5+00).

5. INTERSECTIONS BETWEEN TEST SECTIONS ON THE PROJECT. If any intersections occur between any of the test sections on the project, indicate the number or name of the intersecting route, the reference project station number (referenced to the start of the first test section on the project), and check whether it is an entrance or exit ramp, or an intersection with a stop sign, traffic signal, or is unsignalized.

CONSTRUCTION DATA SHEET 4: LAYER DESCRIPTIONS

This data sheet should be completed for each test section to describe the newly constructed pavement layers. The layer numbers shown on this form provide a key reference to the other detailed information sheets concerning the properties of the layer. In order to provide future analysts with information on the test section pavement structure and to avoid confusion with layer numbers, the complete layer structure of the test section must be described. This pavement layer structure should be the same as that provided on the Laboratory Material Handling and Testing Form LO5.

1. LAYER NUMBER. Enter the printed layer number on the form which is used to reference the pavement layers on other data sheets. The first layer is assigned to subgrade and all other layers assigned increasing numbers. The surface will be the highest numbered layer.

2. LAYER DESCRIPTION. Enter the layer description code, as shown in note 2 on the form, which describes the general type of layer. This code should be entered corresponding to its order within the layer structure.

3. MATERIAL TYPE CLASSIFICATION. Enter the code that identifies the type of material in each layer. These codes are listed in Tables A.5, A.6, A.7, and A.9, of Appendix A of the LTPP Data Collection Guide, for surfacing materials, base and subbase materials, subgrade soils, and thin seals and interlayers, respectively.

4. LAYER THICKNESS. Enter the average thickness of each material layer. If sufficient measurement information is available, enter the maximum, minimum, and standard deviation of the thickness measurements.

5. DEPTH BELOW SURFACE TO "RIGID" LAYER. Enter the depth below the surface where rigid layer is encountered, in feet.

CONSTRUCTION DATA SHEET 5: PLANT MIXED ASPHALT BOUND LAYERS, AGGREGATE PROPERTIES

This sheet should be completed during construction from available project records for each asphalt concrete layer identified on Sheet 4. Although various SHAs differentiate between fine and coarse aggregates on the basis of different sieve sizes, for the SHRP studies all aggregate retained on the No. 8 sieve is classified as coarse aggregate and all aggregate passing the no. 8 sieve is classified as fine aggregate. "Mineral filler" is defined (per ASTM D242) as that portion passing the No. 30 sieve (at least 95 percent must pass the No. 50 sieve and at least 70 percent must also pass the No. 200 sieve).

1. LAYER NUMBER. Enter the asphalt concrete layer number for which a description is being provided (from Sheet 4).

2-4. COMPOSITION OF COARSE AGGREGATE. Enter the type and percentage by weight of materials in the coarse aggregate used in the asphalt concrete mix. Space is provided for identifying a type of coarse aggregate other than those with codes. Where only one type of material is used, enter the type code and 100 in the top set of data spaces, leaving the others blank.

5-7. COMPOSITION OF FINE AGGREGATE. Enter the type and percentage by weight of materials in the fine aggregate (passing the No. 8 sieve and retained on the No. 200 sieve). Space is provided for identifying another type if none of those for which codes are provided was used. Where only one type of material was used, enter its type code and 100 in the top set of data spaces, leaving the others blank.

8. TYPE OF MINERAL FILLER. Enter the type of mineral filler used. The codes appear on the data sheet, including space for entering types other than those for which codes have been provided.

9-12 BULK SPECIFIC GRAVITIES. Enter the mean bulk specific gravities (to the nearest thousandth) for coarse aggregate, fine aggregate, mineral filler,

and the aggregate combination. The bulk specific gravities for the aggregate fractions are measured using the laboratory procedures indicated below:

a. Coarse Aggregate - AASHTO T85 or ASTM C127
b. Fine Aggregate - AASHTO T84 or ASTM C128
c. Mineral Filler - AASHTO T100 or ASTM D854

The bulk specific gravity for the aggregate combination (usually called "bulk specific gravity of aggregate") is calculated as follows:

$$G_{sb} = \frac{P_1 + P_2 + P_3}{\frac{P_1}{G_1} + \frac{P_2}{G_2} + \frac{P_3}{G_3}} \qquad (2.1)$$

where:

G_{sb} = Bulk specific gravity for the total aggregate
P_1, P_2, P_3 = Percentages by weight of coarse aggregate, fine aggregate, and mineral filler
G_1, G_2, G_3 = Specific gravities of coarse aggregates, fine aggregates, and mineral filler

13. EFFECTIVE SPECIFIC GRAVITY OF AGGREGATE COMBINATIONS. Enter the mean calculated effective specific gravity to the nearest 0.001. This calculation requires the maximum specific gravity (no air voids) of the paving mixture, which is obtained by Test Method AASHTO T209 or ASTM D2041. The effective specific gravity of the aggregate is calculated as follows:

$$G_{se} = \frac{100 - P_b}{\frac{100}{G_{mm}} - \frac{P_b}{G_b}} \qquad (2.2)$$

where:

G_{se} = Effective specific gravity of aggregate
P_b = Asphalt cement, percent by total weight of mixture
G_b = Specific gravity of asphalt
G_{mm} = Maximum specific gravity of paving mixtures (no air voids)

14-17 AGGREGATE DURABILITY TEST RESULTS. Enter the type of durability tests used and the results in tenths recorded in units specified for the test. Three of these sets are for coarse and one for the combination of coarse and fine aggregates. The durability test type codes appear in Table A.13 of Appendix A of the LTPP Data Collection Guide.

18. POLISH VALUE OF COARSE AGGREGATES. Enter the accelerated polish value of the coarse aggregates used in the surface layer, as determined by AASHTO T279 (ASTM D3319).

CONSTRUCTION DATA SHEET 6: PLANT MIXED ASPHALT BOUND LAYERS - ASPHALT CEMENT PROPERTIES

This data sheet should be completed during construction from available project records for each asphalt concrete layer identified on Sheet 4.

1. LAYER NUMBER. Enter the asphalt concrete layer to be described on this sheet (from Sheet 4).

2. ASPHALT GRADE. Enter the grade of asphalt cement used (see Table A.16 of the LTPP Data Collection Guide). Space is provided on the data sheet for identifying a grade of asphalt cement other than those listed in Table A.16.

3. SOURCE. Enter the name of the source for the asphalt cement. A list of asphalt refiners and processors is provided in Table A.14 of the LTPP Data Collection Guide (as taken from the Oil and Gas Journal, March 24, 1986). Space is provided to specify other sources which may not be included in the table provided.

4. SPECIFIC GRAVITY OF ASPHALT CEMENT. Enter the mean specific gravity of the asphalt cement (to the nearest 0.001) when it is available. If unavailable, a typical specific gravity for asphalt cements produced at the source refinery may be entered. If source is unknown, enter 1.010 as

a reasonable estimate. This specific gravity is measured as specified by AASHTO T228 (or ASTM D70).

ORIGINAL ASPHALT CEMENT PROPERTIES. The following data items should be provided when available from the supplier for the original asphalt cement, tested prior to its use in the construction.

5. VISCOSITY OF ASPHALT AT 140°F. Enter the results in poise from kinematic viscosity testing using Test Method AASHTO T202 (or ASTM D2171) on samples of the original asphalt cement prior to its use in construction of the pavement section.

6. VISCOSITY OF ASPHALT AT 275°F. Enter the results in centistokes (to the nearest 0.01) from absolute viscosity testing using Test Method AASHTO T201 (or ASTM D2170) on samples of the original asphalt cement.

7. PENETRATION AT 77°F. Enter the penetration (in tenths of a millimeter) from testing the original asphalt cement in the mixture at 77°, using a 100 gram load and a five-second load duration with Test Method AASHTO T49 (or ASTM D5) on samples of the original asphalt cement material.

8-9. TYPE OF ASPHALT MODIFIERS. Enter the codes to identify up to two modifiers added to the asphalt cement for whatever purpose. A list of possible asphalt cement modifiers and codes for data entry are provided on Table A.15 of the LTPP Data Collection Guide. If a material other than those listed in Table A.15 is used, space is provided to record the pertinent information. If no modifier was used, enter "N".

8-9. QUANTITY OF ASPHALT MODIFIER. Enter the quantities of modifier in percent of asphalt cement weight. Some modifiers (such as lime) may be specified in terms of "percent of aggregate weight," but they must be converted to percent of asphalt cement weight for uniformity. Space is provided for up to two types of modifiers. If no modifier was used, enter "N".

10. DUCTILITY AT 77°F. Enter the ductility in centimeters as measured by Test Method AASHTO T51 at 77°F (or ASTM D113).

11. DUCTILITY AT 39.2°F. Enter the ductility in centimeters of the original asphalt cement material at 39.2°F, using the procedures of Test Method AASHTO T51 (or ASTM D113).

12. TEST RATE FOR DUCTILITY MEASUREMENT AT 39.2°F. Enter the test speed in centimeters per minute for the ductility measurement taken at 39.2°F.

13. PENETRATION AT 39.2°F. Enter the penetration value using a 200 gram weight and 60 second loading duration, tested in accordance with Test Method AASHTO T49 (or ASTM D5) on samples of the original asphalt cement, prior to its use as a construction material.

14. RING AND BALL SOFTENING POINT. Enter the softening point of the asphalt cement in degrees Fahrenheit as measured with the ring-and-ball apparatus used in Test Method AASHTO T53, on samples of the original asphalt cement prior to its use as a construction material.

CONSTRUCTION DATA SHEET 7: PLANT MIXED ASPHALT BOUND LAYERS, MIXTURE PROPERTIES

This data sheet should be completed from available project records for each asphalt concrete layer identified on Sheet 4.

The following data items are to be derived from tests conducted on the mixture during construction as part of the contractor/participating agency Quality Control program. Calculations for calculated values (e.g. percent air voids) should be made separately for individual samples, using data applicable to those samples.

The test samples can be compacted in the laboratory after sampling in the field, or obtained by coring, cutting, or sawing after the mixture is compacted

in place. In the event that both types of samples are tested, separate data sheets should be filled out for those compacted in the laboratory and those compacted in the field. Although tests are to be conducted on core samples from the field for SHRP LTPP-SPS (and reported on other data sheets), data from project files should be entered when available.

1. LAYER NUMBER. Enter the asphalt concrete layer to be described on the sheet (from Sheet 4).

2. TYPE OF SAMPLES. Enter the code to indicate whether the test samples were sampled in the field and compacted in the laboratory, or removed from the compacted pavement. The codes appear on the data sheet.

3. MAXIMUM SPECIFIC GRAVITY. Enter the maximum specific gravity of a mixture sampled during or soon after construction, as an average from testing of several samples according to AASHTO 209 or ASTM D2041. When possible, several samples should be tested and the average entered. The resulting maximum specific gravity and the design asphalt content for the mixture should be used to calculate the effective specific gravity of aggregate using Equation 2.3 below. Once the effective specific gravity of the aggregate is established, it may be used to calculate other maximum specific gravities for the mixture at other measured asphalt contents using Equation 2.4 below:

$$G_{se} = \frac{100 - P_b}{\frac{100}{G_{mm}} - \frac{P_b}{G_b}} \qquad (2.3)$$

$$G_{mm} = \frac{100}{\frac{P_s}{G_{se}} + \frac{P_b}{G_b}} \qquad (2.4)$$

where:

G_{mm} = Maximum specific gravity of paving mixture (no air voids)
P_s = Aggregate, percent by total weight of mixture
P_b = Asphalt, percent by total weight of mixture
G_{se} = Effective specific gravity of aggregate
G_b = Specific gravity of asphalt

These calculated values of maximum specific gravity are not to be entered into the data base, but will be needed to calculate the percent air voids for measured asphalt contents for individual extractions on cores.

4-6. BULK SPECIFIC GRAVITY. Enter the number of tests and the minimum, maximum, mean, and standard deviation of bulk specific gravities (to the nearest thousandth) of compacted mixtures measured on cores removed from the pavement during or right after construction. While the test method specified in ASTM D1188 is preferable, the results from nuclear density tests (ASTM D2950), appropriately calibrated to measurements on cores, may also be used. See Appendix B of the LTPP Data Collection Guide for standard deviation equation.

7-9. ASPHALT CONTENT. Enter the number of samples and the minimum, maximum, mean, and standard deviation of percents by weight of the total asphalt cement (including that absorbed by the aggregate) in the asphalt concrete mixture to the nearest 0.1 percent. Asphalt contents measured by extraction tests (AASHTO T164) on field samples are preferred, but results from nuclear test methods may also be used. If no such test results are available, enter the specified asphalt content as the mean, and leave the other spaces blank. See Appendix B of the LTPP Data Collection Guide for the standard deviation equation.

10-12 PERCENT AIR VOIDS. Enter the number of samples and the minimum, maximum, mean, and standard deviation of calculated air voids (to the nearest 0.1 percent) as a percent of the material volume. This data is frequently not available, but can be calculated using other available data from reports on mix design and density measurements on samples from the pavement. Percent air voids is calculated as follows:

$$P_a = 100\frac{G_{mm} - G_{mb}}{G_{mm}} \qquad (2.5)$$

where:

P_a = Air voids in compacted mixture, percent of total volume

G_{mm} = Maximum specific gravity of paving mixture (zero air voids) as determined by ASTM Method D2041

G_{mb} = Bulk specific gravity of compacted mixture

See Appendix B of the LTPP Data Collection Guide for standard deviation equation.

13. VOIDS IN MINERAL AGGREGATE. Enter the mean void space between the aggregate particles of a compacted asphalt concrete mixture, which includes air voids and the effective asphalt content, to the nearest one-tenth of one percent. Percent of voids in mineral aggregate (VMA) is calculated at follows:

$$VMA = 100 - \frac{G_{mb}P_s}{G_{sb}} \qquad (2.6)$$

where:

VMA = Voids in mineral aggregate (percent of bulk volume)

G_{sb} = Bulk specific gravity of aggregate

G_{mb} = Bulk specific gravity of compacted mixture (ASTM D2726)

P_s = Aggregate, percent by total weight of mixture

= 100 - (percent of asphalt cement by total weight of mixture)

14. EFFECTIVE ASPHALT CONTENT. Enter the mean effective asphalt content (total asphalt content of the paving mixture minus the mean portion of asphalt that is lost by absorption into the aggregate particles), expressed by weight of total mixture to the nearest one-tenth of one percent. The asphalt absorption may be calculated as a percent of total weight of mixture as follows:

$$P_{sb} - P_{ba}P_s = \frac{G_{se} - G_{sb}}{G_{sb}G_{se}} G_bP_s \qquad (2.7)$$

where:

P_{sb} = Absorbed asphalt, percent by weight of total mixture

P_{ba} = Absorbed asphalt, percent by weight of aggregate

P_s = aggregate, percent by total weight of mixture

G_{se} = effective specific gravity of aggregate

G_{sb} = bulk specific gravity of aggregate

G_b = specific gravity of asphalt

15. MARSHALL STABILITY. Enter the mean Marshall Stability (Test Method AASHTO T245 or ASTM D1559) in pounds for the mixture during laboratory mix design.

16. NUMBER OF BLOWS. Enter the number of blows of the compaction hammer that were applied to each end of the specimen during laboratory compaction.

17. MARSHALL FLOW. Enter the mean Marshall Flow (average of measured results) as the whole number of hundredths of an inch measured by Test Method AASHTO T245 (or ASTM D1559) for the mixture during the laboratory mix design (i.e., measure 0.15 inch - enter "15").

18. HVEEM STABILITY. Enter the mean Hveem Stability or "stabilometer value" as measured with the Hveem apparatus using Test Method AASHTO T246 (or ASTM D1561).

19. HVEEM COHESIOMETER VALUE. Enter the cohesiometer value, in grams per 25 mm width (or diameter) of specimen, obtained by Test Method AASHTO T246 (or ASTM D1561).

CONSTRUCTION DATA SHEET 8: PLANT MIXED ASPHALT BOUND LAYERS, MIXTURE PROPERTIES (CONTINUED)

This sheet is a continuation of Construction Data Sheet 7, Plant-Mixed Asphalt Bound Layers, Mixture Properties and should be completed for each asphalt concrete layer identified on Sheet 4. These additional data entries are described below.

1. LAYER NUMBER. Enter the asphalt concrete layer to be described on the sheet (from Sheet 4).

2. TYPE OF SAMPLES. Enter the code to indicate whether the test samples were sampled in the field and compacted in the laboratory, or removed from the compacted pavement. The codes appear on the data sheet.

3. TYPE ASPHALT PLANT. Enter the type of plant that produced the asphalt concrete mixture. Codes are provided on the data sheet.

4. TYPE OF ANTISTRIPPING AGENT. Enter the type of antistripping agent used in the mixture. The codes are provided in Table A.21 in Appendix A of the LTPP Data Collection Guide.

5-6. AMOUNT OF ANTISTRIPPING AGENT. Enter the code indicating whether the antistripping agent is liquid or solid. Also, the amount of antistripping agent used in the mixture by weight to the nearest 0.1 percent of weight of asphalt if the agent is liquid and weight of aggregate if it is solid.

CONSTRUCTION DATA SHEET 9: PLANT MIXED ASPHALT BOUND LAYERS - PLACEMENT DATA

This data sheet should be completed for all tests sections.

1. DATE PAVING OPERATIONS BEGAN. Enter the date on which paving operations on the test section began.

2. DATE PAVING OPERATIONS COMPLETED. Enter the date on which paving operations on the test section were completed.

3. ASPHALT CONCRETE HAUL. Enter the type of asphalt concrete mix plant, a reference mix plant name, the haul distance and approximate haul time from the plant to the construction project, and the layer numbers of the material. Space is provided for up to three different mix plants in the instance that more than one mix plant was used to produce the asphalt concrete used in the different paving courses.

4. MANUFACTURER OF ASPHALT CONCRETE PAVER. Enter the name of the manufacturer of the asphalt concrete paver.

5. MODEL DESIGNATION OF ASPHALT CONCRETE PAVER. Enter the model number designation of the asphalt concrete paver used on the test section.

6. SINGLE PASS LAYDOWN WIDTH. Enter the single pass laydown width of the paver used on the test section to the nearest 0.1 foot.

7. ATB PLACEMENT LIFT. Enter the layer number of the asphalt treated base (ATB) specified in Construction Data Sheet 4. Enter the nominal placement thickness of each lift of the asphalt treated, dense graded base course. Replacement thickness is the thickness prior to compaction and should be based on field observations and measurements. Provide only one entry if only one lift is placed.

8. PATB PLACEMENT LIFT. Enter the layer number of the open graded, permeable asphalt treated base course (PATB) specified in Construction Data Sheet 4. Enter the nominal placement thickness of each lift of the open graded material. The placement thickness is the thickness prior to compaction and should be based on field observations and measurements. Provide only one entry of only one lift is placed.

9. AC BINDER COURSE LIFT. Enter the layer number of the AC binder course specified in Construction Data Sheet 4. Enter the nominal placement thickness of each lift of the binder course. This is the placement thickness prior to compaction and should be based on field observations and measurements. Provide only one entry if only one lift is placed. Leave these entries blank if an AC binder course was not placed.

10. AC SURFACE COURSE LIFT. Enter the layer number of the AC surface course lift specified in Construction Data Sheet 4. Enter the nominal placement thickness of each lift of the dense graded surface course. This is the placement thickness prior to compaction and should be based on field observations and measurements. Provide only one entry if only one lift is placed.

11. SURFACE FRICTION COURSE. If a separate surface friction course is applied to the pavement, indicate the layer number from Construction Data Sheet 4 and the nominal placement thickness. Note that surface friction courses are not desired on SPS test sections, but may be used if required by the agency.

12. TEST SECTION STATION OF TRANSVERSE JOINTS. Enter the location of transverse paving joints which occur within the limits of the test section in any of the AC layers. Use the test section relative station number (between 0+00 and 5+00). As transverse paving joints are not allowed within the test sections, this entry would generally be left blank.

13. LOCATION OF LONGITUDINAL SURFACE JOINT. Indicate if the longitudinal joint in the surface of the pavement is either located within the width of the test section lane or between lanes. In either case, enter the offset distance from the outside shoulder longitudinal surface joint (or approximate location of the edge stripe). If joints occur both within the test lane and between lanes, indicate the location of the joint within the test lane.

14. SIGNIFICANT EVENTS DURING CONSTRUCTION. Describe any significant events which occurred during construction and may influence the performance of the test section, e.g. disruptions to the paving operations due to rain,

equipment break downs or unusual periods of sustained high or low temperatures. Use Construction Data Sheet 17, Miscellaneous Construction Notes and Comments, if more space is required.

CONSTRUCTION DATA SHEET 10: COMPACTION DATA

1. DATE PAVING OPERATIONS BEGAN. Enter the date on which paving operations on the test section began.

2. DATE PAVING OPERATIONS COMPLETED. Enter the date on which paving operations on the test section was completed.

3. LAYER NUMBER. Enter the layer number from Construction Data Sheet 4 which corresponds to the compaction information provided on this form. A separate sheet must be completed for each layer compacted.

4. MIXING TEMPERATURE. Enter the temperature of the mixture during mixing at the plant in °F.

5. LAYDOWN TEMPERATURES. Enter the mean, minimum, maximum, standard deviation, and number of measurements of the asphalt concrete laydown temperatures. These measurements should be performed in the field as close to the rear of the paver as practical. Measurements every 100 feet per paver pass are desired.

6-22 ROLLER DATA. Codes appear on the data sheet for steel-wheeled tandem, pneumatic-tired, single-drum vibratory, and double-drum vibratory types of rollers. For each type of roller, spaces are provided to describe significant characteristics for up to four different rollers of the same type. Enter the requested characteristics for each roller used to compact the referenced layer. These roller code numbers are used in the compaction

data portion of the form to indicate the number of coverages of each roller.

23-28 COMPACTION DATA. For the breakdown, intermediate and final compaction of each lift, indicate the numbers of coverages of each roller used. Enter the roller code number specified under roller data and the corresponding number of coverages for each lift of the material. A coverage is defined as one trip of the roller across the pavement.

29. AIR TEMPERATURE. Enter the air temperature during compaction to the nearest degree fahrenheit. Space is provided to record data for each of up to four lifts.

30. COMPACTED THICKNESS. Enter the compacted thickness to the nearest 0.1 inch. Space is provided to record data for each of up to four asphalt concrete lifts.

31. CURING PERIOD. Enter the length of the curing period, to the nearest 0.1 day, before a new lift is placed or the layer is opened to traffic. Space is provided to record data for each of up to four asphalt concrete lifts.

CONSTRUCTION DATA SHEET 11: PLANT-MIXED ASPHALT BOUND LAYERS - DENSITY DATA

The purpose of this form is to record the results of nuclear density tests or surface profile measurements if used for construction control or acceptance by the participating agency. For nuclear density tests, it is desired that the test section be treated as the sampling unit if a random sampling technique is used. Reported Profilograph readings should be based on measurements on the test section and prorated to units of inches per mile. Measurements over 528 feet (0.1 of a mile) centered around the test section may also be used.

1. NUCLEAR DENSITY MEASUREMENTS. Space is provided for entry of the results of nuclear density tests on asphalt treated base (ATB), binder course, surface course, and surface friction course pavement layers. Enter information only for the layers on the test section that were tested. For each layer tested, enter the measurement method (backscatter, direct transmission, air gap), rod depth (for direct transmission measurements), number of measurements, average, maximum, minimum and standard deviation of the density measurements (pounds per cubic foot), and corresponding the layer number from Construction Data Sheet 4.

2. MANUFACTURER OF NUCLEAR DENSITY GAUGE. Indicate the name of the manufacturer of the nuclear density gauge used for the reported measurements.

3. NUCLEAR DENSITY GAUGE MODEL NUMBER. Enter the manufacturer's model designation of the gauge used.

4. NUCLEAR DENSITY GAUGE IDENTIFICATION NUMBER. Enter the identification number of the nuclear density gauge used.

5. NUCLEAR GAUGE COUNT RATE FOR STANDARDIZATION. Enter the gauge count rate used for standardization.

6. PROFILOGRAPH MEASUREMENTS. Report the results of any Profilograph measurements performed on the asphalt concrete surface layer. For each measurement performed, report the type of Profilograph (Rainhart or California), Profile index, interpretation method (manual, mechanical, or computer), height of blanking band, and cutoff height. Note that mechanical interpretation method refers to readings from mechanical counters located on some devices. Enter mechanical counter reading only

counters located on some devices. Enter mechanical counter reading only if the profilograms are not interpreted either by manual or computer methods.

7 . SURFACE PROFILE USED AS BASIS OF INCENTIVE PAYMENT. Indicate if the surface profile is or is not used as a contractual basis for incentive payments to the construction contractor.

CONSTRUCTION DATA SHEET 12: LAYER THICKNESS MEASUREMENTS

This form is used to record the results of the layer thickness measurements within the test section from before and after elevation measurements. Results of these measurements should be provided for 5 offset points at every station along the project which was measured. The station number should be entered as the test section relative station number. Offset distance should be entered in inches and measured from the outside shoulder lane edge joint or edge stripe. Space is provided to enter elevation for up to five types of layers within the test section. If individual layer thicknesses are not measured, enter the layer thicknesses in the column corresponding to the layer whose after placement surface elevation was measured. For example, if surface elevation was only measured for the surface course, then the layer thickness should be entered on Construction Data Sheet 12 under the surface course column. Enter the layer number of any layer for which layer thickness is shown. Use more than one sheet as required.

CONSTRUCTION DATA SHEET 13: UNBOUND AGGREGATE BASE MATERIAL PLACEMENT

1. UNBOUND BASE MATERIAL PLACEMENT BEGAN. Enter the date on which the unbound base material placement on the test section began.

2. UNBOUND BASE MATERIAL PLACEMENT COMPLETED. Enter the date on which the unbound base material placement on the test section completed.

3. LAYER NUMBER. Enter the unbound aggregate base course layer number to be described on this sheet (from Sheet 4).

PRIMARY COMPACTION EQUIPMENT

4. CODE TYPE. Enter the code for primary compaction equipment used to compact the unbound aggregate base course material. The codes for the various types of equipment are given on the data sheet.

5. GROSS WEIGHT. Enter the gross weight (in tons) of the primary compaction equipment used to compact the unbound aggregate base course material.

6. LIFT THICKNESSES. Enter the nominal placement thickness of each lift of the dense graded base course material. The lift thickness is the thickness prior to compaction and should be based on field observations or measurements.

7. SIGNIFICANT EVENTS DURING CONSTRUCTION. Describe any significant events which occurred during construction and may influence the performance of the test section, e.g., disruptions due to equipment break down or the weather. Use Construction Data Sheet 17, Miscellaneous Construction Notes and Comments, if more space is required.

CONSTRUCTION DATA SHEET 14: SUBGRADE PREPARATION

1. SUBGRADE PREPARATION BEGAN. Enter the date on which subgrade preparation on the test section began.

2. SUBGRADE PREPARATION COMPLETED. Enter the date on which subgrade preparation on the test section was completed.

PRIMARY COMPACTION EQUIPMENT

3. CODE TYPE. Enter the code for the primary compaction equipment used in subgrade preparation. The codes are provided on the data sheet.

4. GROSS WEIGHT. Enter the gross weight (in tons) of the primary compaction equipment used to compact the subgrade.

5-6. TYPE AND PERCENT STABILIZING AGENT. Enter the type code and average percent based on dry weight of the subgrade soil for each type of stabilizing agent used. If only one stabilizing agent is used, leave the spaces for "Stabilizing Agent 2" blank. Stabilizing agents can be added to the subgrade to provide a stable working platform as part of the construction process but shall not be used as an additive to increase the strength of the subgrade in the pavement structure.

7. TYPICAL LIFT THICKNESS. Enter the nominal placement thickness of the subgrade fill material. The lift thickness is the thickness prior to compaction and should be based on field observations or measurements.

8 SIGNIFICANT EVENTS DURING SUBGRADE PREPARATION. Describe any significant events which occurred during construction and may influence the performance of the test section, e.g., disruptions due to equipment break downs or the weather. Use Construction Data Sheet 17 if more room is required.

CONSTRUCTION DATA SHEET 15: CUT-FILL SECTION LOCATIONS

This data sheet provides information regarding the locations of the cut and fill sections throughout the entire project length.

1. CUT-FILL. Enter the code shown under note 1 on the form to indicate if the subgrade structure is cut or fill.

2. START STATION NUMBER. Enter the station number of the starting point of the indicated subgrade structure relative to the starting point of the first test section on the project, to the nearest foot.

3. END STATION NUMBER. Enter the station number of the ending point of the indicated subgrade structure relative to the starting point of the first test section on the project, to the nearest foot.

4. TEST SECTION NO.. Enter the six digit test section ID number, consisting of the STATE CODE, SPS PROJECT CODE, and TEST SECTION NUMBER, in which the indicated subgrade structure is located. This number will be repeated for each subgrade structure occurring within the test section.

CONSTRUCTION DATA SHEET 16: SUBGRADE EXCAVATION AND BACKFILLING SKETCH

This form is used to sketch the approximate locations where excavation and backfilling of the subgrade was performed in the test section. It should also be used to indicate the average depth of excavation and backfilling performed at each location, and to describe the type of backfill material.

CONSTRUCTION DATA SHEET 17: MISCELLANEOUS CONSTRUCTION NOTES AND COMMENTS

This data sheet is provided for reporting miscellaneous notes and comments, further descriptions of entries on other forms, or construction related data that are not covered on other data forms. Comments on this form should address features or occurrences which may influence the performance of the test section. For example, comments from the site asphalt concrete inspector concerning marginal or questionable batches which were either rejected or used on the test sections may be included.

Also, this sheet may be used to provide additional comments on items included in other data sheets. In these cases, the items and sheets numbers pertaining to these comments should be indicated on this form.

In addition, this form can be used to report other types of quality control measurements performed on the test sections which are not covered in the construction data sheets. For example, if profile or ride quality acceptance procedures are not based on Profilograph measurements, this information could be provided on this form. In this case, specify the type, manufacture, model number of measurement equipment used, and a reference to the standard test procedure employed (such as ASTM, AASHTO, or Agency's test method). If similar types of data or information are reported for several SPS test sites on this sheet, then consideration will be given to the development of standard forms for reporting this information to simplify its entry in the data base.

LABORATORY MATERIAL TESTING DATA

Laboratory material tests should be performed in accordance with the SHRP standard protocols contained in the most recent version of Operational Guide No. SHRP-LTPP-OG-004, "SHRP-LTPP Interim Guide for Laboratory Material Handling and Testing." The Guide contains data forms for reporting test information and results. Procedures and forms for those test methods that are not included in the GPS materials testing program but required for the SPS-1 experiment are listed in the Operational Memorandum No. SHRP-LTPP-OM-021, "Specific Pavement Studies: Materials Sampling and Testing Requirements for Experiment SPS-1, Strategic Study of Structural Factors for Flexible Pavements", February 1991.

TRAFFIC DATA

Traffic data should be collected and reported using weigh-in-motion equipment. The WIM must be permanently installed and located such that the traffic stream over the project site is properly monitored. Monitoring information must be reported using the same formats and procedures as required for GPS test sections.

In general, traffic data should be recorded as "project level data" and coded with a "00" as the test section number. In instances where an intersection exists within the test site and thus resulting in different traffic levels on the test sections, measurements of the traffic level on the different groups of sections on each side of the intersection should be referenced to the lead test section of the group. The locations of intersections or ramps that exist within the test site should be recorded on Construction Data Sheet 3, Reference Project Station Table.

CLIMATIC DATA

Information on climatic conditions at each SPS-1 test site is needed. In general, the following data elements will be required:

Maximum Daily Temperature, (TMAX);
Minimum Daily Temperature, (TMIN);
Mean Daily Temperature, (MNTP);
Daily Precipitation, (PRCP);
Daily Snowfall, (SNOW);
Daily Occurences of Weather, (DYSW);
Daily Average Wind Speed, (AWND);
Peak Gust Wind Speed and Direction, (PKGS);
Percent of Possible Sunshine, (PSUN);
Average Sky Coverage Sunrise to Sunset, (SCSS);
Average Sky Coverage Midnight to Midnight, (SCMM);
Daily Miminum Relative Humidity, (MNRH); and
Daily Maximum Relative Humidty, (MXRH)

The procedures used for collection and storage of climate and environmental data for GPS test sections should be followed for SPS-1 projects. Since this data will apply to all test sections on the project, it should be recorded as "project level data" with a "00" entered as the test section number.

DISTRESS, DEFLECTION, PROFILE AND SKID DATA

Guidelines on the timing of deflection, profile, distress, and friction measurements are shown in Table 2. In general, the same procedures and reporting formats used for GPS should be followed for the measurements on SPS test sections. Deflection measurements should be obtained in accordance with the FWD

Test Plan developed for this experiment. This monitoring data should be obtained and reported for each test section.

MAINTENANCE AND REHABILITATION DATA

All maintenance and rehabilitation activities performed on the SPS test sections after completion of construction should be recorded on a test section basis using the data sheets contained in the LTPP Data Collection Guide.

Table 2. Guidelines on initial monitoring measurements on SPS-1 test sites.

MEASUREMENT	AFTER CONSTRUCTION
DEFLECTION MEASUREMENTS	1 - 3 Months
PROFILE MEASUREMENTS	< 2 Months
DISTRESS SURVEY	< 6 Months
FRICTION MEASUREMENTS	3 - 12 Months

APPENDIX A

SAMPLING DATA SHEETS, SPS-1 CONSTRUCTION DATA SHEETS AND FIELD OPERATIONS INFORMATION FORMS

(Exclusively for SPS Experiments)

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING
PAVEMENT CORE LOG AT C-TYPE CORE LOCATIONS
SAMPLING DATA SHEET 2

SHEET NUMBER _____ OF _____

SHRP REGION _____ STATE _____ *STATE CODE* __ __
SPS EXPERIMENT NO _____ *SPS PROJECT CODE* __ __
ROUTE/HIGHWAY_____ Lane_____ Direction_____ *TEST SECTION NO.* __ __
SAMPLE/TEST LOCATION: ☐ Before Section ☐ After Section *FIELD SET NO.* __

OPERATOR_____ EQUIPMENT USED_____ *CORING DATE* ___-___-___

SAMPLING AREA NO SA-_____ CORE BARREL: Tip Type_____ Cooling Medium_____

Note: Record information for all cores extracted from each core hole in one column in the table below. Use a separate sheet for each sampling area. "Depth" should be measured from the pavement surface to the bottom of the core and recorded to the nearest tenth of an inch.

CORE HOLE NUMBER						
LOCATION: (a) STATION						
(b) OFFSET (Feet, O/S)						
Core Recovered?	*YES/NO*	*YES/NO*	*YES/NO*	*YES/NO*	*YES/NO*	*YES/NO*
Replacement Core Hole No.						
Core Size (inch Diam.)	*4/6*	*4/6*	*4/6*	*4/6*	*4/6*	*4/6*
Core Sample No.						
Depth (Inches)						
Material Description						
Material Code						
Core Size (inch Diam)	*4/6*	*4/6*	*4/6*	*4/6*	*4/6*	*4/6*
Core Sample No.						
Depth (Inches)						
Material Description						
Material Code						
Core Size (inch Diam.)	*4/6*	*4/6*	*4/6*	*4/6*	*4/6*	*4/6*
Core Sample No.						
Depth (Inches)						
Material Description						
Material Code						
Core Size (inch Diam.)	*4/6*	*4/6*	*4/6*	*4/6*	*4/6*	*4/6*
Core Sample No.						
Depth (Inches)						
Material Description						
Material Code						
Remarks						

GENERAL REMARKS: _____

CERTIFIED VERIFIED AND APPROVED DATE

_____ _____ _____-____-19___
Field Crew Chief SHRP Representative Month- Day- Year
Affiliation:_____ Affiliation:_____

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING SHEET NUMBER _____ OF _____
A-TYPE BORE HOLE LOG
SAMPLING DATA SHEET 4-1

IRP REGION _____ STATE _____ ***STATE CODE*** __ __
'S EXPERIMENT NO _____ ***SPS PROJECT CODE*** __ __
ROUTE/HIGHWAY_____ Lane_____ Direction_____ ***TEST SECTION NO.*** __ __
SAMPLE/TEST LOCATION: ☐ Before Section ☐ After Section ***FIELD SET NO.*** 1
☐ Within Section

OPERATOR_____ EQUIPMENT USED_____ ***BORING DATE***___-___-___

SAMPLING AREA NO: SA-_____ ***LOCATION: STATION***_____ ***OFFSET***_____ ***feet from °/s***

BORE HOLE NUMBER:_____ ***BORE HOLE SIZE:*** _____ (inch Diam.)

Scale (Inches)	***Strata Change (Inches)***	***Sample Number*** (1)	***#Blows***(2) 6"	6"	6"	***Ref? Y/N*** (3)	***DLR (Inches)*** (4)	***IOP*** (5)	***Material Description***	***Material Code***
_____										
10.0										
_____										
20.0										
_____										
30.0										
_____										
40.0										
_____										
50.0										

1. Record sample numbers for splitspoon/thin-walled tube samples taken from the subgrade.
2. For splitspoon samples, record the number of blows for the first, second and third 6 inches of penetration.
3. ***Refused*** - If the splitspoon is refused, place a Y in the ***REFUSAL*** column and complete ***Driving Length To Refusal*** column. Refusal is defined as less than 1 inch of penetration with 100 blows.
4. ***Driving Length To Refusal*** - Record penetration to refusal of splitspoon from the top of the pavement surface.
5. ***Inches Of Penetration*** - Record from start of splitspoon sampling procedure if 100 blows is reached before one foot of penetration. If penetration exceeds 12 inches before 100 blows is reached, enter middle 6 inches plus depth of penetration into the last 6 inches when 100 blows was reached (not including seating drive); record to nearest tenth of an inch.

GENERAL REMARKS:_____

CERTIFIED VERIFIED AND APPROVED DATE

_____ _____ _____-_____-19___

Field Crew Chief SHRP Representative Month- Day- Year

Affiliation:_____ Affiliation:_____

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING SHEET NUMBER _____ OF _____

IN SITU DENSITY AND MOISTURE TESTS

SAMPLING DATA SHEET 8-1

SHRP REGION _____ STATE _____ *STATE CODE* ___ ___
SPS EXPERIMENT NO _____ *SPS PROJECT CODE* ___ ___
ROUTE/HIGHWAY _____ Lane _____ Direction _____ *TEST SECTION NO.* ___ ___
SAMPLE/TEST LOCATION: **9** Before Section **9** After Section *FIELD SET NO.* ___
9 Within Section
OPERATOR _____ *NUCLEAR DENSITY GAUGE I.D.* _____ *TEST DATE* ___-___-___
SAMPLING AREA NO: SA-_____ *LOCATION: STATION* _____ *OFFSET* _____ *feet from E/s*
LOCATION NO: _____ DATE OF LAST MAJOR CALIBRATION ___-___-___
Note: Use additional sheets if necessary

DEPTH FROM SURFACE TO THE TOP OF THE LAYER, INCHES (From Plans)							
LAYER NUMBER							
MATERIAL TYPE: (Unbound=G Other=T)							
	1						
IN SITU	**2**						
DENSITY, pcf	**3**						
(AASHTO T238-86)	**4**						
AVERAGE							
Method (A,B,or C)							
Rod Depth, inches							
	1						
IN SITU	**2**						
MOISTURE CONTENT, %	**3**						
(AASHTO T239-86)	**4**						
AVERAGE							

GENERAL REMARKS: _____
_____

CERTIFIED VERIFIED AND APPROVED DATE
_____ _____ ___ - ___ -19 __
Field Crew Chief SHRP Representative Month - Day - Year
Affiliation: _____ Affiliation: _____

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING SHEET NUMBER _____ OF _____
SHOULDER PROBE LOG
SAMPLING DATA SHEET 9

SHRP REGION _____ STATE _____ ***STATE CODE*** __ __
SPS EXPERIMENT NO _____ ***SPS PROJECT CODE*** __ __
ROUTE/HIGHWAY_____ Lane_____ Direction_____ ***TEST SECTION NO.*** __ __
SAMPLE/TEST LOCATION: ☐ Before Section ☐ After Section ***FIELD SET NO.*** __
☐ Within Section
OPERATOR_____ EQUIPMENT USED_____ ***AUGERING DATE***___-____-____
AUGER PROBE NUMBER_____ ***LOCATION STATION:***_____ ***OFFSET:***_____***feet from °/s***
SAMPLING AREA NUMBER SA-_____
TOP OF ROCK BASED ON:_____

Scale (feet)	*Depth from Surface (Feet)*	*Material Description*	*Material Code*
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

REFUSAL WITHIN 20 FEET (Y/N):_____ ***DEPTH TO REFUSAL:***_____***(FEET)***

GENERAL REMARKS:_____

CERTIFIED VERIFIED AND APPROVED DATE

_____ _____ _____-_____-19___

Field Crew Chief SHRP Representative Month- Day- Year

Affiliation:_____ Affiliation:_____

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING SHEET NUMBER _____ OF _____
SAMPLING UNCOMPACTED BITUMINOUS PAVING MIXTURES
SAMPLING DATA SHEET 10-1

SHRP REGION _____ STATE _____ ***STATE CODE*** __ __
SPS EXPERIMENT NUMBER _____ ***SPS PROJECT CODE*** __ __
ROUTE/HIGHWAY_____ Lane_____ Direction_____ ***TEST SECTION NO.*** __ __
FIELD SET NO. 1

PERSON PERFORMING SAMPLING

NAME _____ EMPLOYER _____

TITLE _____

MIX PLANT

PLANT NAME _____

PLANT LOCATION _____

PLANT TYPE Batch..... 1 Drum..... 2 Other (Specify)..... 3 [__]

DESCRIPTION OF MIX PLANT _____

MANUFACTURER OF ASPHALT PLANT _____

MODEL NUMBER _____

BATCH SIZE _____

SAMPLING LOCATION [___]

Conveyor Belt..... 1 Stockpile..... 2 Haul Truck..... 3 Funnel Device..... 4
Roadway Prior to Compaction ..... 5 Station __ + __ __ Offset ____ (feet from O/S)
Other..... 6 (specify) _____

MIX TYPE "Virgin" Asphalt Concrete ..... 1 Recycled Asphalt Concrete..... 2 [___]
Asphalt Treated Dense Graded ..... 3 Permeable Asphalt Treated..... 4 [___]

LAYER NUMBER [___]

LAYER TYPE BINDER COURSE ...3 SURFACE COURSE... 4 [___]
SURFACE FRICTION LAYER ... 5 BASE COURSE ... 6

SAMPLE TYPE DESIGNATION [___ ___ ___ ___]

SAMPLE NUMBER [___ ___ ___ ___]

APPROXIMATE SAMPLE SIZE (lbs) ___ ___ ___

DATE SAMPLED (Month - Day - Year) [__ __ - __ __ - __ __]

LOCATION SAMPLE SHIPPED TO _____

DATE SHIPPED (Month-Day-Year) [__ __ - __ __ - __ __]

GENERAL REMARKS: _____

_____

_____

CERTIFIED VERIFIED AND APPROVED DATE

_____ _____ _____-____-19___

Field Crew Chief SHRP Representative Month- Day- Year

Affiliation:_____ Affiliation:_____

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING SHEET NUMBER _____ OF _____
BULK SAMPLING OF SUBGRADE AND UNBOUND GRANULAR MATERIALS
SAMPLING DATA SHEET 12

SHRP REGION _____ STATE _____ ***STATE CODE*** __ __
SPS EXPERIMENT NO _____ ***SPS PROJECT CODE*** __ __
ROUTE/HIGHWAY_____ Lane_____ Direction_____ ***TEST SECTION NO.*** __ __
SAMPLE/TEST LOCATION: ☐ Before Section ☐ After Section ***FIELD SET NO.*** 1

TECHNICIAN_____ EQUIPMENT _____ ***EXPLORATION DATE***___-___-___
SAMPLING AREA NO: SA-_____ ***LOCATION: STATION***_____ ***OFFSET***_____***feet from °/s***
SAMPLING LOCATION NUMBER_____
PIT SIZE: (a) ***Length***_____feet (b) ***Width***_____feet

LAYER NUMBER:_____ **(SUBGRADE _____ GRADED AGGREGATE BASE _____)**

Scale (Inches)	*Strata Change (Inches)*	*Moisture Sample No.*	*Bulk Sample No.*	*Material Description*	*Material Code*
4					
8					
12					
16					

GENERAL REMARKS:_____

CERTIFIED _____ Field Crew Chief
Affiliation:_____

VERIFIED AND APPROVED _____ SHRP Representative
Affiliation:_____

DATE _____-_____-19___ Month- Day- Year

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING
LABORATORY SHIPMENT SAMPLES INVENTORY
FIELD OPERATIONS INFORMATION FORM 1

SHEET NUMBER _____ OF _____

SHRP REGION _____ STATE _____ ***STATE CODE*** __ __
SPS EXPERIMENT NO _____ ***SPS PROJECT CODE*** __ __
ROUTE/HIGHWAY_____ Lane_____ Direction_____ ***TEST SECTION NO.*** __ __
SAMPLE/TEST LOCATION: ☐ Before Section ☐ After Section ***FIELD SET NO.*** __
☐ Within Section

SAMPLING AREA No: SA- _____ FIELD WORK COMPLETED ON ____-____-____

Note: Use a separate form for each sampling area. Use additional sheets if necessary. Include summary information (Field Operations Information Form 2) and "as actual" sampling location plan sheets with this material samples inventory.

SAMPLE LOCATION	SAMPLE NUMBER	SAMPLE SIZE	SAMPLE TYPE	SAMPLE MATERIAL	SAMPLE CONDITION	LAB*

* Enter number of laboratory, as specified below, each sample was sent to:

Lab No.(1) _____
Lab No.(2) _____
Lab No.(3) _____

GENERAL REMARKS: _____

CERTIFIED _____
Field Crew Chief
Affiliation: _____

VERIFIED AND APPROVED _____
SHRP Representative
Affiliation: _____

DATE ____-____-19___
Month- Day- Year

LTPP-SPS MATERIAL SAMPLING AND FIELD TESTING SHEET NUMBER _____ OF _____
SUMMARY OF MATERIAL SAMPLES SENT TO EACH LABORATORY
FIELD OPERATIONS INFORMATION FORM 2-1

HRP REGION _____ STATE _____ ***STATE CODE*** __ __
PS EXPERIMENT NO _____ ***SPS PROJECT CODE*** __ __
ROUTE/HIGHWAY_____ Lane_____ Direction_____ ***TEST SECTION NO.*** __ __
FIELD SET NO. __

LABORATORY _____ WORK COMPLETED ON ____-____-____

NOTE: This is a summary of material samples sent to each laboratory based on the information from Field Operations Information Form 1. Complete one form for each laboratory that material samples were sent.

LAYER NO. (From Subgrade)	**MATERIAL/SAMPLE TYPE**	**TOTAL NUMBER OF SAMPLES**
6	AC CORES: 4" Diameter_____	
	AC Cores with Bound Base	_____
6	AC MIX BULK SAMPLES: 100 Pound Samples - Surface	_____
	100 Pound Samples - Binder	_____
5	AC Treated BULK SAMPLES: 100 Pound Samples - ATB	_____
5	ATB CORES: 4" Diameter_____	
4	AC Treated BULK SAMPLES: 100 Pound Samples - PATB	_____
4	PATB CORES: 4" Diameter_____	
3	UNBOUND BASE SAMPLES: (a) BAGS (BULK)_____ (b) JARS (MOISTURE)_____	
2	UNBOUND SUBBASE SAMPLES: (a) BAGS (BULK)_____ (b) JARS (MOISTURE)_____	
1	SUBGRADE SAMPLES: (a) BAGS (BULK)_____ (b) JARS (MOISTURE)_____	
	(c) THIN-WALLED TUBES_____ (d) SPLITSPOON _____ JARS	

GENERAL REMARKS: _____

_____

_____

_____

CERTIFIED VERIFIED AND APPROVED DATE

_____ _____ _____-_____-19___
Field Crew Chief SHRP Representative Month- Day- Year
Affiliation:_____ Affiliation:_____

07 March 1995

SPS CONSTRUCTION DATA SHEET 1 PROJECT IDENTIFICATION	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

* 1. DATE OF DATA COLLECTION OR UPDATE (Month/Year) [__ __/__ __]

* 2. STATE HIGHWAY AGENCY (SHA) DISTRICT NUMBER [__ __]

* 3. COUNTY OR PARISH [__ __ __]

4. FUNCTIONAL CLASS (SEE TABLE A.2, APPENDIX A) [__ __]

* 5. ROUTE SIGNING (NUMERIC CODE) [__]
Interstate ... 1 U.S. 2
State ..... 3 Other ... 4

* 6. ROUTE NUMBER [__ __ __ __ __]

7. NUMBER OF THROUGH LANES (ONE DIRECTION) [__]

* 8. DATE OF CONSTRUCTION COMPLETION (Month/Year) [__ __/__ __]

* 9. DATE OPENED TO TRAFFIC (Month/Year) [__ __/__ __]

10. CONSTRUCTION COSTS PER LANE MILE (In $1000) [__ __ __ __ __]

11. DIRECTION OF TRAVEL [__]
East Bound .... 1 West Bound 2
North Bound ... 3 South Bound ... 4

PROJECT STARTING POINT LOCATION

*12. MILEPOINT [__ __ __.__ __]

*13. ELEVATION [__ __ __ __ __]

*14. LATITUDE [__ __° __ __' __ __ . __ __"]

*15. LONGITUDE [__ __ __° __ __' __ __ . __ __"]

16. ADDITIONAL LOCATION INFORMATION (SIGNIFICANT LANDMARKS): [_____
_____
_____]

17. HPMS SAMPLE NUMBER (HPMS ITEM 28) [__ __ __ __ __ __ __ __ __ __ __ __]

18. HPMS SECTION SUBDIVISION (HPMS ITEM 29) [__]

PREPARER _____ EMPLOYER _____ DATE _____

SPS CONSTRUCTION DATA SHEET 2 GEOMETRIC, SHOULDER AND DRAINAGE INFORMATION	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

*1. LANE WIDTH (FEET) [__ __]

2. MONITORING SITE LANE NUMBER [__]
Lane 1 is outside lane, next to shoulder
Lane 2 is next to lane 1, etc.

*3. SUBSURFACE DRAINAGE LOCATION [__]
Continuous Along Test Section 1
Intermittent ... 2 None 3

*4. SUBSURFACE DRAINAGE TYPE [__]
No Subsurface Drainage ... 1 Longitudinal Drains ... 2
Transverse Drains ..... 3 Drainage Blanket 4
Well System 5
Drainage Blanket with Longitudinal Drains 6
Other (Specify) ..... 7 _____

SHOULDER DATA	INSIDE SHOULDER	OUTSIDE SHOULDER
*5. SURFACE TYPE Turf ..... 1 Granular ... 2 Asphalt Concrete ... 3 Concrete ... 4 Surface Treatment... 5 Other (Specify) .... 6 _____	[__]	[__]
*6. TOTAL WIDTH (FEET)	[__ __]	[__ __]
*7. PAVED WIDTH (FEET)	[__ __]	[__ __]
8. SHOULDER BASE TYPE (CODES-TABLE A.6)	[__ __]	[__ __]
9. SURFACE THICKNESS (INCHES)	[__ __. __]	[__ __. __]
10. SHOULDER BASE THICKNESS (INCHES)	[__ __. __]	[__ __. __]

11. DIAMETER OF LONGITUDINAL DRAINPIPES (INCHES) [__. __]

12. SPACING OF LATERALS (FEET) [__ __ __]

13. TYPE OF PAVEMENT (See APPENDIX B, Table A.4 Pavement Type Codes) [__ __]

PREPARER _____ EMPLOYER _____ DATE _____

SPS-1 CONSTRUCTION DATA SHEET 3 REFERENCE PROJECT STATION TABLE	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

ORDER	*1 TEST SECTION ID NO	REFERENCE PROJECT STATION NUMBER		*4 CUT-FILL[1] TYPE
		*2 START	*3 END	
1	__ __ __ __ __ __	0 + 0 0	__ __ __ __ + __ __	__
2	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	__
3	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	__
4	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	__
5	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	__
6	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	__
7	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	__
8	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	__
9	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	__
10	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	__
11	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	__
12	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	__
13	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	__
14	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	__
15	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	__
16	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	__
17	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	__
18	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	__
19	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	__
20	__ __ __ __ __ __	__ __ __ __ + __ __	__ __ __ __ + __ __	__

*5 INTERSECTIONS BETWEEN TEST SECTION ON THE PROJECT

ROUTE	PROJECT STATION NO.	RAMPS EXIT	RAMPS ENT	INTERSECTION STOP	INTERSECTION SIGNAL	INTERSECTION UNSIG
_____	__ __ __ __+__ __	___	___	___	___	___
_____	__ __ __ __+__ __	___	___	___	___	___
_____	__ __ __ __+__ __	___	___	___	___	___

Note 1. Indicate the type of subgrade construction the test section is located on:
Cut... 1 Fill... 2 At-Grade... 3 Cut, Fill, and At-Grade Combo... 4

If a section contains any combination of cut, fill and at-grade portions (code 4 above), enter the specific details of the cut, fill and at-grade locations on SPS-1 Construction Data Sheet 15.

PREPARER _____ EMPLOYER _____ DATE _____

SPS-1 CONSTRUCTION DATA SHEET 4 LAYER DESCRIPTIONS	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

*1 LAYER NUMBER	*2 LAYER DESCRIPTION	*3 MATERIAL TYPE CLASS	*4 LAYER THICKNESSES (Inches)			
			AVERAGE	MINIMUM	MAXIMUM	STD. DEV.
1	SUBGRADE(7)	[__ __]	[redacted]	[redacted]	[redacted]	[redacted]
2	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._
3	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._
4	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._
5	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._
6	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._
7	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._
8	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._
9	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._
10	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._
11	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._
12	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._
13	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._
14	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._
15	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._

*5 DEPTH BELOW SURFACE TO "RIGID" LAYER (FEET) [__ __ . __]
(Rock, Stone, Dense Shale)

NOTES:

1. Layer 1 is the subgrade soil, the highest numbered layer is the pavement surface.

2. Layer description codes:

Overlay.....01	Base Layer.....05	Porous Friction Course..09
Seal/Tack Coat.....02	Subbase Layer.....06	Surface Treatment.....10
Original Surface.....03	Subgrade.....07	Embankment (Fill).....11
HMAC Layer (Subsurface).04	Interlayer.....08	

3. The material type classification codes are presented in Tables A.5, A.6, A.7 and A.8 of the Data Collection Guide for Long Term Pavement Performance Studies, dated January 17, 1990.

4. Enter the average thickness of each layer and the minimum, maximum and standard deviation of the thickness measurements, if known.

PREPARER _____ EMPLOYER _____ DATE _____

SPS-1 CONSTRUCTION DATA SHEET 5 PLANT-MIXED ASPHALT BOUND LAYERS AGGREGATE PROPERTIES	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

*1. LAYER NUMBER (FROM SHEET 4) [__]

	COMPOSITION OF COARSE AGGREGATE	TYPE	PERCENT
*2.	Crushed Stone... 1 Gravel... 2 Crushed Gravel... 3	[__]	[__ __ __.]
*3.	Crushed Slag... 4 Manufactured Lightweight... 5	[__]	[__ __ __.]
*4.	Other (Specify)... 6 _____	[__]	[__ __ __.]
	COMPOSITION OF FINE AGGREGATE	TYPE	PERCENT
*5.	Natural Sand... 1	[__]	[__ __ __.]
*6.	Crushed or Manufactured Sand (From Crushed Gravel or	[__]	[__ __ __.]
*7.	Stone... 2 Recycled Concrete... 3 Other (Specify)... 4 _____	[__]	[__ __ __.]

*8. TYPE OF MINERAL FILLER [__]
Stone Dust... 1 Hydrated Lime... 2 Portland Cement... 3
Fly Ash... 4
Other (Specify)... 5 _____

BULK SPECIFIC GRAVITIES:

*9. Coarse Aggregate (AASHTO T85 or ASTM C127) [__.__ __ __]

*10. Fine Aggregate (AASHTO T84 or ASTM C128) [__.__ __ __]

*11. Mineral Filler (AASHTO T100 or ASTM D854) [__.__ __ __]

*12. Aggregate Combination (Calculated) [__.__ __ __]

13. Effective Specific Gravity of Aggregate Combination (Calculated) [__.__ __ __]

AGGREGATE DURABILITY TEST RESULTS
(SEE DURABILITY TEST TYPE CODES, TABLE A.13)

	TYPE OF AGGREGATE	TYPE OF TEST	RESULTS
14.	Coarse	[__ __]	[__ __ __.__ __ __]
15.	Coarse	[__ __]	[__ __ __.__ __ __]
16.	Coarse	[__ __]	[__ __ __.__ __ __]
17.	Coarse and Fine - Combined	[__ __]	[__ __ __.__ __ __]

18. POLISH VALUE OF COARSE AGGREGATES
SURFACE LAYER ONLY (AASHTO T279, ASTM D3319) __ __.

PREPARER _____ EMPLOYER _____ DATE _____

SPS-1 CONSTRUCTION DATA SHEET 6 PLANT-MIXED ASPHALT BOUND LAYERS ASPHALT CEMENT PROPERTIES	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

*1. LAYER NUMBER (FROM SHEET 4) [__]

*2. ASPHALT GRADE (SEE ASPHALT CODE SHEET, TABLE A.16) [__ __]
(IF OTHER, SPECIFY) _____

*3. SOURCE (SEE SUPPLY CODE SHEET, TABLE A.14) [__ __]
(IF OTHER, SPECIFY) _____

4. SPECIFIC GRAVITY OF ASPHALT CEMENT [__.__ __ __]
(AASHTO T228)

GENERAL ASPHALT CEMENT PROPERTIES **(If available from supplier)**

5. VISCOSITY OF ASPHALT AT 140°F (POISES)
(AASHTO T202) [__ __ __ __ __ __.]

6. VISCOSITY OF ASPHALT AT 275°F (CENTISTOKES)
(AASHTO T202) [__ __ __ __.__ __]

7. PENETRATION AT 77°F (AASHTO T49) (TENTHS OF A MM)
(100 g., 5 sec.) [__ __ __ __.]

ASPHALT MODIFIERS (SEE TYPE CODE, A.15)

		TYPE	QUANTITY (%)
8.	MODIFIER #1	[__ __]	[__ __.]
9.	MODIFIER #2 (IF OTHER, SPECIFY) _____	[__ __]	[__ __.]

10. DUCTILITY AT 77°F (CM)
(AASHTO T51) [__ __ __.]

11. DUCTILITY AT 39.2°F (CM)
(AASHTO T51) [__ __ __.]

12. TEST RATE FOR DUCTILITY MEASUREMENT
AT 39.2°f (CM/MIN) [__ __ __.]

13. PENETRATION AT 39.2°F (AASHTO T49) (TENTHS OF A MM)
(200 g., 60 sec.) [__ __ __.]

14. RING AND BALL SOFTENING POINT (AASHTO T53) (°F) [__ __ __.]

NOTE: If emulsified or cutback asphalt was used, enter "N" in the spaces for "Original Asphalt Cement Properties".

PREPARER _____ EMPLOYER _____ DATE _____

SPS-1 CONSTRUCTION DATA SHEET 7 PLANT-MIXED ASPHALT BOUND LAYERS MIXTURE PROPERTIES	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

*1. LAYER NUMBER (FROM SHEET 4) [__]

*2. TYPE OF SAMPLES [__]
SAMPLES COMPACTED IN LABORATORY 1
SAMPLES TAKEN FROM TEST SECTION 2

*3. MAXIMUM SPECIFIC GRAVITY (NO AIR VOIDS) [__ . __ __ __]
(AASHTO T209 OR ASTM D2041)

BULK SPECIFIC GRAVITY (ASTM D1188)

*4. MEAN [__ . __ __ __] NUMBER OF TESTS [__ __ .]

5. MINIMUM [__ . __ __ __] MAXIMUM [__ . __ __ __]

6. STD. DEV. [__ . __ __ __]

ASPHALT CONTENT (PERCENT WEIGHT OF TOTAL MIX)
(AASHTO T164 OR ASTM D2172)

*7. MEAN [__ . __ __ __] NUMBER OF SAMPLES [__ __ .]

8. MINIMUM [__ . __ __ __] MAXIMUM [__ . __ __ __]

9. STD. DEV. [__ . __ __ __]

PERCENT AIR VOIDS

*10. MEAN [__ . __ __ __] NUMBER OF SAMPLES [__ __ .]

11. MINIMUM [__ . __ __ __] MAXIMUM [__ . __ __ __]

12. STD. DEV. [__ . __ __ __]

*13. VOIDS IN MINERAL AGGREGATE (PERCENT) [__ __ . __]

*14. EFFECTIVE ASPHALT CONTENT (PERCENT) [__ __ . __]

*15. MARSHALL STABILITY (LBS) (AASHTO T245 OR ASTM D1559) [__ __ __ __ .]

*16. NUMBER OF BLOWS [__ __]

*17. MARSHALL FLOW (HUNDREDTHS OF AN INCH) [__ __ __ __ .]
(AASHTO T245 OR ASTM D1559)

*18. HVEEM STABILITY (AASHTO T246 OR ASTM D1561) [__ __ __ .]

*19. HVEEM COHESIOMETER VALUE (GRAMS/25 MM OF WIDTH) [__ __ __ __ .]
(AASHTO T246 OR ASTM 1561)

PREPARER _____ EMPLOYER _____ DATE _____

SPS-1 CONSTRUCTION DATA SHEET 8 PLANT-MIXED ASPHALT BOUND LAYERS MIXTURE PROPERTIES (CONTINUED)	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

*1. LAYER NUMBER (FROM SHEET 4) [__]

*2. TYPE OF SAMPLES [__]
SAMPLES COMPACTED IN LABORATORY... 1
SAMPLES TAKEN FROM TEST SECTION... 2

*3. TYPE ASPHALT PLANT [__]

BATCH PLANT... 1 DRUM MIX PLANT... 2

OTHER (SPECIFY)... 3 _____

*4. TYPE OF ANTISTRIPPING AGENT USED [__ __]
(SEE TYPE CODES, TABLE A.21)
OTHER (SPECIFY) _____

*5. AMOUNT OF ANTISTRIPPING AGENT USED LIQUID OR SOLID CODE [__]

*6. (If liquid, enter code 1, and amount as percent of asphalt cement weight. If solid, enter code 2 and amount as percent of aggregate weight.) [__ __.__]

PREPARER _____ EMPLOYER _____ DATE _____

SPS-1 CONSTRUCTION DATA SHEET 9 PLANT-MIXED ASPHALT BOUND LAYERS PLACEMENT DATA	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

*1. DATE PAVING OPERATIONS BEGAN (Month-Day-Year) [__ __-__ __-__ __]

*2. DATE PAVING OPERATIONS COMPLETED (Month-Day-Year) [__ __-__ __-__ __]

*3 ASPHALT CONCRETE PLANT AND HAUL

	Type	Name	Haul Distance (Mi)	Time (Min)	Layer Numbers
Plant 1	[__]	_____	[__ __ __]	[__ __]	[__] [__] [__]
Plant 2	[__]	_____	[__ __ __]	[__ __]	[__] [__] [__]
Plant 3	[__]	_____	[__ __ __]	[__ __]	[__] [__] [__]

Plant Type: Batch..... 1 Drum Mix.... 2 Other...3 Specify_____

4. MANUFACTURER OF ASPHALT CONCRETE PAVER _____

5. MODEL DESIGNATION OF ASPHALT CONCRETE PAVER _____

6. SINGLE PASS LAYDOWN WIDTH (Feet) [__ __.__]

7. ATB PLACEMENT LIFTS
   - Layer Number [__ __]
   - Nominal First Lift Placement Thickness (Inches) [__.__]
   - Nominal Second Lift Placement Thickness (Inches) [__.__]
   - Nominal Third Lift Placement Thickness (Inches) [__.__]
   - Nominal Fourth Lift Placement Thickness (Inches) [__.__]

8. PATB PLACEMENT LIFTS
   - Layer Number [__ __]
   - Nominal First Lift Placement Thickness (Inches) [__.__]
   - Nominal Second Lift Placement Thickness (Inches) [__.__]

9. AC BINDER COURSE LIFT
   - Layer Number [__ __]
   - Nominal First Lift Placement Thickness (Inches) [__.__]
   - Nominal Second Lift Placement Thickness (Inches) [__.__]

10. AC SURFACE COURSE LIFT
   - Layer Number [__ __]
   - Nominal First Lift Placement Thickness (Inches) [__.__]
   - Nominal Second Lift Placement Thickness (Inches) [__.__]

11. SURFACE FRICTION COURSE (If Placed)
   - Layer Number [__ __]
   - Nominal Placement Thickness (Inches) [__.__]

12. TEST SECTION STATION OF TRANSVERSE JOINTS (within test section)
   - Binder Course [__ + __ __]
   - Surface Course [__ + __ __]
   - Surface Friction Course [__ + __ __]

13. LOCATION OF LONGITUDINAL SURFACE JOINT [__]
   Between lanes.. 1 Within lane.. 2
   (specify offset from O/S feet) [__ __.__]

14. SIGNIFICANT EVENTS DURING CONSTRUCTION (disruptions, rain, equip. problems, etc.)_____

_____

PREPARER _____ EMPLOYER _____ DATE _____

SPS-1 CONSTRUCTION DATA SHEET 10 PLANT-MIXED ASPHALT BOUND LAYERS COMPACTION DATA	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

*1. DATE PAVING OPERATIONS BEGAN (Month-Day-Year) [__ __-__ __-__ __]

*2. DATE PAVING OPERATIONS COMPLETED (Month-Day-Year) [__ __-__ __-__ __]

*3. LAYER NUMBER [__]

*4. MIXING TEMPERATURE (°F) [__ __ __.]

5. LAYDOWN TEMPERATURES (°F)

Mean..... __ __ __. Number of Tests ..... __ __.

Minimum..... __ __ __. Maximum..... __ __ __.

Standard Deviation... __ __.__

ROLLER DATA

	Roller Code #	Roller Description	Gross Wt (Tons)	Tire Press. (psi)	Frequency (Vibr./Min)	Amplitude (Inches)	Speed (mph)
6	A	Steel-Whl Tandem	__ __.__				
7	B	Steel-Whl Tandem	__ __.__				
8	C	Steel-Whl Tandem	__ __.__				
9	D	Steel-Whl Tandem	__ __.__				
10	E	Pneumatic-Tired	__ __.__	__ __ __ __.			
11	F	Pneumatic-Tired	__ __.__	__ __ __ __.			
12	G	Pneumatic-Tired	__ __.__	__ __ __ __.			
13	H	Pneumatic-Tired	__ __.__	.			
14	I	Single-Drum Vibr.	__ __.__		__ __ __ __.	.__ __ __	__ __.__
15	J	Single-Drum Vibr.	__ __.__		__ __ __ __.	.__ __ __	__ __.__
16	K	Single-Drum Vibr.	__ __.__		__ __ __ __.	.__ __ __	__ __.__
17	L	Single-Drum Vibr.	__ __.__		__ __ __ __.	.__ __ __	__ __.__
18	M	Double-Drum Vibr.	__ __.__		__ __ __ __.	.__ __ __	__ __.__
19	N	Double-Drum Vibr.	__ __.__		__ __ __ __.	.__ __ __	__ __.__
20	O	Double-Drum Vibr.	__ __.__		__ __ __ __.	.__ __ __	__ __.__
21	P	Double-Drum Vibr.	__ __.__		__ __ __ __.	.__ __ __	__ __.__
22	Q	Other	_____				

	COMPACTION DATA	First Lift	Second Lift	Third Lift	Fourth Lift
	BREAKDOWN				
23	Roller Code (A-Q)	__	__	__	__
24	Coverages	__ __.	__ __.	__ __.	__ __.
	INTERMEDIATE				
25	Roller Code (A-Q)	__	__	__	__
26	Coverages	__ __.	__ __.	__ __.	__ __.
	FINAL				
27	Roller Code (A-Q)	__	__	__	__
28	Coverages	__ __.	__ __.	__ __.	__ __.
29	Air Temperature (°F)	__ __ __.	__ __ __.	__ __ __.	__ __ __.
30	Compacted Thickness (In)	__.__	__.__	__.__	__.__
31	Curing Period (Days)	__ __.__	__ __.__	__ __.__	__ __.__

PREPARER _____ EMPLOYER _____ DATE _____

SPS-1 CONSTRUCTION DATA SHEET 11 PLANT-MIXED ASPHALT BOUND LAYERS DENSITY AND PROFILE DATA	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

1. NUCLEAR DENSITY MEASUREMENTS

LAYER TYPE	ATB	Binder Course	Surface Course	Surface Friction Layer
Measurement Method (A, B, C)[1]	__	__	__	__
Number of Measurements	__ __	__ __	__ __	__ __
Average (pcf)	__ __ __.__	__ __ __.__	__ __ __.__	__ __ __.__
Maximum (pcf)	__ __ __.__	__ __ __.__	__ __ __.__	__ __ __.__
Minimum (pcf)	__ __ __.__	__ __ __.__	__ __ __.__	__ __ __.__
Standard Deviation (pcf)	__ __ __.__	__ __ __.__	__ __ __.__	__ __ __.__
Layer Number	__ __	__ __	__ __	__ __

[1]Measurement Method Backscatter... **A** Direct Transmission... **B** Air Gap... **C**

2. MANUFACTURER OF NUCLEAR DENSITY GAUGE _____

3. NUCLEAR DENSITY GAUGE MODEL NUMBER _____

4. NUCLEAR DENSITY GAUGE IDENTIFICATION NUMBER _____

5. NUCLEAR GAUGE COUNT RATE FOR STANDARDIZATION __ __ __ __ __

6. PROFILOGRAPH MEASUREMENTS

Profilograph Type California... **1** Rainhart... **2** __
Profile Index (Inches/Mile) __ __
Interpretation Method Manual.. **1** Mechanical.. **2** Computer.. **3** __
Height of Blanking Band (Inches) __.__ __
Cutoff Height (Inches) __.__ __

7. SURFACE PROFILE USED AS BASIS OF INCENTIVE PAYMENT? (YES, NO) ____

PREPARER _____ EMPLOYER _____ DATE _____

SPS-1 CONSTRUCTION DATA SHEET 12 LAYER THICKNESS MEASUREMENTS	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

LAYER THICKNESS MEASUREMENTS (Inches) SHEET ____ OF ____

STATION NUMBER	OFFSET (Inches)	DENSE GRADED AGGREGATE BASE	PERMEABLE ASPHALT TREATED BASE	DENSE GRADED ASPHALT TREATED BASE	SURFACE AND BINDER	SURFACE FRICTION LAYER
__+__ __	__ __ __ __ __ __ __ __ __ __ __ __ __ __ __	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __
__+__ __	__ __ __ __ __ __ __ __ __ __ __ __ __ __ __	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __
__+__ __	__ __ __ __ __ __ __ __ __ __ __ __ __ __ __	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __
__+__ __	__ __ __ __ __ __ __ __ __ __ __ __ __ __ __	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __
__+__ __	__ __ __ __ __ __ __ __ __ __ __ __ __ __ __	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __
__+__ __	__ __ __ __ __ __ __ __ __ __ __ __ __ __ __	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __
__+__ __	__ __ __ __ __ __ __ __ __ __ __ __ __ __ __	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ .__ __ __ .__ __ __ .__ __ __ .__ __ __ .__	__ __ . __ __ __ . __ __ __ . __ __ __ . __ __ __ . __
LAYER NUMBER[1]		__ __	__ __	__ __	__ __	__ __

[1] from Sheet 4

PREPARER ____________ EMPLOYER ____________ DATE ____________

SPS-1 CONSTRUCTION DATA SHEET 13 UNBOUND AGGREGATE BASE MATERIAL PLACEMENT	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

*1. UNBOUND BASE MATERIAL PLACEMENT BEGAN (Month-Day-Year) [__ __-__ __-__ __]

*2. UNBOUND BASE MATERIAL PLACEMENT COMPLETED (Month-Day-Year) [__ __-__ __-__ __]

*3. LAYER NUMBER (From Sheet 4) [__]

PRIMARY COMPACTION EQUIPMENT

*4. CODE TYPE [__]

COMPACTION TYPE CODES
Pneumatic - Tired... 1 Steel Wheel Tandem... 2 Single Drum Vibr.... 3
Double Drum Vibr.... 4
Other (Specify)... 5 _____

*5. GROSS WEIGHT (TONS) [__ __.__]

*6. LIFT THICKNESSES
Nominal First Lift Placement Thickness (inches) [__ __]
Nominal Second Lift Placement Thickness (inches) [__ __]
Nominal Third Lift Placement Thickness (inches) [__ __]
Nominal Fourth Lift Placement Thickness (inches) [__ __]

DENSITY DATA IS RECORDED ON SAMPLING DATA SHEET 8-1

7. SIGNIFICANT EVENTS DURING CONSTRUCTION (DISRUPTIONS, RAIN, EQUIPMENT PROBLEMS, ETC.) _____

_____

_____

_____

PREPARER _____ EMPLOYER _____ DATE _____

SPS-1 CONSTRUCTION DATA SHEET 14 SUBGRADE PREPARATION	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

*1. SUBGRADE PREPARATION BEGAN (Month-Day-Year) [__ __-__ __-__ __]

*2. SUBGRADE PREPARATION COMPLETED (Month-Day-Year) [__ __-__ __-__ __]

PRIMARY COMPACTION EQUIPMENT

*3. CODE TYPE [__]

COMPACTION EQUIPMENT TYPE CODES
Sheepsfoot... 1 Pneumatic Tired... 2 Steel Wheel Tandem... 3
Single Drum Vibr.... 4 Double Drum Vibr.... 5
Other (Specify)... 6 _____

*4. GROSS WEIGHT (TONS) [__ __.__]

	TYPE	PERCENT
*5. STABILIZING AGENT 1	[__]	[__ __.__]
*6. STABILIZING AGENT 2	[__]	[__ __.__]

STABILIZING AGENT TYPE CODES
Portland Cement... 1 Lime... 2 Fly Ash, Class C... 3
Fly Ash, Class N... 4
Other (Specify)... 5 _____

*7. TYPICAL LIFT THICKNESS (INCHES) [__ __]
(For Fill Sections Only)

DENSITY DATA IS RECORDED ON SAMPLING DATA SHEET 8-1

8. SIGNIFICANT EVENTS DURING CONSTRUCTION (DISRUPTIONS, RAIN, EQUIPMENT PROBLEMS, ETC.) _____
_____
_____
_____

PREPARER _____ EMPLOYER _____ DATE _____

SPS-1 CONSTRUCTION DATA SHEET 15 CUT-FILL SECTION LOCATIONS	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

ORDER	*1 CUT-FILL[1]	REFERENCE PROJECT STATION NUMBER		*4 TEST SECTION NO
		*2 START	*3 END	
1	_____	0 + 0 0	_ _ _ _ + _ _	_ _ _ _ _ _
2	_____	_ _ _ _ + _ _	_ _ _ _ + _ _	_ _ _ _ _ _
3	_____	_ _ _ _ + _ _	_ _ _ _ + _ _	_ _ _ _ _ _
4	_____	_ _ _ _ + _ _	_ _ _ _ + _ _	_ _ _ _ _ _
5	_____	_ _ _ _ + _ _	_ _ _ _ + _ _	_ _ _ _ _ _
6	_____	_ _ _ _ + _ _	_ _ _ _ + _ _	_ _ _ _ _ _
7	_____	_ _ _ _ + _ _	_ _ _ _ + _ _	_ _ _ _ _ _
8	_____	_ _ _ _ + _ _	_ _ _ _ + _ _	_ _ _ _ _ _
9	_____	_ _ _ _ + _ _	_ _ _ _ + _ _	_ _ _ _ _ _
10	_____	_ _ _ _ + _ _	_ _ _ _ + _ _	_ _ _ _ _ _
11	_____	_ _ _ _ + _ _	_ _ _ _ + _ _	_ _ _ _ _ _
12	_____	_ _ _ _ + _ _	_ _ _ _ + _ _	_ _ _ _ _ _
13	_____	_ _ _ _ + _ _	_ _ _ _ + _ _	_ _ _ _ _ _
14	_____	_ _ _ _ + _ _	_ _ _ _ + _ _	_ _ _ _ _ _
15	_____	_ _ _ _ + _ _	_ _ _ _ + _ _	_ _ _ _ _ _
16	_____	_ _ _ _ + _ _	_ _ _ _ + _ _	_ _ _ _ _ _
17	_____	_ _ _ _ + _ _	_ _ _ _ + _ _	_ _ _ _ _ _
18	_____	_ _ _ _ + _ _	_ _ _ _ + _ _	_ _ _ _ _ _
19	_____	_ _ _ _ + _ _	_ _ _ _ + _ _	_ _ _ _ _ _
20	_____	_ _ _ _ + _ _	_ _ _ _ + _ _	_ _ _ _ _ _
21	_____	_ _ _ _ + _ _	_ _ _ _ + _ _	_ _ _ _ _ _
22	_____	_ _ _ _ + _ _	_ _ _ _ + _ _	_ _ _ _ _ _
23	_____	_ _ _ _ + _ _	_ _ _ _ + _ _	_ _ _ _ _ _
24	_____	_ _ _ _ + _ _	_ _ _ _ + _ _	_ _ _ _ _ _
25	_____	_ _ _ _ + _ _	_ _ _ _ + _ _	_ _ _ _ _ _

NOTES:

1. Indicate the type of subgrade section with one of the following:
   Cut... 1 Fill... 2

2. A given Test Section No. will be repeated if both cut and fill sections exist within the test section.

PREPARER _____ EMPLOYER _____ DATE _____

SPS-1 CONSTRUCTION DATA SHEET 16 SUBGRADE EXCAVATION AND BACKFILLING SKETCH	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

PREPARER _____ EMPLOYER _____ DATE _____

SPS-1 CONSTRUCTION DATA SHEET 17 MISCELLANEOUS CONSTRUCTION NOTES AND COMMENTS	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

Provide any miscellaneous comments and notes concerning construction operations which may have an influence on the ultimate performance of the test sections or which may cause undesired performance differences to occur between test sections. Also include any quality control measurements or data for which space is not provided on other forms. Provide an indication of the basis for such measurements, such as an ASTM, AASHTO, or Agency standard test designation.

PREPARER _____ EMPLOYER _____ DATE _____

APPENDIX B

SHRP-LTPP DATA COLLECTION STANDARD CODES

(Reproduced from Appendix A of the SHRP-LTPP Data Collection Guide)

Revised June 13, 1988

Table A.1. Table of Standard Codes for States, District of Columbia, Puerto Rico, American Protectorates and Canadian Provinces.

State	Code	State	Code
Alabama	01	New York	36
Alaska	02	North Carolina	37
Arizona	04	North Dakota	38
Arkansas	05	Ohio	39
California	06	Oklahoma	40
Colorado	08	Oregon	41
Connecticut	09	Pennsylvania	42
Delaware	10	Rhode Island	44
District of Columbia	11	South Carolina	45
Florida	12	South Dakota	46
Georgia	13	Tennessee	47
Hawaii	15	Texas	48
Idaho	16	Utah	49
Illinois	17	Vermont	50
Indiana	18	Virginia	51
Iowa	19	Washington	53
Kansas	20	West Virginia	54
Kentucky	21	Wisconsin	55
Louisiana	22	Wyoming	56
Maine	23	American Samoa	60
Maryland	24	Guam	66
Massachusetts	25	Puerto Rico	72
Michigan	26	Virgin Islands	78
Minnesota	27	Alberta	81
Mississippi	28	British Columbia	82
Missouri	29	Manitoba	83
Montana	30	New Brunswick	84
Nebraska	31	Newfoundland	85
Nevada	32	Nova Scotia	86
New Hampshire	33	Ontario	87
New Jersey	34	Prince Edward Island	88
New Mexico	35	Quebec	89
		Saskatchewan	90

Note: The U.S. codes are consistent with the Federal Information Processing Standards (FIPS) and HPMS

Table A.2. Functional class codes.

Functional Class	Code
Rural:	
Principal Arterial - Interstate	01
Principal Arterial - Other	02
Minor Arterial	06
Major Collector	07
Minor Collector	08
Local Collector	09
Urban:	
Principal Arterial - Interstate	11
Principal Arterial - Other Freeways or Expressways	12
Other Principal Arterial	14
Minor Arterial	16
Collector	17
Local	19

Note: These codes are consistent with the HPMS system.

Revised June 13, 1988

Table A.3. Detailed Descriptions of Pavements for Each LTPP General Pavement Studies Experiment.

(01) ASPHALT CONCRETE PAVEMENT WITH GRANULAR BASE

Acceptable pavements for this study include a dense-graded hot mix asphalt concrete (HMAC) surface layer (1), with or without other HMAC layers (28), placed over untreated granular base (22 or 23). One or more subbase layers (22, 23, 24, 25, 26,42, or 43) may also be present, but are not required. Two or more consecutive lifts of the same mixture design are to be treated as one layer. "Full depth" asphalt concrete pavements are also included in this study. They include an HMAC surface layer (1) and usually one or more HMAC layers (28) beneath the surface, with a minimum total HMAC thickness of 8 inches placed directly upon treated or untreated subgrade. For "full depth" asphalt concrete pavements, a base layer (Layer Description 5) of zero thickness and material code 21 should be indicated. If a treated subgrade (42 or 43) is present, it should be shown as a subbase (Layer Description 6). Seal coats or porous friction courses are allowed on the surface, but not in combination, i.e., a porous friction course placed over a seal coat is not acceptable. Seal coats are also permissible on top of granular base layers. At least one layer of dense graded HMAC is required, regardless of the existence of seal coats or porous friction courses.

(02) ASPHALT CONCRETE PAVEMENT WITH BOUND BASE

Acceptable pavements for this study include a dense-graded HMAC surface layer (1) with or without other HMAC layers (28), placed over a bound base layer (27-39, 42-44, 46). To properly account for a variety of bound base types in the sampling design, two classifications of binder types, bituminous and non-bituminous, are defined as the factor levels. Bituminous binders include asphalt cements, cutbacks, emulsions, and road tars. Non-bituminous binders include all hydraulic cements (those which harden by a chemical reaction with water and are capable of hardening under water), lime, fly ashes and natural pozzolans, or combinations thereof. Stabilized bases with lower quality materials such as sand asphalt or soil cement are also allowed. Stabilization practices of primary concern for this tudy are those in which the strucutral characteristics of the material are improved due to the cementing action of the stabilizing agent. Thus, the description of the study actually refers to treatments improving the structural properties of the base materials. Two or more consecutive lifts of the same mixture design are to be treated as one layer. One or more subbase layers (22, 23, 24, 25, 26, 42, or 43) may be present but are not required. Seal coats or porous friction courses are permitted on the surface but not in combination, i.e., a porous friction course placed over a seal coat is not acceptable. Project selection is often to those constructed on both fine and coarse subgrades (51-65).

Table A.3. Detailed Descriptions of Pavements for Each LTPP General Pavement Studies Experiment (Continued).

(03) JOINTED PLAIN CONCRETE PAVEMENT - JPCP

Acceptable jointed, unreinforced portland cement concrete slab (4) placed over untreated granular base (22 or 23), HMAC (28 or 31), or stabilized base (29, 30, 37, or 38). One or more subbase layers (22, 23, 24, 25, 26, 42, or 43) may also be present, but are not required. The joints may have either no load transfer devices or smooth dowel bars. A seal coat is also permissible above a granular base layer. Jointed slabs with load transfer devices other than dowel bars and pavements placed directly upon a treated or untreated subgrade are also not acceptable.

(04) JOINTED REINFORCED CONCRETE PAVEMENT - JRCP

Acceptable projects include jointed reinforced portland cement concrete pavements (5) with doweled joints spaced between 20 and 65 feet. The slab may rest directly upon a layer of any material listed in Table A.6 (except 25 and 45) or upon unstabilized coarse-grained subgrade (57-65). A base layer and one or more subbase layers may exist, but are not required. These layers may consist of any of the material types indicated in Table A.6. A seal coat is also permissible above a granular base layer. JRCP placed directly upon a fine-grained soil/aggregate layer (25) or a fine-grained subgrade (51-56) will not be considered for this study. JRCP's without load transfer devices or using devices other than smooth dowel bars at the joints are not acceptable.

(05) CONTINUOUSLY REINFORCED CONCRETE PAVEMENT - CRCP

Acceptable projects include continuously reinforced portland cement concrete pavements (6) placed directly upon a layer of any material listed in Table A.6 (except 25 or 45), or upon unstabilized coarse-grained subgrade (57-65). CRCP's placed directly upon a fine-grained soil/aggregate layer (25) or a fine-grained subgrade (51-56) are not acceptable for this study.

(06) AC OVERLAY OF AC PAVEMENT

Acceptable pavements for this study include a dense-graded HMAC surface layer (1) with or without other HMAC layers (28) placed over a previously existing asphalt concrete pavement meeting the requirements of GPS-1 or GPS-2. Seal coats or porous friction courses are allowed, but not in combination. Fabric interlayers (75 and 76) and Stress Absorbing Membrane Interlayers (SAMIs) (77) are permitted between the original surface and the overlay. The total pavements which have been overlaid more than once since they were originally constructed are not acceptable. Pavements in both bad and good condition as measured by levels of specific distress types present prior to the overlay are needed.

Table A.3. Detailed Descriptions of Pavements for Each LTPP General Pavement Studies Experiment (Continued).

(07) AC OVERLAY OF JOINTED CONCRETE PAVEMENT

Acceptable pavements for this study include a dense-graded HMAC surface layer (1) with or without other HMAC layers (28) placed on either a JPCP (4), JRCP (5), or CRCP (6). The slab may rest on any combination of base and/or subbase layers indicated in Table A.6 (except 45). The previously existing concrete slab may also have been placed directly on lime or cement treated fine or coarse-grained subgrade (27, 42, and 43), or on untreated coarse-grained subgrade (57-65). Slabs placed directly on untreated fine-grained subgrade (51-56) are not acceptable. Seal coats or porous friction courses are permissible, but not in combination. Fabric interlayers (75 or 76) and SAMIs (77) are acceptable when placed between the original surface (concrete) and the overlay. Overlaid pavements with aggregate interlayers (79) and open-graded asphalt concrete (80) will not be considered in this study. The total thickness of HMAC used in the overlay must be at least 1.5 inches. Pavements which have been overlaid more than once since they were originally constructed are not acceptable. Pavements in both bad and good condition as measured by levels of specific distress types present prior to the overlay are needed.

(09) UNBONDED JCP OVERLAYS OF CONCRETE PAVEMENT

Acceptable projects for this study include unbonded JPCP (4), JRCP (5), or CRCP (6) overlay with a thickness of 5 inches or more placed over an existing JPCP (4), JRCP (5), or CRCP (6) pavement. The overlaid concrete pavement may rest on any of the base and subbase types listed in Table A.6 or directly upon subgrade.

Revised June 13, 1988

Table A.4 Pavement Type Codes

Type of Pavement	Code
Asphalt Concrete (AC) Surfaced Pavements:	
AC With Granular Base	01
AC With Bituminous Treated Base	02
AC With Non-Bituminous Treated Base	07
AC Overlay on AC Pavement	03
AC Overlay on JPCP Pavement	28
AC Overlay on JRCP Pavement	29
AC Overlay on CRCP Pavement	30
Other	10
Portland Cement Concrete Surfaced Pavements:	
JPCP - Placed Directly On Untreated Subgrade	11
JRCP - Placed Directly On Untreated Subgrade	12
CRCP - Placed Directly On Untreated Subgrade	13
JPCP - Placed Directly On Treated Subgrade	14
JRCP - Placed Directly On Treated Subgrade	15
CRCP - Placed Directly On Treated Subgrade	16
JPCP - Over Unbound Base	17
JRCP - Over Unbound Base	18
CRCP - Over Unbound Base	19
JPCP Over Bituminous Treated Base	20
JRCP Over Bituminous Treated Base	21
CRCP Over Bituminous Treated Base	22
JPCP Over Non-Bituminous Treated Base	23
JRCP Over Non-Bituminous Treated Base	24
CRCP Over Non-Bituminous Treated Base	25
JPCP Overlay on JPCP Pavement	31
JPCP Overlay on JRCP Pavement	33
JPCP Overlay on CRCP Pavement	35
JRCP Overlay on JPCP Pavement	32
JRCP Overlay on JRCP Pavement	34
JRCP Overlay on CRCP Pavement	36
CRCP Overlay on JPCP Pavement	38
CRCP Overlay on JRCP Pavement	39
CRCP Overlay on CRCP Pavement	37
JPCP Overlay on AC Pavement	04
JRCP Overlay on AC Pavement	05
CRCP Overlay on AC Pavement	06
Prestressed Concrete Pavement	40
Other	49

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Table A.4 Pavement Type Codes
(Continued)

*Composite Pavements (Wearing Surface Included in Initial Construction:

JPCP With Asphalt Concrete Wearing Surface.....51
JRCP With Asphalt Concrete Wearing Surface.....52
CRCP With Asphalt Concrete Wearing Surface.....53
Other.....59

Definitions:
JPCP - Jointed Plain Concrete Pavement
JRCP - Jointed Reinforced Concrete Pavement
CRCP - Continuously Reinforced Concrete Pavement

* "Composite Pavements" are pavements originally constructed with an asphalt concrete wearing surface over a portland cement concrete slab (1986 "AASHTO Guide for Design of Pavement Structures").

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Table A.5 Pavement Surface Material Type Classification Codes

Material Type	Code
Hot Mixed, Hot Laid Asphalt Concrete, Dense Graded	01
Hot Mixed, Hot Laid Asphalt Concrete, Open Graded (Porous Friction Course)	02
Sand Asphalt	03
Portland Cement Concrete (JPCP)	04
Portland Cement Concrete (JRCP)	05
Portland Cement Concrete (CRCP)	06
Portland Cement Concrete (Prestressed)	07
Portland Cement Concrete (Fiber Reinforced)	08
Plant Mix (Emulsified Asphalt) Material, Cold Laid	09
Plant Mix (Cutback Asphalt) Material, Cold Laid	10
Single Surface Treatment	11
Double Surface Treatment	12
Recycled Asphalt Concrete	
Hot, Central Plant Mix	13
Cold Laid Central Plant Mix	14
Cold Laid Mixed-In-Place	15
Heater Scarification/Recompaction	16
Recycled Portland Cement Concrete	
JPCP	17
JRCP	18
CRCP	19
Other	20

Table A.6. Base and subbase material type classification codes.

	Code
No Base (Pavement Placed Directly on Subgrade)	21
Gravel (Uncrushed)	22
Crushed Stone, Gravel or Slag	23
Sand	24
Soil-Aggregate Mixture (Predominantly Fine-Grained Soil)	25
Soil-Aggregate Mixture (Predominantly Coarse-Grained Soil)	26
Soil Cement	27
Asphalt Bound Base or subbase Materials	
Dense Graded, Hot Laid, Central Plant Mix	28
Dense Graded, Cold Laid, Central Plant Mix	29
Dense Graded, Cold Laid, Mixed In-Place	30
Open Graded, Hot Laid, Central Plant Mix	31
Open Graded, Cold Laid, Central Plant Mix	32
Open Graded, Cold Laid, Mixed In-Place	33
Recycled Asphalt Concrete, Plant Mix, Hot Laid	34
Recycled Asphalt Concrete, Plant Mix, Cold Laid	35
Recycled Asphalt Concrete, Mixed In-Place	36
Sand Asphalt	46
Cement-Aggregate Mixture	37
Lean Concrete (<3 sacks cement/cy)	38
Recycled Portland Cement Concrete	39
Sand-Shell Mixture	40
Limerock, Caliche (Soft Carbonate Rock)	41
Lime-Treated Subgrade Soil	42
Cement-Treated Subgrade Soil	43
Pozzolanic-Aggregate Mixture	44
Cracked and Seated PCC Layer	45
Other	49

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Table A.7. Subgrade soil description codes.

Soil Description	Code
Fine-Grained Subgrade Soils:	
Clay (Liquid Limit >50)	51
Sandy Clay	52
Silty Clay	53
Silt	54
Sandy Silt	55
Clayey Silt	56
Coarse-Grained Subgrade Soils:	
Sand	57
Poorly Graded Sand	58
Silty Sand	59
Clayey Sand	60
Gravel	61
Poorly Graded Gravel	62
Clayey Gravel	63
Shale	64
Rock	65

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Table A.8. Material type codes for thin seals and interlayers.

	Code
Chip Seal Coat	71
Slurry Seal Coat	72
Fog Seal Coat	73
Woven Geotextile	74
Nonwoven Geotextile	75
Stress Absorbing Membrane Interlayer	77
Dense Graded Asphalt Concrete Interlayer	78
Aggregate Interlayer	79
Open Graded Asphalt Concrete Interlayer	80
Chip Seal With Modified Binder (Does Not Include Crumb Rubber)	81
Sand Seal	82
Asphalt-Rubber Seal Coat (Stress Absorbing Membrane)	83
Sand Asphalt	84
Other	85

Table A.9. Geologic classification codes.

Igneous:	Code
Granite	01
Syenite	02
Diorite	03
Gabbro	04
Peridotite	05
Felsite	06
Basalt	07
Diabase	08
Sedimentary:	
Limestone	09
Dolomite	10
Shale	11
Sandstone	12
Chert	13
Conglomerate	14
Breccia	15
Metamorphic:	
Gneiss	16
Schist	17
Amphibolite	18
Slate	19
Quartzite	20
Marble	21
Serpentine	22

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Table A.10. Soil and soil-aggregate mixture type codes, AASHTO classification.

	Code
A-1-a	01
A-1-b	02
A-3	03
A-2-4	04
A-2-5	05
A-2-6	06
A-2-7	07
A-4	08
A-5	09
A-6	10
A-7-5	11
A-7-6	12

Table A.11 Portland Cement Type Codes

	Code
Type I	41
Type II	42
Type III	43
Type IV	44
Type V	45
Type IS	46
Type ISA	47
Type IA	48
Type IIA	49
Type IIIA	50
Type IP	51
Type IPA	52
Type N	53
Type NA	54
Other	55

Table A.12 Portland Cement Concrete Admixture Codes

	Code
Water-Reducing (AASHTO M194, Type A)	01
Retarding (AASHTO M194, Type B)	02
Accelerating (AASHTO M194, Type C)	03
Water-Reducing and Retarding (AASHTO M194, Type D)	04
Water-Reducing and Accelerating (AASHTO M194, Type E)	05
Water-Reducing, High Range (AASHTO M194, Type F)	06
Water-Reducing, High Range and Retarding (AASHTO M194, Type G)	07
Air-Entraining Admixture (AASHTO M154)	08
Natural Pozzolans (AASHTO M295, Class N)	09
Fly Ash, Class F (AASHTO M295)	10
Fly Ash, Class C (AASHTO M295)	11
Other (Chemical)	12
Other (Mineral)	13

Table A.13. Aggregate durability test type codes.

Description	AASHTO	ASTM	Code
Resistance to Abrasion of Small Size Coarse Aggregate by Use of Los Angeles Machine (Percent Weight Loss)	T96	C131	01
Soundness of Aggregate by Freezing and Thawing (Percent Weight Loss)	T103	--	02
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate (Percent Weight Loss)	T104	C88	03
Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine (Percent Weight Loss)	--	C535	04
Potential Volume Change of Cement-Aggregate Combinations (Percent Expansion)	--	C342	05
Evaluation of Frost Resistance of Coarse Aggregates in Air-Entrained Concrete by Critical Dilution Procedures (Number of Weeks of Frost Immunity)		C682	06
Potential Alkali Reactivity of Cement Aggregate Combinations (Average Percent Expansion)	--	C227	07
Potential Reactivity of Aggregates (Reduction in Alkalinity-mmol/L)	--	C289	08
Test for Clay Lumps and Friable Particles in Aggregates (Percent by Weight)	T112	C142	09
Test for Potential Alkali Reactivity of Carbonate Rocks for Concrete Aggregates (Percent Change in Speciment Length)	--	C586	11

Table A.14. Codes for Asphalt Refiners and Processors in the United States.*

	Code
Belcher Refining Co.--Mobile Bay, Alabama	78
Hunt Refining Company--Tuscaloosa, Alabama	01
Chevron USA, Inc.--Kenai, Alaska	02
Mapco Alaska Petroleum--North Pole, Alaska	03
Intermountain Refining Cl.--Fredonia, Arizona	04
Berry Petroleum Company--Stevens, Arkansas	05
Cross Oil and Refining Company--Smackover, Arkansas	06
Lion Oil Company--El Dorado, Arkansas	07
McMillan Ring, Free Oil Cl.--Norphlet, Arkansas	08
Chevron USA, Inc.--Richmond, California	09
Conoco, Inc.--Santa Maria, California	10
Edgington Oil Co., Inc.--Long Beach, California	11
Golden Bear Division, Witco Chemical Corp.--Oildale, California	12
Golden West Refining, Co.--Santa Fe Springs, California	13
Huntway Refining Co.--Benicia, California	14
Huntway Refining Co.--Wilmington, California	15
Lunday-Thagard Co.--South Gate, California	79
Newhall Refining Co., Inc.--Newhall, California	16
Oxnard Refining--Oxnard, California	17
Paramount Petroleum Corp.--Paramount, California	80
Powerline Oil Co.--Santa Fe Springs, California	81
San Joaquin Refining Cl.--Bakersfield, California	18
Shell Oil Co.--Martinez, California	19
Superior Processing Co.--Santa Fe Springs, California	20
Colorado Refining Co.--Commerce City, Colorado	82
Conoco, Inc.--Commerce City, Colorado	21
Amoco Oil Co.--Savannah, Georgia	22
Young Refining Corp.--Douglasville, Georgia	23
Chevron USA--Barber's Point, Hawaii	24
Clark Oil and Refining Corp.--Blue Island, Illinois	25
Shell Oil Co.--Wood River, Illinois	26
Unacol Corp.--Lemont, Illinois	27
Amoco Oil Co.-- Whiting, Indiana	28
Laketon Refining Corp.--Laketon, Indiana	83
Young Refining Corp.--Laketon, Indiana	29
Derby Refining Co.-- El Dorado, Kansas	84
Farmland Industries, Inc.--Phillipsburg, Kansas	30
Total Petroleum, Inc.--Arkansas City, Kansas	31
Ashland Petroleum Co.--Catlettsburg, Kentucky	32
Atlas Processing Co.--Shreveport, Louisiana	33
Calumet Refining Co.--Princeton, Louisiana	34
Exxon Co.--Baton Rouge, Louisiana	35
Marathon Petroleum Co.--Garyville, Louisiana	36
Marathon Petroleum Co.--Detroit, Michigan	37
Ashland Petroleum Co.--St. Paul, Minnesota	38
Koch Refining Co.--Rosemount, Minnesota	39
Chevron USA, Inc.--Pascagoula, Mississippi	40
Ergon Refining Inc.--Vicksburg, Mississippi	41
Southland Oil Co.--Lumberton, Mississippi	42
Southland Oil Co.--Sanderson, Mississippi	43

Table A.14. Codes for Asphalt Refiners and Processors in the United States (Continued).*

	Code
Cenex--Laurel, Montana	44
Conoco, Inc.--Billings, Montana	45
Exxon Co.--Billings, Montana	46
Chevron USA, Inc.--Perth Amboy, New Jersey	47
Exxon Co., Linden, New Jersey	48
Giant Industries, Inc.--Gallup, New Mexico	85
Navahoe Refining Co.--Artesia, New Mexico	49
Cibro Petroleum Products Co.--Albany, New York	86
Ashland Petroleum Co.--Canton, Ohio	50
Standard Oil Co.--Toledo, Ohio	51
Sohio Oil Co (BP America)--Toledo, Ohio	87
Kerr-McGee Refining Co.--Wynnewood, Oklahoma	52
Sinclair Oil Corp.--Tulsa, Oklahoma	53
Sun Co. Inc.--Tulsa, Oklahoma	54
Total Petroleum Inc.--Ardmore, Oklahoma	55
Chevron USA, Inc.--Portland, Oregon	56
Atlantic Refining & Marketing Corp.--Philadelphia, PA	57
United Refining Co.--Warren, Pennsylvania	58
Mapco Petroleum Inc.--Memphis, Tennessee	59
Charter International Oil Co.--Houston, Texas	60
Chevron USA, Inc.--El Paso, Texas	61
Coastal Refining & Marketing, Inc.--Corpus Christi, Texas	88
Coastal States Petroleum Co.--Corpus Christi, Texas	62
Diamond Shamrock Corp.--Sunray, Texas	63
Exxon Co. USA--Baytown, Texas	64
Fina Oil and Chemical Co.--Big Spring, Texas	65
Fina Oil and Chemical Co.--Port Arthur, Texas	89
Hill Petroleum Co.--Houston, Texas	90
Shell Oil Co.--Deer Park, Texas	66
Star Enterprise--Port Arthur & Port Neches, Texas	91
Texaco Refining & Marketing Inc.--Port Arthur & Port Neches, Texas	67
Trifinery--Corpus Christi, Texas	92
Unocal Corp.--Nederland, Texas	68
Valero Refining Co.--Corpus Christi, Texas	69
Phillips 66 Co.--Woods Cross, Utah	70
Chevron USA Inc.--Seattle, Washington	71
Sound Refining, Inc.--Tacoma, Washington	72
US Oil and Refining Co.--Tacoma, Washington	73
Murphy Oil USA, Inc.--Superior, Wisconsin	74
Big West Oil Co.--Cheyenne, Wyoming	75
Little America Refining Co.--Casper, Wyoming	93
Sinclair Oil Corp.--Sinclair, Wyoming	76
Other	77

* Taken from Oil and Gas Journal, March 20, 1989, pp. 72-89.

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Table A.15 Asphalt Cement Modifier Codes

	Code
Stone Dust	01
Lime	02
Portland Cement	03
Carbon Black	04
Sulfur	05
Lignin	06
Natural Latex	07
Synthetic Latex	08
Block Copolymer	09
Reclaimed Rubber	10
Polyethylene	11
Polypropylene	12
Ethylene-Vinyl Acetate	13
Polyvinyl Chloride	14
Asbestos	15
Rock Wool	16
Polyester	17
Manganese	18
Other Mineral Salts	19
Lead Compounds	20
Carbon	21
Calcium Salts	22
Recycling Agents	23
Rejuvenating Oils	24
Amines	25
Fly Ash	26
Other	27

Table A.16 Grades of Asphalt, Emulsified Asphalt, and Cutback Asphalt Codes

	Code
Asphalt Cements	
AC-2.5	01
AC-5	02
AC-10	03
AC-20	04
AC-30	05
AC-40	06
AR-1000 (AR-10 by AASHTO Designation)	07
AR-2000 (AR-20 by AASHTO Designation)	08
AR-4000 (AR-40 by AASHTO Designation)	09
AR-8000 (AR-80 by AASHTO Designation)	10
AR-16000 (AR-160 by AASHTO Designation)	11
200-300 pen	12
120-150 pen	13
85-100 pen	14
60-70 pen	15
40-50 pen	16
Other Asphalt Cement Grade	17
Emulsified Asphalts	
RS-1	18
RS-2	19
MS-1	20
MS-2	21
MS-2h	22
HFMS-1	23
HFMS-2	24
HFMS-2h	25
HFMS-2s	26
SS-1	27
SS-1h	28
CRS-1	29
CRS-2	30
CMS-2	31
CMS-2h	32
CSS-1	33
CSS-1h	34
Other Emulsified Asphalt Grade	35
Cutback Asphalts (RC, MC, SC)	
30 (MC only)	36
70	37
250	38
800	39
3000	40
Other Cutback Asphalt Grade	99

Taken from MS-5, "A Brief Introduction to Asphalt," and Specification Series No. 2 (SS-2), "Specifications for Paving and Industrial Asphalts," both publications by the Asphalt Institute.

Table A.17 Maintenance and Rehabilitation Work Type Codes

	Code
Crack Sealing (linear ft.)	01
Transverse Joint Sealing (linear ft.)	02
Lane-Shoulder, Longitudinal Joint Sealing (linear ft.)	03
Full Depth Joint Repair Patching of PCC (sq. yards)	04
Full Depth Patching of PCC Pavement Other than at Joint (sq. yards)	05
Partial Depth Patching of PCC Pavement Other than at Joint (sq. yards)	06
PCC Slab Replacement (sq. yards)	07
PCC Shoulder Restoration (sq. yards)	08
PCC Shoulder Replacement (sq. yards)	09
AC Shoulder Restoration (sq. yards)	10
AC Shoulder Replacement (sq. yards)	11
Grinding/Milling Surface (sq. yards)	12
Grooving Surface (sq. yards)	13
Pressure Grout Subsealing (no. of holes)	14
Slab Jacking Depressions (no. of depressions)	15
Asphalt Subsealing (no. of holes)	16
Spreading of Sand or Aggregate (sq. yards)	17
Reconstruction (Removal and Replacement) (sq. yards)	18
Asphalt Concrete Overlay (sq. yards)	19
Portland Cement Concrete Overlay (sq. yards)	20
Mechanical Premix Patch (using motor grader and roller) (sq. yards)	21
Manual Premix Spot Patch (hand spreading and compacting with roller) (sq. yards)	22
Machine Premix Patch (placing premix with paver, compacting with roller) (sq. yards)	23
Full Depth Patch of AC Pavement (removing damaged material, repairing supporting material, and repairing) (sq. yards)	24
Patch Pot Holes - Hand Spread, Compacted with Truck (no. of holes)	25
Skin Patching (hand tools/hot pot to apply liquid asphalt and aggregate) (sq. yards)	26
Strip Patching (using spreader and distributor to apply hot liquid asphalt and aggregate) (sq. yards)	27
Surface Treatment, single layer (sq. yards)	28
Surface Treatment, double layer (sq. yards)	29
Surface Treatment, three or more layers (sq. yards)	30
Aggregate Seal Coat (sq. yards)	31
Sand Seal Coat (sq. yards)	32
Slurry Seal Coat (sq. yards)	33
Fog Seal Coat (sq. yards)	34
Prime Coat (sq. yards)	35
Tack Coat (sq. yards)	36
Dust Layering (sq. yards)	37
Longitudinal Subdrains (linear feet)	38
Transverse Subdrainage (linear feet)	39

Table A.17 Maintenance and Rehabilitation Work Type Codes
(continued)

	Code
Drainage Blankets (sq. yards)	40
Well System	41
Drainage Blankets with Longitudinal Drains	42
Hot-Mix Recycled Asphalt Concrete (sq. yards)	43
Cold-Mix Recycled Asphalt Concrete (sq. yards)	44
Heater Scarification, Surface Recycled Asphalt Concrete (sq. yards)	45
Crack and Seat PCC Pavement as Base for New AC Surface (sq. yards)	46
Crack and Seat PCC Pavement as Base for New PCC Surface (sq. yards)	47
Recycled Portland Cement Concrete (sq. yards)	48
Pressure Relief Joints in PCC Pavements (linear feet)	49
Joint Load Transfer Restoration in PCC Pavements (linear feet)	50
Mill Off Existing Pavement and Overlay with AC (sq. yards)	51
Mill Off Existing Pavement and Overlay with PCC (sq. yards)	52
Other	53
Partial Depth Patching of PCC Pavement at Joints (sq. yards)	54

Table A.18. Maintenance location codes.

	Code
Outside Lane (Number 1)	01
Inside Lane (Number 2)	02
Inside Lane (Number 3)	03
All Lanes	09
Shoulder	04
All Lanes Plus Shoulder	10
Curb and Gutter	05
Side Ditch	06
Culvert	07
Other	08

Note: SHRP LTPP only studies outside lanes.

Table A.19 Maintenance Materials Type Codes

	Code
Preformed Joint Fillers	01
Hot-Poured Joint and Crack Sealer	02
Cold-Poured Joint and Crack Sealer	03
Open Graded Asphalt Concrete	04
Hot Mix Asphalt Concrete Laid Hot	05
Hot Mix Asphalt Concrete Laid Cold	06
Sand Asphalt	07
Portland Cement Concrete (overlay or replacement)	
Joint Plain (JPCP)	08
Joint Reinforced (JRCP)	09
Continuously Reinforced (CRCP)	10
Portland Cement Concrete (Patches)	11
Hot Liquid Asphalt and Aggregate (Seal Coat)	12
Hot Liquid Asphalt and Mineral Aggregate	13
Hot Liquid Asphalt and Sand	14
Emulsified Asphalt and Aggregate (Seal Coat)	15
Emulsified Asphalt and Mineral Aggregate	16
Emulsified Asphalt and Sand	17
Hot Liquid Asphalt	18
Emulsified Asphalt	19
Sand Cement (Using Portland Cement)	20
Lime Treated or Stabilized Materials	21
Cement Treated or Stabilized Materials	22
Cement Grout	23
Aggregate (Gravel, Crushed Stone or Slag)	24
Sand	25
Mineral Dust	26
Mineral Filler	27
Other	28

Table A.20. Recycling agent type codes.

	Code
RA 1	42
RA 5	43
RA 25	44
RA 75	45
RA 250	46
RA 500	47
Other	48

Note: The recycling agent groups shown in this table are defined in ASTM D4552.

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Table A.21. Anti-stripping agent type codes.

	Code
Permatac	01
Permatac Plus	02
Betascan Roads	03
Pavebond	04
Pavebond Special	05
Pavebond Plus	06
BA 2000	07
BA 2001	08
Unichem "A"	09
Unichem "B"	10
Unichem "C"	11
AquaShield AS4115	12
AquaShield AS4112	13
AquaShield AS4113	14
Portland Cement	15
Hydrated Lime:	
Mixed Dry With Asphalt Cement	16
Mixed Dry with Dry Aggregate	17
Mixed Dry with Wet Aggregate	18
Slurried Lime Mixed with Aggregate	19
Hot Lime Slurry (Quick Lime Slaked and Slurried at Job Site)	20
Nostrip Chemicals A-500	21
No Strip Chemical Works ACRA RP-A	22
No Strip Chemical Works ACRA Super Conc.	23
No Strip Chemical Works ACRA 200	24
No Strip Chemical Works ACRA 300	25
No Strip Chemical Works ACRA 400	26
No Strip Chemical Works ACRA 500	27
No Strip Chemical Works ACRA 512	28
No Strip Chemical Works ACRA 600	29
Darakote	30
De Hydro H86C	31
Emery 17065	32
Emery 17319	33
Emery 17319 - 6880	34
Emery 17320	35
Emery 17321	36
Emery 17322	37
Emery 17339	38
Emery 1765-6860	39
Emery 6886B	40
Husky Anti-Strip	41
Indulin AS-Special	42

Table A.21. Anti-stripping agent type codes (continued).

	Code
Indulin AS-1	43
Jetco AD-8	44
Kling	45
Kling Beta ZP-251	46
Kling Beta L-75	47
Kling Beta LV	48
Kling Beta 1000	49
Kling Beta 200	50
Nacco Anti Strip	51
No Strip	52
No Strip Concentrate	53
Redi-Coat 80-S	54
Redi-Coat 82-S	55
Silicone	56
Super AD-50	57
Tap Co 206	58
Techni H1B7175	59
Techni H1B7173	60
Techni H1B7176	61
Techni H1B7177	62
Tretolite DH-8	63
Tretolite H-86	64
Tretolite H-86C	65
Tyfo A-45	66
Tyfo A-65	67
Tyfo A-40	68
Edoco 7003	69
Other	70

Table A.22 Distress Types

	Code
Asphalt Concrete Pavement	
Alligator Cracking	01
Block Cracking	02
Edge Cracking	03
Longitudinal Cracking	04
Reflection Cracking	05
Transverse Cracking	06
Patch Deterioration	07
Potholes	08
Rutting	09
Shoving	10
Bleeding	11
Polished Aggregate	12
Raveling and Weathering	13
Lane Shoulder Dropoff	14
Water Bleeding	15
Pumping	16
Other	17
Portland Cement Concrete Pavement	
Corner Breaks	20
Durability Cracking	21
Longitudinal Cracking	22
Transverse Cracking	23
Joint Seal Damage	24
Spalling	25
Map Cracking/Scaling	26
Polished Aggregate	27
Popouts	28
Punchouts	29
Blowouts	30
Faulting	31
Lane/Shoulder Dropoff	32
Lane/Shoulder Separation	33
Patch Deterioration	34
Water Bleeding/Pumping	35
Slab Settlement	36
Slab Upheavel	37
Other	38