SPECIFIC PAVEMENT STUDIES DATA COLLECTION GUIDELINES FOR EXPERIMENT SPS-9A

SUPERPAVE™ ASPHALT BINDER STUDY

Prepared for

U.S. Department of Transportation
Federal Highway Administration
Long-Term Pavement Performance Division
Federal Highway Administration
Turner-Fairbank Highway Research Center
6300 Georgetown Pike
McLean, Virginia 22101

Prepared by

PCS/Law Engineering
A Division of Law Engineering and Environmental Services, Inc.
12104 Indian Creek Court, Suite A
Beltsville, Maryland 20705-1242
Telephone: 301-210-5105

PCS/LAW Reference 10992-5-0104

April 1996

TABLE OF CONTENTS

LIST OF TABLES

DATA COLLECTION GUIDELINES
SPECIFIC PAVEMENT STUDIES EXPERIMENT 9A
SUPERPAVE™ Asphalt Binder Study

INTRODUCTION

This document provides guidelines and instructions for collection of data for the Specific Pavement Studies SPS-9A experiment, SUPERPAVE™ Asphalt Binder Study. Forms for recording and reporting this data are also included.

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

- "Specific Pavement Studies: Experimental Design and Research Plan for Experiment SPS-9A, SUPERPAVE™ Asphalt Binder Study" January 1995, Revised September, 1995.
- "Specific Pavement Studies: Guidelines for Nomination and Evaluation of Candidate Projects for Experiment SPS-9A, SUPERPAVE™ Asphalt Binder Study" August 1994, Revised September, 1995.
- "Specific Pavement Studies: Construction Guidelines for Experiment SPS-9A, SUPERPAVE™ Asphalt Binder Study" August 1994, Revised September, 1995.
- "Specific Pavement Studies: Materials Sampling and Testing Requirements for Experiment SPS-9A, SUPERPAVE™ Asphalt Binder Study", June 1995
- 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
Climatic
Maintenance
Rehabilitation

The data collection and reporting process for SPS-9A 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 prior to and during construction. Monitoring measurements to be 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 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. Each SPS test section will be identified with a six digit code consisting of a two digit STATE CODE and a four digit SHRP SECTION ID number. Unlike the GPS SHRP SECTION ID number, the SPS 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 of the 6 digit SPS code 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 of the SPS test section number 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., "9" for SPS-9A test sites.

The far right two digits of the SPS test section number are the TEST SECTION NUMBER. This is the two digit number for each test section on a test site. The test section numbers for the SPS-9A test sections are specified in the Construction Guidelines referenced earlier. Test section numbers for the supplemental test sections on the SPS project should be specified by the SHRP regional office in coordination with the participating highway agency.

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 should be used (01 through 03 or higher).

SPS Layer Numbering Scheme

A layer description table should be completed for each test section to note any differences in the layer structure and thicknesses. To ensure consistency in data reporting, a detailed layer structure should be developed prior to sampling and testing for the entire SPS project (termed "Project Level") and for each individual pavement section (termed "Section Level"). In the Project Level scheme, each individual layer is designated by a letter of the alphabet. An example project level layer structure is shown in Table 1 for an example SPS-9A project.

Several issues are involved herein. The first issue is the designation of the subgrade and embankment material. If a project or test section is located on fill material, then the project layer numbering shall contain an embankment layer.

Table 1. Example Project Layer Numbering

Project Layer Code	Material Code	Comments
A	104	Natural Soil
B	107	Embankment
C	338	Lime Treated Subgrade
D	303	Dense Graded Aggregate Base
E	01	HMAC Binder Course
F	01	SuperPave™ HMAC Surface Course
G	01	SuperPave™ Alternate HMAC Surface Course
H	01	HMAC Agency Mix Surface Course

It must be noted that if a fill (embankment) layer is present and is greater than 1.2 m (4 ft.) in thickness, the natural subgrade will NOT be sampled or tested. The fill (embankment) layer only will be sampled and tested as if it were natural subgrade.

Also if any test section on a project is located on a treated subgrade layer, the project layering table shall contain a project layer code for this treated subgrade layer; designated as a treated subgrade.

The layering for the dense graded aggregate base, and other base materials is rather straight forward. However, the hot mix asphalt surface course may be comprised of multiple lifts. If the entire surface course is comprised of the same mix design, then only one layer code is needed to represent the layer. However, if the hot mix asphalt consists of a surface and binder course (which are distinct mix designs) then these must be treated as two separate layers and coded and sampled accordingly. It should be noted that multiple lifts of the same material shall not be identified as separate layers.

After the project layering report is completed, each individual test section will use the appropriate project layer code to designate their layer structure. Table 2 presents an example section layering structure.

Table 2. Example Section Layering Structure

Layer Number	Project Layer Code	Layer Thickness (Inches)	Material Code	Comment
1	A	N/A	104	Natural Soil
2	B	24	107	Embankment
3	D	12	303	DGAB
4	E	4	01	HMA Binder Course
5	H	3	01	HMA Agency Surface

The establishment of this project and test section layer structure is essential to maintain consistency within the project. These layer numbers will follow the project and each test section throughout the field sampling and laboratory testing program. Details for the proper procedures to be used to perform this layering activity can be found in the latest version of the "Specific Pavement Studies Layering Methodology" report.

FIELD MATERIALS SAMPLING AND TESTING

Field materials sampling and testing shall be performed following the guidelines outlined in Specific Pavement Studies, Materials Sampling and Testing Requirements, Experiment SPS-9A, SUPERPAVE™ Asphalt Binder Study 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-9A experiment. The operational memorandum for the SPS-9A experiment includes revised field data forms and new data sheets for materials sampling and testing during construction.

Revised Field Data Forms

In general, the field materials sampling and testing should be performed following the guidelines provided in Operational Guide No. SHRP-LTPP-OG-006, "SHRP-LTPP Guide for Field Materials Sampling, Testing, and Handling", May 1990. However, field data forms have been revised and data sheets have been included to report data for bulk sampling of subgrade, granular material, and asphalt concrete materials performed during construction. These changes and/or additions have been made to accommodate the specific needs of the experiment.

Due to differences between the sampling requirements for GPS and SPS projects, 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 and sample location referencing.

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 under SPS Test Section Numbering Scheme in this document.

LTPP-SPS Material Sampling and Field Testing Data Sheets

Material sampling and field testing data sheets used in the SPS experiments include Sampling Data Sheets and Field Operations Information Forms. The SPS-9A experiment requires completion of the following sheets and forms summarized in Table 3:

Table 3. Material Sampling and Field Testing Forms

Sampling Data Sheet No.	Description
2	Pavement Core Log at C-Type Core Locations
4-1	A-Type Bore Hole Log
8-1	In-Situ Density and Moisture Tests
9	Shoulder Probe Log
10-1	Sampling Uncompacted Bituminous Paving Mixtures
12	Bulk Sampling of Subgrade and Unbound Granular Materials
Field Operations Information - Form No.	**Description**
1	Laboratory Shipment Samples Inventory
2-1	Summary of Material Samples Sent to Each Laboratory

Most of the LTPP-SPS Material Sampling and Field Testing data sheets (Sampling Data Sheets and Field Operations Information Forms) use the same top block of information related to the test section and project.

SHEET NUMBER Since multiple data sheets will be required for the samples and tests from the multiple sampling areas on the project, room is provided on all data forms to sequentially order 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 submitted.

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

STATE Indicate the name of the State, District of Columbia, Puerto Rico, or the Canadian Province the project is located.

STATE CODE Enter the two-digit numeric code corresponding to the state or province as shown in Table C.1 of the SHRP-LTPP Guide for Field Materials Sampling, Testing and Handling.

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 project constructed in a state and province, or a letter starting with A, B, etc. for the second, third, etc. projects of the same SPS experiment constructed in the same state and province. The second digit corresponds to the SPS experiment number i.e. "9" for SPS-9A experiment.

TEST SECTION NO The two digit number assigned to the test section. If a GPS project is co-located on the SPS project and the GPS data sheets are used for the material sampling and field testing, the four digit SHRP SECTION ID should be divided into two-two digit fields and the

first two digits (from the left) should be entered as the SPS PROJECT CODE and the last two digits entered as the TEST SECTION NO. Enter the test section number marked on the project in the field.

SPS EXPERIMENT NO The SPS experiment number for the project (i.e. "9" for projects in the SPS-9A experiment, "SUPERPAVE Asphalt Binder Study"

ROUTE/HIGHWAY Record the signed designation for the route or highway where the project is located.

Lane Drilling and sampling shall always occur on the outside lane for the SPS program. Record a "1" for sampling occurring on the outside lane and a "2" for sampling on the inside lane.

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 location is before the beginning of the test section indicated under TEST SECTION NUMBER on the form (station 0-). Check "After Section" if the sampling location is after the end of the test section indicated on the form (station 5+). Check "Within Section" if the sampling is performed within the boundaries of the monitoring length.

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 construction or life, such as prior to overlay construction, after overlay construction, etc. A field set number can apply to more than one day since sampling of SPS test sections may require 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 time that material sampling and field testing conducted on the prepared subgrade and base during construction on the project. Enter 2, 3, etc. for the second, third and subsequent sampling and field testing on this project.

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 6-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. 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.

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.

CORE BARREL SIZE 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.

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 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.

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 specified, and less than 0+00 for sampling locations which occur before the test section specified.

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 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 splitspoon or thin-walled tube samples 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 the splitspoon sampler is "refused" 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 the splitspoon is refused 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

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.

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.

LOCATION: OFFSET This is the distance from the edge of the pavement lane and the outside shoulder to the location 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 Sampling Data Sheet 4 for each unbound granular layer. 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); record "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 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 as a percentage moisture content 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.

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.

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.

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 MIX 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).

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 LOCATION DESIGNATOR Enter the sample type designation for the sample. Sampling locations are designated on the LTPP forms and material sampling plans with the following six digit code format:

L ## t X X

where

L = Location type:
B - bulk sample location
A - 150 mm diameter core and/or auger locations
S - Shoulder auger probe 6 m below the pavement surface
C - 150 mm diameter core locations

= Location number. Up to a two digit location number is assigned sequentially to each location type on each test section.

t = Sampling time interval. This time interval is used for samples taken at specified time intervals referenced to the construction date. The single letter designating the time from paving is as follows:

A	-	prior, during or immediately after construction
B	-	6 months
C	-	12 months
D	-	18 months
E	-	24 months
F	-	48 months

X X = Section. Use the 2 digit test section number, e.g., 01, 02, 03. This makes the sample location unique to that test section.

SAMPLE NUMBER Each sample (core, bulk, moisture, compacted) shall be assigned a seven digit designation that must be recorded on the appropriate data forms. The sample number will consist of the following format:

	S	***M***	***##***	***t***	***X X***
Digit	1	2	34	5	6 7

where

S = Sample type:
C - core sample
D - compacted specimen from plant mixed material
B - bulk sample
M - moisture sample
L - compacted specimen from laboratory mixed material
N - uncompacted laboratory mixed material sample

M = Material Type:

A - asphalt concrete
C - asphalt cement
P - portland cement concrete
T - treated, bound, or stabilized base/subbase
U - combined aggregate used in asphalt concrete mixes
G - untreated, unbound granular base/subbase
S - subgrade soil or fill material

= Sample number. Up to a two digit sample number assigned sequentially to each sample with the same sample type and material type designation.

t = Sampling time interval. This time interval is used for samples taken at specified time intervals referenced to the construction date. The single letter designating the time from paving is as follows:

A	-	prior, during or immediately after construction
B	-	6 months
C	-	12 months
D	-	18 months
E	-	24 months
F	-	48 months

XX = Section number. Use the 2 digit test section number, e.g., 01, 02, 03. This makes the sample location unique to that test section.

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 the sample was shipped to from the field. In many cases this should be the laboratory which will perform the testing.

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

GENERAL REMARKS Provide any general remarks concerning the representativeness of 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 USED Indicate the generic type of the equipment used to excavate the material.

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

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.

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.

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. 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 and sample 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. 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.

Other GPS Data Forms

Other Field Materials Sampling and Testing data forms used for GPS test sections not referenced in this report should not be completed for the SPS activity. These forms include S07, S08, S09, S10, S11, S12, S13, S14A, S14B, S15A, S15B, S16A, and S16B.

REQUIRED DATA SHEETS

Summary of SPS-9A Construction Data Sheets

Construction data for the SPS-9A 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 also includes material properties measured as part of the mix design and construction control operations which are not included as part of the field sampling and testing data.

The following summary listing of Construction Data Sheets is presented. These forms shall be completed according to the tables for the appropriate construction type (new AC, AC overlay over AC or AC overlay over PCC) following the guidelines contained in this report. It should be noted that the overlay experiments will require the completion of selected Inventory forms developed during the GPS experiments. The required forms will be listed either in tables or in the text following the tables in the sections describing the overlay experiments. The Construction Data Sheets developed for the SPS-9A experiment are as follows:

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: Plant-Mixed Asphalt Bound Layers - Aggregate Properties

Construction Data Sheet 6: Plant-Mixed Asphalt Bound Layers - SuperPave™ Aggregate Properties

Construction Data Sheet 7: Plant-Mixed Asphalt Bound Layers - Asphalt Cement Properties

Construction Data Sheet 8: Plant-Mixed Asphalt Bound Layers - SuperPave™ Asphalt Binder Properties

Construction Data Sheet 9: Plant-Mixed Asphalt Bound Layers - Mixture Properties

Construction Data Sheet 10: Plant-Mixed Asphalt Bound Layers - SuperPave™ Mixture Properties

Construction Data Sheet 11: Cut-Fill Locations

Construction Data Sheet 12: Plant-Mixed Asphalt Bound Layers - Placement Data

Construction Data Sheet 13: Plant-Mixed Asphalt Bound Layers - Compaction Data

Construction Data Sheet 14: Plant-Mixed Asphalt Bound Layers - Density and Profile Data

Construction Data Sheet 15: Layer Thickness Measurements

Construction Data Sheet 16: Miscellaneous Construction Notes and Comments

Construction Data Sheet 17: Unbound Aggregate Base Material Placement

Construction Data Sheet 18: Subgrade Preparation

Construction Data Sheet 19: Subgrade Excavation and Backfilling Sketch

Construction Data Sheet 20. Pre-Overlay Surface Preparation Sketch

Construction Data Sheet 21. Pre-Overlay Condition Summary

Construction Data Sheet 22. Rut Level-Up Treatment

Construction Data Sheet 23. Preparation of Milled Test Sections

Construction Data Sheet 24. Asphalt Patching of PCC Pavements

Construction Data Sheet 25. Partial Depth Patching Data for Pavements with Portland Cement Concrete Surfaces

Construction Data Sheet 26. Partial Depth Patching Data for Pavements with Portland Cement Concrete Surfaces (continued)

Construction Data Sheet 27. Partial Depth Patching Data for Pavements with Portland Cement Concrete Surfaces (continued)

Construction Data Sheet 28. Joint Resealing Data for Pavements with Portland Cement Concrete Surfaces

Construction Data Sheet 29. Joint Resealing Data for Pavements with Portland Cement Concrete Surfaces (continued)

Construction Data Sheet 30. Crack Sealing Data for Pavements with Portland Cement Concrete Surfaces

Construction Data Sheet 31. Crack Sealing Data for Pavements with Portland Cement Concrete Surfaces (Continued)

Construction Data Sheet 32. Diamond Grinding For Pavement Surfaces

Construction Data Sheet 33. Full Depth Repair Data for Pavements with Portland Cement Concrete Surfaces

Construction Data Sheet 34. Full Depth Repair Data for Pavements with Portland Cement Concrete Surfaces (continued)

Construction Data Sheet 35. Full Depth Repair Data for Pavements with Portland Cement Concrete Surfaces (continued)

Construction Data Sheet 36. Full Depth Repair Data for Pavements with Portland Cement Concrete Surfaces (continued)

Construction Data Sheet 37. Load Transfer Restoration Data for Pavements with Portland Cement Concrete Surfaces

Construction Data Sheet 38. Load Transfer Restoration Data for Pavements with Portland Cement Concrete Surfaces (continued)

Construction Data Sheet 39. Undersealing Data for Pavements with Portland Cement Concrete Surfaces

Construction Data Sheet 40. Undersealing Data for Pavements with Portland Cement Concrete Surfaces (continued)

Construction Data Sheet 41. Subdrainage Retrofit Data for Pavements with Portland Cement Concrete Surfaces

The instructions for entering data on these forms are presented later in this report.

Summary of Inventory Data Sheets Used in SPS-9A Projects

Similar to the Construction Data Sheets, on overlay projects, some of the set of 22 Inventory Data Sheets may be required (dependent upon the project's construction). It should be noted that sheets are identical to those developed during the original GPS studies. For reference, these sheets are listed below.

Sheet 1 Project and Section Identification

Sheet 2 Geometric, Shoulder and Drainage Information

Sheet 3 Layer Descriptions

Sheet 4 Age and Major Pavement Improvements

Sheet 5 Portland Cement Concrete Layers Joint Data

Sheet 6 Portland Cement Concrete Layers Joint Data (continued)

Sheet 7 Portland Cement Concrete Layers Reinforcing Steel Data

Sheet 8	Portland Cement Concrete Layers Mixture Data
Sheet 9	Portland Cement Concrete Layers Mixture Data (continued)
Sheet 10	Portland Cement Concrete Layers Mixture Data (continued)
Sheet 11	Portland Cement Concrete Layers Strength Data
Sheet 12	Plant Mixed Asphalt Bound Layers Aggregate Properties
Sheet 13	Plant Mixed Asphalt Bound Layers Aggregate Properties (continued)
Sheet 14	Plant Mixed Asphalt Bound Layers Asphalt Cement Properties
Sheet 15	Plant Mixed Asphalt Bound Layers Asphalt Cement Properties (continued)
Sheet 16	Plant Mixed Asphalt Bound Layers Original Mixture Properties
Sheet 17	Plant Mixed Asphalt Bound Layers Original Mixture Properties (continued)
Sheet 18	Plant Mixed Asphalt Bound Layers Construction Data
Sheet 19	Unbound or Stabilized Base or Subbase Material Description
Sheet 20	Unbound or Stabilized Base or Subbase Material Description (continued)
Sheet 21	Subgrade Data
Sheet 22	Subgrade Data (continued).

Summary of Rehabilitation Data Sheets Used in SPS-9A Projects

Similar to the Inventory Data Sheets, Rehabilitation Data Sheet 61 may be required (if the project involves shoulder reconstruction). It should be noted that this sheet is identical to those developed during the original GPS studies. For reference, this sheet is included within this document.

Rehabilitation Data Sheet 61,	Restoration of AC Shoulders

Summary of Maintenance Data Sheets Used in SPS-9A Projects

Similar to the Rehabilitation Data Sheets, some of the set of Maintenance Data Sheets may be required. It should be noted that sheets are identical to those developed during the original GPS studies. For reference, these sheets are listed below.

Maintenance Data Sheet 1	Historical Maintenance Information
Maintenance Data Sheet 5	Crack Sealing Data

FORM USAGE BY CONSTRUCTION TYPE

In the following sections, the forms required for each distinct style of construction are presented. These will be grouped into three subheadings:

- Part I New Construction or Reconstruction
- Part II Overlay Construction Data On Asphalt Pavements
- Part III Overlay Construction Data On Portland Cement Concrete Pavements

Part I New Construction or Reconstruction

The forms to be completed for new construction and reconstruction projects are shown in Table 4. The form type (i.e. SPS-9A CD for Construction Data) is shown in the left column and the form number is listed under the appropriate heading for Project or applicable test section. If an asterisk is present, the form may only be required if a treatment has actually been performed.

Table 4. Data Sheets for New/Reconstruction Projects

Form Type	Project Level	Test Section 01	Test Section 02	Test Section 03	Supplemental Sections
SPS-9A CD	1				
		2	2	2	2
	3				
		4	4	4	4
		5			5
			6	6	
		7			7
			8	8	
		9			9
			10	10	
		11	11	11	11
		12	12	12	12
		13	13	13	13
		14	14	14	14
		15	15	15	15
		16*	16*	16*	16*
		17	17	17	17
		18	18	18	18
		19	19	19	19

* Complete when necessary

Part II Overlay Construction Data On Asphalt Pavements

Overlay Construction data for the SPS 9A experiment are primarily those features of the test section related to surface preparation and placement of the overlay material. Information in this module also includes material properties measured by the agency as part of the mix design and construction control operations. Table 5 lists the forms to be completed, including Inventory, Maintenance, Rehabilitation and SPS-9A Construction Data Forms.

Table 5. Data Sheets for Overlay of Existing Flexible Pavements

Form Type	Project Level	Test Section 01	Test Section 02	Test Section 03	Supplemental Sections
Inventory	1				
	2				
	3				
	4				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
Maint		1	1	1	1
		5	5	5	5
SPS-9A CD	1				
		2	2	2	2
	3				
		4	4	4	4
		5			5
			6	6	
		7			7
			8	8	
		9			9
			10	10	

Table 5. Data Sheets for Overlay of Existing Flexible Pavements

Form Type	Project Level	Test Section 01	Test Section 02	Test Section 03	Supplemental Sections
SPS-9A CD		11	11	11	11
		12	12	12	12
		13	13	13	13
		14	14	14	14
		15	15	15	15
		16*	16*	16*	16*
		20	20	20	20
		21	21	21	21
		22*	22*	22*	22*
		23*	23*	23*	23*
Rehab		61*	61*	61*	61*

* Complete when necessary

All forms are contained in Appendix A

Part III Overlay Construction Data On Portland Cement Concrete Pavements

The following LTPP-SPS construction data sheets were developed for the SPS-9A overlay experiment for sections placed upon Portland Cement Concrete Pavements. Forms to be completed where the existing pavement is Portland cement concrete are listed in Table 6.

Table 6. Data Sheets for Overlay of Existing PCC Pavements

Form Type	Project Level	Test Section 01	Test Section 02	Test Section 03	Supplemental Sections
Inventory	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	10				

Table 6. Data Sheets for Overlay of Existing PCC Pavements

Form Type	Project Level	Test Section 01	Test Section 02	Test Section 03	Supplemental Sections
Inventory	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
Maint		1	1	1	1
		5	5	5	5
SPS-9A CD	1				
		2	2	2	2
	3				
		4	4	4	4
		5			5
			6	6	
		7			7
			8	8	
		9			9
			10	10	
		11	11	11	11
		12	12	12	12
		13	13	13	13
		14	14	14	14
		15	15	15	15
		16*	16*	16*	16*
		20*	20*	20*	20*
		24*	24*	24*	24*
		25*	25*	25*	25*
		26*	26*	26*	26*

Table 6. Data Sheets for Overlay of Existing PCC Pavements

Form Type	Project Level	Test Section 01	Test Section 02	Test Section 03	Supplemental Sections
SPS-9A CD		27*	27*	27*	27*
		28*	28*	28*	28*
		29*	29*	29*	29*
		30*	30*	30*	30*
		31*	31*	31*	31*
		32*	32*	32*	32*
		33*	33*	33*	33*
		34*	34*	34*	34*
		35*	35*	35*	35*
		36*	36*	36*	36*
		37*	37*	37*	37*
		38*	38*	38*	38*
		39*	39*	39*	39*
		40*	40*	40*	40*
		41*	41*	41*	41*
Rehab		61*	61*	61*	61*

* Complete when necessary

SPS-9A CONSTRUCTION DATA FORMS

This Chapter describes the input required for each of the Construction Data Sheets in numeric order. A brief description of the data entry for each field is presented in order of appearance on the form. For brevity, the data elements common to all forms (header information) is presented first with the individual instructions for the data forms following.

Data Common for All SPS-9A Construction Data Sheets

A common set of project identification data appears in the upper right hand corner of each SPS-9A 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 A of this report for codes).

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

Construction Data Sheet 1: Project and Section Identification

0. PROJECT TYPE Enter the code "N" for new construction/reconstruction or "R" for overlay projects.

   Note: For the overlays of existing pavements, the remainder of the Construction Data Sheet 1 should be left blank as the information will be recorded on Inventory Sheet 1.

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 Appendix A, Table A.2).

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

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

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

10. 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.

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

12-16. PROJECT STARTING POINT LOCATION The location of the starting point of the project is to be identified by milepoint, elevation, latitude, and longitude.

12. MILEPOINTS 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.

13. 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.

14-15. 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 shall be determined through use of a Global Positioning System.

16. ADDITIONAL LOCATION INFORMATION (SIGNIFICANT LANDMARKS) Enter additional information regarding the location of the section starting point location. This

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

17. 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.

18. 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 foot.

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.

   SHOULDER DATA Spaces are provided to enter data describing both the outside and inside shoulder. If there are no inside shoulders, place a line through 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 newly constructed SPS-9A sites.

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

7. PAVED WIDTH Enter the paved widths of the outside and inside shoulders to the nearest foot.

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

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

10. SHOULDER BASE THICKNESS Enter the average base thicknesses along the shoulders to the nearest tenth of an inch.

11. DIAMETER OF LONGITUDINAL DRAINPIPES Enter the inside diameter to the nearest tenth of an 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.

13. 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-9A are 01 to 07.

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 NO. 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.

REFERENCE PROJECT STATION NUMBER

2. START. 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. 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. CUT-FILL 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, Construction Data Sheet 11 should be completed for that test section indicating the approximate location of the cut-fill transition(s) using the 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 L05.

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. This code, which describes the general type of layer, 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, 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.

Construction Data Sheet 5: Plant-Mixed Asphalt Bound Layers, Aggregate Properties

This sheet is to be filled out during construction from available project records for each asphalt concrete layer identified on Sheet 4. Although various SHAs discriminate between fine and coarse aggregates on the basis of different sieve sizes, the following definition (Ref. 20) is to be applied for SHRP studies: All aggregate retained on the No. 8 sieve (or metric equivalent) is coarse aggregate and all aggregate passing the no. 8 sieve (or metric equivalent) is fine aggregate. "Mineral filler" is defined (ASTM D242) as that portion passing the No. 30 sieve (or metric equivalent) (at least 95 percent must pass the No. 50 sieve (or metric equivalent) and at least 70 percent must also pass the No. 200 sieve [or metric equivalent]).

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 [metric equivalents may be used]). 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 some other type for which a code has not been provided.

9-12. BULK SPECIFIC GRAVITIES 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 simply "bulk specific gravity of aggregate") is calculated as follows (Ref. 19):

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

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 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 (Ref. 19):

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

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.

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, SuperPaveTM Aggregate Properties

This sheet is to be filled out during construction from available project records for each asphalt concrete layer identified on Sheet 4. Although various SHAs discriminate between fine and coarse aggregates on the basis of different sieve sizes, the following definition (Ref. 20) is to be applied for SHRP studies: All aggregate retained on the No. 8 sieve (or metric equivalent) is coarse aggregate and all aggregate passing the no. 8 sieve (or metric equivalent) is fine aggregate. "Mineral filler" is defined (ASTM D242) as that portion passing the No. 30 sieve (or metric equivalent) (at least 95 percent must pass the No. 50 sieve (or metric equivalent) and at least 70 percent must also pass the No. 200 sieve [or metric equivalent]).

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 [metric equivalents may be used]). 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 some other type for which a code has not been provided.

9-12. BULK SPECIFIC GRAVITIES 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 simply "bulk specific gravity of aggregate") is calculated as follows (Ref. 19):

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

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 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 (Ref. 19):

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

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. ANGULARITY Both the coarse and fine aggregate angularity should be determined. The coarse aggregate angularity shall be determined by determining the count percentage of aggregate with one or more and two or more crushed faces. This determination shall be performed in accordance with the Pennsylvania Test Method 621 with the results reported to the nearest 0.1 %. The fine aggregate angularity shall be determined by ASTM C1252 with the void determined reported to the nearest 0.1 %.

15. SOUNDNESS The coarse and fine aggregate soundness shall be determined by AASHTO T104 with the weighted percent loss reported to the nearest 0.1 %.

16. TOUGHNESS The coarse aggregate toughness shall be determined by use of the Los Angelos Abrasion Apparatus by following AASHTO T96. The wear loss determined by this method shall be reported to the nearest 0.1 %.

17. DELETERIOUS MATERIALS The estimate of percentage of deleterious materials by weight shall be determined through use of AASHTO T112 "Clay Lumps and Friable Particles of Fine Aggregate". The test results shall be reported to the nearest 0.1 %.

18. CLAY CONTENT The "clay content" will be determined by the use of the Sand Equivalent (AASHTO T176). The resulting ratio shall be recorded to the nearest 0.1 %.

19. THIN ELONGATED PARTICLES is the percentage by weight of aggregate that have a maximum to minimum dimension ratio of greater than 5. ASTM D4791 shall be used to determine this percentage with the results reported to the nearest 0.1 %.

Construction Data Sheet 7: Plant-Mixed Asphalt Bound Layers - Asphalt Cement Properties

This data sheet is to be filled out 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). Space is provided on the data sheet for identifying another grade of asphalt cement not appearing 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, Appendix A 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°F, 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, Appendix A. 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 8: Plant-Mixed Asphalt Bound Layers, SuperPaveTM Asphalt Binder Properties

This data sheet is to be filled out 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 PG Grade of asphalt cement used. Space is provided on the sheet to enter the upper and lower temperature ranges of the PG Grading System.

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, Appendix A 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).

5-7. DYNAMIC SHEAR RHEOMETER COMPLEX MODULUS AND PHASE ANGLE Enter the Dynamic Shear Complex Modulus to the nearest 0.01 kPa for the Tank and RTFO processed asphalts. For the Pressure Aged Vessel processed asphalts, report the Complex Modulus value to the nearest kPa. The Phase Angle shall be reported to the nearest degree.

8. BENDING BEAM RHEOMETER STIFFNESS MODULUS AND SLOPE Enter the Stiffness Modulus to the nearest MPa. The slope shall be reported to the three decimal places.

9. DIRECT TENSION TENSILE STRENGTH AND TENSILE STRAIN Enter the Tensile Stress to the nearest tenth of a kiloPascal and the percent strain to the nearest one hundredth of a percent.

Construction Data Sheet 9: Plant-Mixed Asphalt Bound Layers, Mixture Properties

This data sheet is to be filled out 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 (i.e., 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 (Ref. 19):

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

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

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 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 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 mi design and density measurements on samples from the pavement. Percent air voids is calculated as follows (Ref. 19):

$$P_a = 100\frac{G_{mm} - G_{mb}}{G_{mm}}$$

(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 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 (Ref. 19):

$$VMA = 100 - \frac{G_{mb}P_s}{G_{sb}} \tag{2.6}$$

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 (Ref. 19):

$$P_{sb} - P_{ba}P_s = \frac{G_{se} - G_{sb}}{G_{sb}G_{se}} G_bP_s \tag{2.7}$$

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 0.01 inches measured by Test Method AASHTO T245 (or ASTM D1559) for the mixture during the laboratory mix design.

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).

20. 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.

21-22. 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 10: Plant-Mixed Asphalt Bound Layers, SuperPaveTM Mixture Properties

This data sheet is to be filled out from Construction Quality Control records for the SUPERPAVE™ sections 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 (i.e., 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.

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 (Ref. 19):

$$G_{se} = \frac{100 - P_b}{\frac{100}{G_{mm}} - \frac{P_b}{G_b}} \tag{2.3}$$

$$G_{mm} = \frac{100}{\frac{P_s}{G_{se}} + \frac{P_b}{G_b}} \tag{2.4}$$

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 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 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 mi design and density measurements on samples from the pavement. Percent air voids is calculated as follows (Ref. 19):

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

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 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 (Ref. 19):

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

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 (Ref. 19):

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

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. FREQUENCY SWEEP (Complex Modulus and Phase Angle) Enter the mean Complex Modulus and Phase Angle (SHRP Designation M-003) in MegaPascals and to the nearest 0.1 degree for Phase Angle for each of the three temperatures (4°C, 20°C and 40°C).

16. UNIAXIAL STRAIN Enter the Axial Stress and percent Strain (SHRP Designation M-003) for each of the three temperatures (4°C, 20°C and 40°C) in KiloPascals and the nearest 0.01 % strain.

17. VOLUMETRIC STRAIN Enter the Confining Pressure and percent Strain (SHRP Designation M-003) for each of the three temperatures (4°C, 20°C and 40°C) in KiloPascals and the nearest 0.01 % strain.

18. SIMPLE SHEAR Enter the Axial Stress, Shear Stress and percent Strain (SHRP Designation M-003) for each of the three temperatures (4°C, 20°C and 40°C) in KiloPascals and the nearest 0.01 % strain.

19. 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.

20-21. 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 11: 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 TYPE. Enter the code shown under note 1 on the form to indicate if the subgrade structure is cut or fill.
TEST SECTION STATION NUMBER

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

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

Construction Data Sheet 12: 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. SURFACE PREPARATION PRIOR TO PLACEMENT OF OVERLAY Indicate the type of preparation treatment applied to the pavement surface of prior to placement of overlay layer.

4. TACK COAT Enter the material type code from the list provided. If other, please provide a brief description of the tack coat material.

5. TACK COAT DILUTION Enter either the dilution percentage or the mixing rate of water in emulsified asphalt cement tack coat materials. Use the following formula to compute percent dilution:

$$\textbf{Percent} = [V_{asphalt} / (V_{water} + V_{asphalt})] * 100$$

where:

V_{water} = volume of water or diluent added to unit volume of asphalt.
$V_{asphalt}$ = unit volume of asphalt used as basis of mixing.

Alternatively, the mixing rate of parts diluent (water) to parts asphalt can be specified in the space provided.

6. TACK COAT APPLICATION RATE Enter the application rate used to apply the combined tack coat mixture in gallons per square yard.

7. 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.

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

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

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

11. LAYER NUMBER Enter the layer number (consistent with Sheet 4) for the layers placed.

12. MATERIAL TYPE CLASSIFICATION CODE Enter the Material Type Classification code for the material placed. These codes are listed in Tables A.5, A.6, A.7, and A.9, of Appendix A, for surfacing materials, base and subbase materials, subgrade soils, and thin seals and interlayers, respectively.

13 NOMINAL LIFT PLACEMENT THICKNESS Enter the nominal lift thickness for each lift of material as placed to the nearest tenth of an inch.

14. TACK COAT BETWEEN LIFTS? (Y/N) Indicate whether or not a tack coat (of material listed above under line 4) was placed between the different lifts of HMA placed.

15. TRANSVERSE JOINTS STATION 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.

16. 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 occurs both within the test lane and between lanes, indicate the location of the joint within the test lane.

17. 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 16 if more room is required for comments.

Construction Data Sheet 13: Plant-Mixed Asphalt Bound Layers - 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. COVERAGES 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 tenth of an 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 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 14: Plant-Mixed Asphalt Bound Layers - Density and Profile 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.

1. NUCLEAR DENSITY MEASUREMENTS Space is provided for entry of the results of nuclear density tests on surface course, and surface fiction 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 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 15: 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 15 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 16: 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.

Construction Data Sheet 17: Unbound Aggregate Base Material Placement

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

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

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

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 16 if more room is required for comments.

Construction Data Sheet 18: 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 16 if more room is required.

Construction Data Sheet 19: 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 20. Pre-Overlay Surface Preparation Sketch

This form is used to sketch the approximate locations of pre-overlay preparation treatments applied to the test section. It should also be used to describe any discontinuities existing or treatments placed after completion of milling. The approximate location of patches, sealed cracks, leveling course, and other significant features of the surface prior to placement of the overlay layers should be sketched. On milled sections, this form only needs to be completed if patches were placed, cracks were sealed, or delaminations were present in the surface after milling. The objective is to provide a reference to the location of significant features on the test section surface prior to placement of the overlay material and those which may not have been captured by the distress survey performed prior to the start of construction.

Construction Data Sheet 21. Pre-Overlay Condition Summary

The information on this data sheet applies to asphalt concrete patches placed for preparation of the test sections as part of the rehabilitation construction operations. One data sheet should be completed for each test section. The information on this form provides a summary of the patching operations on a test section. Information on the location of patches should be sketched on Construction Data Sheet 20.

1. DATE PATCHING OPERATION BEGAN This is the date patching operation on the test section began.

2. DATE PATCHING OPERATIONS COMPLETED This is the date that placement of all patches on the test section was completed.

3. PRIMARY DISTRESS OCCURRENCE PATCHED Indicate the code number from Table A.22 for the primary, or most prevalent, distress occurrence patched. If the code descriptions provided in Table A.22 do not adequately describe the primary distress, describe the distress or occurrence being patched in the space provided. The distress terminology and definitions contained in the SHRP Distress Identification Manual should be used as a guide to distresses interpretations as appropriate.

4. SECONDARY DISTRESS OCCURRENCE PATCHED Indicate the code number from Table A.22 corresponding to the second most prevalent distress occurrence patched. If the code descriptions provided in Table A.22 do not adequately describe the primary distress, describe the distress or occurrence being patched in the space provided. The distress terminology and definitions contained in the SHRP Distress Identification Manual should be used as a guide to distresses interpretations.

5. SUMMARY OF PATCHING Summarize the number of patches placed and the area of patching by type of patch. This should include only those patches placed in the SHRP study lane.

6. METHOD USED TO DETERMINE LOCATION AND SIZES OF PATCHES Enter the code number corresponding to the primary method used to determine the location and extent of patches. Enter code 2 if a visual determination was the only method employed.

7. METHOD USED TO FORM PATCH BOUNDARY Enter the code number corresponding to the type of equipment used to form the boundary of the patch. For example, if saw cuts were made and an air hammer used to remove the material from within the patch area, then saw cuts should be indicated since they were used to form the patch boundary.

8. COMPACTION EQUIPMENT Enter the code numbers for the type of equipment used to compact the patches. Space is provided for two responses if more than one type of compaction equipment was used.

9. PATCH MATERIAL Enter the code corresponding to the general classification of material used in the surface of the patches.

10. MINIMUM TIME FROM MATERIAL PLACEMENT TO OPENING TO TRAFFIC Indicate the minimum time, to the nearest hour, from completion of placement of the patch to traffic opening.

11. MAXIMUM MATERIAL TEMPERATURE FOR TRAFFIC OPENING If opening of a patch to traffic is specified in terms of the maximum allowable temperature of the patch material, indicate the highest allowable temperature. Leave blank if temperature was not used as a criteria for opening the patched section to traffic.

12. AIR TEMPERATURE DURING PLACEMENT OPERATIONS Enter the highest and lowest air temperature, in degrees Fahrenheit, during the patching operations.

13. PREDOMINATE ROAD SURFACE MOISTURE CONDITION DURING PLACEMENT OPERATIONS Indicate the predominate moisture condition of the pavement surface during patching operations. Moist is considered as some moisture visible on the pavement surface, but the entire surface of the pavement is not wet and no standing water is present.

Construction Data Sheet 22. Rut Level-Up Treatment

This sheet is used to record information on rut level-up treatments placed in the wheel paths in the test section. If this treatment was not applied, or if the surface layer was milled, do not complete this data sheet. Note that level-up layers to compensate for transverse distortion due to rutting are limited in the SPS-9A construction guidelines to placement in the ruts only. On SPS-9A test sections a full lane width level-up layer should not be placed.

1. DATE LEVEL-UP LAYER APPLIED Enter the date the level-up layer in the ruts was applied to the test section.

2. PLACEMENT LOCATION OF LEVEL-UP LAYER Indicate if the level-up was applied in either inside rut, outside rut (relative to outside edge of study lane), or both of the ruts (channels).

3. LENGTH OF TEST SECTION COVERED Indicate the length of the test section on which the rut level-up layer was placed. If the level-up was placed over less than the full length of the test section, enter the start and end station number (test section station number) of the level-up.

4. AVERAGE RUT DIMENSIONS Enter the approximate width and depth of the inside and outside wheel path ruts in which the level up material is placed. The depth should be referenced to a 6 foot straight edge. The width should be the width over which the level-up material is placed. These should be measured at 25 foot intervals and the average of the measurements entered to the nearest tenth of an inch.

5. RUT PREPARATION PRIOR TO APPLICATION OF LEVEL-UP Enter the code number shown on the form which corresponds to the preparation treatment prior to application of the level-up material. If wheel path milling is used (inlay), then specify the depth and width of the milled trench. If other treatments, or combination of treatments, were used, provide a written description under other.

6. COMPACTION EQUIPMENT Enter the code numbers for the type of equipment used to compact the level-up material. Space is provided for two responses if more than one type of compaction equipment was used.

7. TYPE OF LEVEL-UP MATERIAL Enter the code corresponding to the type of level-up material used in the ruts. If a material not described on the form was used, provide a written description in the space provided under other.

8. MAXIMUM TOP SIZE AGGREGATE Enter the nominal maximum top size aggregate used in the level-up mixture.

9. MINIMUM TIME FROM MATERIAL PLACEMENT TO OPENING TO TRAFFIC Indicate the minimum time, to the nearest hour, from completion of level-up placement to the opening of traffic or placement of the overlay.

10. MAXIMUM MATERIAL TEMPERATURE FOR TRAFFIC OPENING If opening of a section to traffic, or placement of the overlay, is specified in terms of the maximum allowable temperature of the level-up material, indicate the highest allowable temperature. Leave blank if temperature was not used as a criteria for opening to traffic or further construction operations.

12. AIR TEMPERATURE DURING PLACEMENT OPERATIONS Enter the highest and lowest air temperature, in degrees Fahrenheit, during the placement operations.

13. PREDOMINATE ROAD SURFACE MOISTURE CONDITION DURING PLACEMENT OPERATIONS Indicate the predominate moisture condition of the pavement surface during placement operations. Moist is considered as some moisture visible on the pavement surface, but the entire surface of the pavement is not wet.

Construction Data Sheet 23. Preparation of Milled Test Sections

The information on this form applies to those test sections which are milled full lane width prior to placement of the overlay material.

1. DATE OF MILLING OPERATION Enter the date the milling operation on the test section was completed.

2. MANUFACTURER OF MILLING MACHINE Indicate the manufacturer of the milling machine.

3. MILLING MACHINE MODEL DESIGNATION Specify the model number and designation of the milling machine.

4. WIDTH OF CUTTING HEAD Enter the width of the cutting head employed on the milling machine, in inches.

5. TOTAL MILLED DEPTH Enter the measured average final milled depth to the nearest tenth of an inch. The milled depth should be measure at the outside (adjacent to the shoulder) and the inside edge (along center line or adjacent lane) of the milled area every 25 feet. Measurements should be made from the surface of the pavement adjacent to the milled surface. For surfaces with significant macro texture, the measurement should be made to the nominal bottom milled surface (bottom of valleys between peaks in the macrotexture). Enter the number of measurements, maximum, minimum and standard deviation of the measurements in the spaces provided.

MILLED SURFACE CHARACTERISTICS

6. MACRO-TEXTURE Indicate the general roughness of the macro texture. Fine macro-texture is defined as the average or typical height of the peaks (distance between valleys and peaks in the texture) in the surface being ¼ inch (6) mm or less high. Coarse macro-texture is defined as the average height of the peaks being greater than ¼ inch (6 mm).

7. ESTIMATE OF EXTENT OF TEST SECTION DELAMINATED This data item refers to delaminations in the milled surface due to chipping of two square inch or greater size chunks from the surface. This occasionally occurs when material separates from an interface between pavement layers and becomes dislodged. Estimate the extent of delamination due to milling as a percentage of the surface area in the study lane delaminated. If the extent of delaminations is great enough (>30%) or is localized, provide a sketch of the milled surface using Construction Data Sheet 20.

8. HEIGHT OF RIDGE BETWEEN PARALLEL PASSES If a less than full lane width milling machine is used, indicate the height of any longitudinal ridge remaining between parallel passes of the milling machine in the study lane, to the nearest tenth of an inch. If a distinguishable ridge does not exist, enter 0.

9. COMMENTS Describe any other significant events or features of the milling operation which may have potential impact on the performance of the overlay in the comment space provided under item 10.

10. WERE PATCHES PLACED AFTER MILLING? If patches were placed in the test section lane after the completion of milling, indicate yes. Show the approximate location and size the patches placed on Construction Data Sheet 20.

11. LENGTH OF TIME MILLED SURFACE OPENED TO TRAFFIC If the milled pavement surface was opened to traffic prior to placement of the replacement material layer, enter then length of time, in hours, it was opened to general traffic. If the milled surface was not opened to traffic, enter a 0.

12. LAYER NUMBER OF MILL REPLACEMENT Enter the layer number corresponding to the mill replacement layer.

13. NOMINAL THICKNESS OF MILL REPLACEMENT MATERIAL Enter the nominal thickness of the mill replacement layer, to the nearest tenth of an inch. On SPS-9A test sections, this should be equivalent to the average milled depth.

14. TYPE OF MILL REPLACEMENT LAYER MATERIAL Enter the generic type of asphaltic material (virgin or recycled) used in the mill replacement layer.

15. WAS ADJACENT TRAVEL LANE MILLED TO SAME DEPTH AS TEST LANE? Indicate if the adjacent travel lane was eventually milled to the same depth as the test section lane. If the lane next to the test section was not milled or not milled to the same depth as the travel lane, then indicate no and record the total width of pavement milled to the same depth as the travel lane, to the nearest tenth of a foot.

16. COMMENTS Provide any general comments pertinent to the milling operation, which may be useful in interpreting the subsequent performance of the overlay, such as unusual events, equipment problems, climatic events, etc.

Construction Data Sheet 24. Asphalt Patching of PCC Pavements

The information on this data sheet applies to asphalt concrete patches placed for preparation of the test sections as part of the rehabilitation construction operations. One data sheets should be completed for each test section. The information on this form provides a summary of the patching operations on a test section. Information on the location of patches should be sketched on Construction Data Sheet 20.

1. DATE PATCHING OPERATION BEGAN This is the date patching operation on the test section began.

2. DATE PATCHING OPERATIONS COMPLETED This is the date that placement of all patches on the test section was completed.

3. PRIMARY DISTRESS OCCURRENCE PATCHED Indicate the code number from Table A.22 for the primary, or most prevalent, distress occurrence patched. If the code descriptions provided in Table A.22 do not adequately describe the primary distress, describe the distress or occurrence being patched in the space provided. The distress terminology and definitions contained in the SHRP Distress Identification Manual should be used as a guide to distresses interpretations as appropriate.

4. SECONDARY DISTRESS OCCURRENCE PATCHED Indicate the code number from Table A.22 corresponding to the second most prevalent distress occurrence patched. If the code descriptions provided in Table A.22 do not adequately describe the primary distress, describe the distress or occurrence being patched in the space provided. The distress terminology and definitions contained in the SHRP Distress Identification Manual should be used as a guide to distresses interpretations.

5. SUMMARY OF PATCHING Summarize the number of patches placed and the area of patching by type of patch. This should include only those patches placed in the SHRP study lane.

6. METHOD USED TO DETERMINE LOCATION AND SIZES OF PATCHES Enter the code number corresponding to the primary method used to determine the location and extent of patches. Enter code 2 if a visual determination was the only method employed.

7. METHOD USED TO FORM PATCH BOUNDARY Enter the code number corresponding to the type of equipment used to form the boundary of the patch. For example, if saw cuts were made and an air hammer used to remove the material from within the patch area, then saw cuts should be indicated since they were used to form the patch boundary.

8. COMPACTION EQUIPMENT Enter the code numbers for the type of equipment used to compact the patches. Space is provided for two responses if more than one type of compaction equipment was used.

9. PATCH MATERIAL Enter the code corresponding to the general classification of material used in the surface of the patches.

10. MINIMUM TIME FROM MATERIAL PLACEMENT TO OPENING TO TRAFFIC Indicate the minimum time, to the nearest hour, from completion of placement of the patch to traffic opening.

11. MAXIMUM MATERIAL TEMPERATURE FOR TRAFFIC OPENING If opening of a patch to traffic is specified in terms of the maximum allowable temperature of the patch material, indicate the highest allowable temperature. Leave blank if temperature was not used as a criteria for opening the patched section to traffic.

12. AIR TEMPERATURE DURING PLACEMENT OPERATIONS Enter the highest and lowest air temperature, in degrees Fahrenheit, during the patching operations.

13. PREDOMINATE ROAD SURFACE MOISTURE CONDITION DURING PLACEMENT OPERATIONS Indicate the predominate moisture condition of the pavement surface during patching operations. Moist is considered as some moisture visible on the pavement surface, but the entire surface of the pavement is not wet and no standing water is present.

Construction Data Sheet 25. Partial Depth Patching Data for Pavements with Portland Cement Concrete Surfaces

This data sheet is used for reporting information on patches constructed on jointed portland cement concrete pavements within a test section. A partial depth patch consists of replacing less than the full depth of the pavement surface layer primarily to repair areas of spalling. It does not include replacing all pavement and base courses down to the subgrade.

1. DATE PATCHING OPERATIONS BEGAN This is the date on which patching operations on the test section began.

2. DATE PATCHING OPERATIONS COMPLETE This is the date on which placement of all patches on the test section was completed.

3. PRIMARY DISTRESS OCCURRENCE PATCHED Enter the code which indicates the primary reason for patching. Where patching was required for more than one reason, enter the cause resulting in the greatest area of patching. Codes appear on Table A.22 of Appendix A of the LTPP Data Collection Guide. A space is also provided for writing in a reason for which no code is provided.

4. SECONDARY DISTRESS OCCURRENCE PATCHING Enter the code which indicates the secondary reason for patches from Table A.22 of Appendix A of the LTPP Data Collection Guide.

5. PATCHES The approximate total area patched in square feet, i.e. the number of patches, and the average depth of the patches to the nearest tenth of an inch.

6. METHOD USED FOR PATCH BOUNDARY DETERMINATION Enter the appropriate code to identify the method of patch boundary determination. A space is provided on the data form to specify other methods, if used.

7. METHOD USED TO CUT BOUNDARIES Enter the appropriate code to indicate the method used for cutting the existing pavement at the patch boundary. A space is provided for entering other methods, if used.

8. METHOD USED TO BREAK UP AND/OR REMOVE DETERIORATED CONCRETE Enter the appropriate code to identify the method used to break up and/or remove the existing PCC materials. A space is provided to specify other methods, if used.

9. METHOD FOR FINAL CLEANING OF PATCH AREA Enter the appropriate code to specify the means of final surface preparation used to prepare the area to be patched.

Construction Data Sheet 26. Partial Depth Patching Data for Pavements with Portland Cement Concrete Surfaces, Continued

This data sheet is a continuation of Construction Data Sheet 25, Partial Depth Patching Data for Pavements with Portland Cement Concrete Surfaces.

1. PATCH MATERIAL USED Enter the appropriate code to identify the type of surface material used to patch the pavement. If a material other than those specified is used, it should be indicated in the space provided.

2. BONDING AGENT Enter the appropriate code to identify the material used to bond the patch material to the existing portland cement. If a material other than those specified is used, it should be indicated in the space provided.

3. MIXTURE DESIGN FOR PATCH MATERIAL The pounds per cubic yard of coarse aggregate, fine aggregate, cement, and water in the patch mixture. Coarse aggregate is aggregate retained on a No. 4 sieve.

4. MAXIMUM SIZE OF COARSE AGGREGATE The maximum size of coarse aggregate used in the patch material to the nearest tenth of an inch.

5. CEMENT TYPE USED Enter the appropriate code to identify the type of cement used in the patch mix. Types of cement and associated codes are shown in Table A.11 of the Data Collection Guide. Enter "61" for epoxy cement and "62" for polymer cement. If a cement not otherwise identified was used, enter "63."

6. AIR CONTENT The mean air content in percent by volume and range of air contents in the portland cement concrete mix to the nearest one-tenth of a percent.

7. ADMIXTURES Admixtures added to the concrete mix. Spaces are provided to list up to two types of admixtures. Codes are provided in Table A.12 of the Data Collection Guide.

8. SLUMP The mean and range of the slump for portland cement concrete patch material to the nearest tenth of an inch.

9. COMPRESSIVE STRENGTH OF PATCH MATERIAL The compressive strength of a standard cylinder of PCC patch material in psi after a certain curing time period in days. If compression tests were not performed and another strength test (such as the indirect tensile test) was performed, space is provided to identify the type of strength testing performed on the patch material, type of loading, age at testing, and measured strength. Refer to the test by AASHTO, ASTM, or agency's designation.

Construction Data Sheet 27. Partial Depth Patching Data for Pavements with Portland Cement Concrete Surfaces, Continued

This data sheet is a continuation of Construction Data Sheets 25 and 26, Partial Depth Patching Data for Pavements with Portland Cement Concrete Surfaces.

1. CURING METHOD The methods used for curing the patch material, if any. Space is provided to identify up to two methods used. Space is also provided to specify other methods that are not shown on the data form. Where only one method is used, enter code for "Method 1" and leave "Method 2" blank.

2. APPROXIMATE TIME BETWEEN PATCHING AND OPENING TO TRAFFIC The approximate time in hours after placement of materials until traffic was allowed on the patch surface.

3. AMBIENT CONDITIONS AT TIME OF PATCHING The low and high air temperatures observed during patching activities in degrees Fahrenheit, and a code to indicate whether the surface was dry or wet at the time of patching.

4. METHOD OF CONSOLIDATING MATERIAL A code to identify the means of consolidating the patch materials.

5. FINISHING METHOD A code to identify the method used to finish the patch surface.

6. JOINT FORMING METHOD The method used for forming contraction joints into the patch for longitudinal, transverse, and shoulder joints where they may be present.

Construction Data Sheet 28. Joint Resealing Data for Pavements with Portland Cement Concrete Surfaces

This data sheet is used for recording data for replacement of joint seals in PCC pavements.

1. DATE JOINT SEALANT OPERATIONS BEGAN This is the date on which joint sealant operations on the test section began.

2. DATE JOINT SEALANT OPERATIONS COMPLETE This is the date on which all joint sealant operations on the test section were completed.

3. METHOD OF REMOVING OLD SEALANT A code to identify the method used for removing the old or existing joint sealant.

4. NEW SEALANT RESERVOIR DIMENSIONS The width and depth of the sealant reservoir to the nearest tenth of an inch.

5. BOND BREAKER UNDER SEALANT A code to identify the material used to prevent an adhesive bond between the sealant and the bottom of the reservoir. Space is also provided to identify other materials or methods, if used.

6. WERE JOINTED SIDEWALLS REFACED A code to specify whether none, one, or both sidewalls were refaced during the joint resealing process.

7. CLEANING OF SIDEWALLS A code to specify the means of cleaning the sidewalls prior to resealing.

Construction Data Sheet 29. Joint Resealing Data for Pavements with Portland Cement Concrete Surfaces, Continued

This data sheet is a continuation of Construction Data Sheet 28, Joint Resealing Data for Pavements with Portland Cement Concrete Surfaces. If more than one material or method is used for different joints, repeat Sheets 28 and 29 for each type.

1. TYPE OF CONTRACTION JOINT SEALANT A code to specify the AASHTO/ASTM designation of the type of joint sealant material used. Space is also provided to enter information regarding the manufacturer and the product's specific name, if no code is provided for the joint sealant used.

2. AVERAGE DEPTH OF TOP OF SEALANT PLACEMENT The depth to the nearest tenth of an inch from the top of the slab to the top of the joint sealant material.

3. ARE EXPANSION JOINTS SEALED DIFFERENTLY THAN CONTRACTION JOINTS A code to indicate differences in sealing materials used for contraction and expansion joints. A space is provided to enter information on the material types, if used.

4. TOTAL LINEAR FEET OF JOINTS SEALED The total linear feet to the nearest tenth of a foot of joints sealed for transverse and longitudinal joints.

Construction Data Sheet 30. Crack Sealing Data for Pavements with Portland Cement Concrete Surfaces

This data sheet is used for recording data for sealing of cracks in PCC pavements.

1. DATE CRACK SEALANT OPERATIONS BEGAN This is the date on which crack sealing operations began.

2. DATE CRACK SEALANT OPERATIONS COMPLETE This is the date on which crack sealing operations were completed.

3. NEW SEALANT RESERVOIR DIMENSIONS The width and depth of the sealant reservoir to the nearest tenth of an inch.

4. BOND BREAKER UNDER SEALANT A code to identify the material used to prevent an adhesive bond between the sealant and the bottom of the reservoir. Space is also provided to identify other materials or methods, if used.

5. CLEANING OF CRACKS A code to specify the means of cleaning the cracks prior to sealing.

Construction Data Sheet 31. Crack Sealing Data for Pavements with Portland Cement Concrete Surfaces, Continued

This data sheet is a continuation of Construction Data Sheet 30, Crack Sealing Data for Pavements with Portland Cement Concrete Surfaces. If more than one material or method is used for different cracks, repeat Sheets 30 and 31 for each type.

1. TYPE OF SEALANT A code to specify the AASHTO/ASTM designation of the type of crack sealant material used. Space is also provided to enter information regarding the manufacturer and the product's specific name, if no code is provided for the crack sealant used.

2. AVERAGE DEPTH OF TOP OF SEALANT PLACEMENT The depth to the nearest tenth of an inch from the top of the slab to the top of the crack sealant material.

3. TOTAL LINEAR FEET OF CRACKS SEALED The total linear feet to the nearest 0.1 foot of cracks sealed on the test section.

Construction Data Sheet 32. Diamond Grinding for Portland Cement Concrete Pavement Surfaces

1. DATE DIAMOND GRINDING OPERATIONS BEGAN This is the date on which diamond grinding operations began.

2. DATE DIAMOND GRINDING OPERATIONS COMPLETE This is the date on which all diamond grinding operations were completed.

3. REASON FOR GRINDING Enter the code corresponding to the primary reason for grinding the pavement section. A space is provided to indicate a reason for which no code is provided.

4. AVERAGE DEPTH OF CUT The average depth of the cut in the surface material to the nearest hundredth of an inch.

5. CUTTING HEAD WIDTH The approximate width to the nearest tenth of an inch of the machine cutting head.

6. AVERAGE GROOVE WIDTH The average groove width to the nearest tenth of an inch.

7. AVERAGE SPACING BETWEEN BLADES The average spacing between the grinding blades to the nearest tenth of an inch.

Construction Data Sheet 33. Full Depth Repair for Pavements with Portland Cement Concrete Surfaces

This data sheet is used for reporting details of full depth repair, including either full depth patches or complete slab replacement, for pavements with PCC surfaces.

1. DATE PATCHING OPERATIONS BEGAN This is the date on which patching operations on the test section began.

2. DATE PATCHING OPERATIONS COMPLETE This is the date on which placement of all patches on the test section was completed.

3. PRIMARY DISTRESS OCCURRENCE PATCHED OR REPLACED WITH NEW SLAB A code for indicating the primary reason for patching or slab replacement. If patching or slab replacement was required for more than one reason, enter the cause resulting in the greatest repair area. Codes appear in Table A.22 of Appendix A of the SHRP-LTPP Data Collection Guide and space is provided for writing in a reason for which no code is provided.

4. SECONDARY DISTRESS OCCURRENCE PATCHED OR REPLACED WITH NEW SLAB A code for indicating a second reason for patching or slab replacement.

5. PATCHES The number and area in square feet of patches placed. Quantities shall be recorded separately for patches of slab only and for patches of the slab combined with base replacement.

6. PATCH MATERIAL USED A code entered to record the type of surface material used to patch the pavement. If a material other than those specified is used, it should be described in the space provided.

7. SLABS REPLACED The number and area in square feet of slabs replaced. Quantities shall be recorded separately for slab replacement only and for replacement of both the concrete slab and base layers.

8. METHOD FOR PATCH BOUNDARY DETERMINATION A code to indicate the means of determining the extent of the area to be patched, or whether slabs should be replaced. Space is provided to describe other methods for which a code was not provided.

9. CUTTING INSTRUMENT A code to specify the instrument used to cut the boundaries of the are to be patched.

Construction Data Sheet 34. Full Depth Repair Data for Pavements with Portland Cement Concrete Surfaces, Continued

This data sheet is a continuation of Construction Data Sheet 33, Full Depth Repair Data for Pavements with Portland Cement Concrete Surfaces.

1. SECURING LOAD TRANSFER DEVICES A code to indicate the material used to grout or epoxy load transfer devices into drilled or preformed holes. Space is provided to enter material other than those specified on the data sheet.

2. REINFORCING STEEL PLACED IN PATCH A code to indicate whether the patched area contains reinforcing steel or not.

TEMPERATURE STEEL

3. REBAR NUMBER The rebar numbers of the longitudinal and transverse bars or wire mesh (tied or untied to old reinforcement) for temperature steel, dowel bars, and tie bars in the full-depth repair. If either longitudinal or transverse bars were not used, the appropriate spaces may be left blank for these and the next three items.

4. BAR LENGTHS The lengths of longitudinal and transverse bars or wire mesh, to the nearest tenth of an inch.

5. BAR SPACINGS The approximate center-to-center spacings of adjacent longitudinal and transverse bars or wire mesh, to the nearest tenth of an inch.

DOWEL AND TIE BARS

6. REBAR NUMBER The rebar numbers of the longitudinal and transverse dowel and tie bars, and tie bars in the full-depth repair. If either longitudinal or transverse bars were not used, the appropriate spaces may be left blank for these and the next three items.

7. BAR LENGTHS The lengths of longitudinal and transverse dowel and tie bars to the nearest tenth of an inch.

8. BAR SPACINGS The approximate center-to-center spacings of adjacent longitudinal and transverse bars to the nearest tenth of an inch.

9. DOWEL COATINGS Codes to record the coatings used on longitudinal and transverse dowel bars. If dowel bars were not used, leave this space blank.

10. NUMBER OF SAW CUTS The number of saw cuts required per patch, if any.

11. DEPTH OF TYPICAL BOUNDARY SAW CUT The depth, to the nearest tenth of an inch, of the average boundary saw cut.

12. CONCRETE BREAKUP A code to specify the means of breaking up the existing concrete to be removed.

13. REMOVAL OF CONCRETE A code entered to indicate the method of material removal from the area patched.

Construction Data Sheet 35. Full Depth Repair Data for Pavements with Portland Cement Concrete Surfaces, Continued

This data sheet is a continuation of Construction Data Sheets 33 and 34, Full Depth Repair Data for Pavements with Portland Cement Concrete Surfaces.

1. METHOD OF REINFORCING STEEL PLACEMENT A code to indicate the means of placing the reinforcing steel. If reinforcing steel is not included, this space should be left blank.

2. MIXTURE DESIGN FOR PCC PATCH MATERIAL The pounds per cubic yard of coarse aggregate, fine aggregate, cement, and water in patch mixture. Coarse aggregate is the portion retained on the No. 4 sieve.

3. CEMENT TYPE USED Enter the appropriate code to identify the type of cement used in the patch mix. Types of cement and associated codes are provided in Table A.11 of

the Data Collection Guide. Enter "61 for epoxy cement and "62" for polymer cement. If a cement not otherwise identified was used, enter "63."

4. AIR CONTENT The mean air content and range of the measured values (in percent by volume) in the portland cement mix, to the nearest 0.1 percent.

5. ADMIXTURES Admixtures added to the PCC mix. Spaces are provided to list up to two types of admixtures. A list of admixtures is provided in Table A.12, Appendix A of the SHRP-LTPP Data Collection Guide.

6. SLUMP The mean slump and the range (minimum and maximum measured value) for portland cement concrete patch material, to the nearest tenth of an inch.

7. FLEXURAL STRENGTH (MODULUS OF RUPTURE) The mean flexural strength of the portland cement concrete mix used in the patch in psi, based on third point loading (ASTM C78), and the number of days the beam was cured before testing. If third-point beam tests were not performed and another strength test (such as compressive or splitting tensile tests) was performed, space is provided to identify the type of strength testing performed on the concrete mixture, the type of loading, age at testing, and measured strength. Refer to the test by AASHTO, ASTM, or agency's designation.

8. AMBIENT CONDITIONS AT TIME OF PATCHING The low and high air temperature observed during patching activities in degrees Fahrenheit, and a code to indicate whether the surface was dry or wet at the time of patching.

9. MAXIMUM SIZE OF COARSE AGGREGATE The maximum size of the coarse aggregate in the patch material to the nearest tenth of an inch.

10. CONSOLIDATION OF MATERIALS A code to indicate the means of consolidating the patch materials into the area patched.

11. FINISHING A code to indicate the means of finishing the surface of the patched area or new slab. Where a method other than one of those specified was used, it should be indicated in the space provided.

Construction Data Sheet 36. Full Depth Repair Data for Pavements with Portland Cement Concrete Surfaces, Continued

This data sheet is a continuation of Construction Data Sheets 33, 34, and 35, Full Depth Repair Data for Pavements with Portland Cement Concrete Surfaces.

1. JOINT FORMING METHOD Codes to identify the method of forming contraction joints in the shoulder, transverse direction, and longitudinal direction. Space is provided to identify a method other than those listed.

2. WAS BOND BREAKER USED BETWEEN ADJACENT LANES A code to indicate whether a bond breaker was used to prevent bonding of the new patch to the adjacent lane.
3. CURING METHOD Codes to indicate one or two methods of curing the patch materials. A space is provided to specify a method other than one of those listed. If only one method was used, leave "Method 2" blank.

4. APPROXIMATE TIME BETWEEN PATCHING AND OPENING TO TRAFFIC The approximate time, in hours, the patch materials were allowed to cure prior to allowing traffic on the surface.

5. TYPE OF TRANSVERSE JOINTS IN PATCHES OR SLABS Codes to indicate the type of joints adjacent to or in patches or new slabs, respectively, include expansion joints, contraction joints, or a mixture of the two. Leave code for patches blank if no patches were adjacent to or include joints. Leave code for slabs blank if no full slabs were replaced.

6. WERE OLD JOINTS MATCHED A code to indicate whether joints in the patch were matched with the existing joints in the pavement.

Construction Data Sheet 37. Load Transfer Restoration Data for Pavement with Portland Cement Concrete Surfaces

This data sheet is used for describing work to restore load transfer across joints in an existing jointed concrete pavement.

1. DATE LOAD TRANSFER RESTORATION BEGAN This is the date on which load transfer restoration operations on the test section began.

2. DATE LOAD TRANSFER RESTORATION COMPLETE This is the date on which load transfer restoration of all required joints on the test section was completed.

3. NUMBER OF JOINTS IN TEST SECTION The total number of joints in the test section.

4. NUMBER OF LOAD TRANSFER RESTORATION LOCATIONS The total number of joints where load transfer restoration was performed.

5. NUMBER OF DEVICES PER JOINT The number of load restoration devices installed per joint.

6. LOCATION OF DOWELS OR SHEAR DEVICES The average distances (to the nearest inch) from the outer lane edge to the center of the load transfer device, for up to fourteen devices.

7. DIAMETER OF RETROFIT DOWEL BARS The average dowel bar diameter to the nearest 0.01 inch, if dowel bars are installed. The dowel bar diameter shall be greater than or equal to 1 ½ inch (38 millimeters).

8. MATERIAL USED TO BACKFILL SLOT/CORE HOLE A code to identify the type of material used to backfill around the load transfer restoration device.

9. BONDING AGENT USED BETWEEN EXISTING PCC AND BACKFILL MATERIAL A code to identify the material used to bond the backfill material to the existing PCC pavement.

Construction Data Sheet 38. Load Transfer Restoration Data for Pavements With Portland Cement Concrete Surfaces, Continued

This data sheet is a continuation of Construction Data Sheet 37, Load Transfer Restoration Data for Pavements with Portland Cement Concrete Surfaces. This data sheet is used to report information on the joint load transfer efficiency measurements made both before and after treatment. The procedures for performing the necessary deflection testing using a Falling Weight Deflectometer are contained in the "Manual for FWD Testing in the Long Term Pavemetn Performance Study, Operational Field Guidelines".

1. LOAD TRANSFER EFFICIENCY BEFORE AND AFTER RESTORATION The load transfer efficiencies are recorded in the outer wheel path (approximately 30 inches from the edge of the traveled lane for transverse joints) at a maximum of 10 joints. Entries for point distance will be the same for each of the three separate tests (deflection basin at the center of the slab, deflection transfer on the approach side of the joint and deflection transfer on the leave side of the joint) performed at a particular joint. Tests are to be conducted before and after restoration at the same joints.

Load Transfer Efficiency (LTE) is calculated as follows:

$$LTE = A * \frac{\delta_{ul}}{\delta_l} * 100$$

where:

LTE = percent load transfer

A = 1 if $X \leq 12$ inches.

$A = \delta_o/\delta_x$ if $X > 12$ inches.

X = distance between deflection measurements δ_o and δ_x, and δ_l and δ_{ul}, inches (it is preferred that $X \leq 12$ inches)

δ_o = center load deflection for midslab test (at same load level as δ_l).

δ_x = midslab deflection measured X distance from δ_o.
δ_l = center load deflection for test at edge of crack or joint.
δ_{ul} = deflection of the surface of the unloaded slab X distance from δ_l.

(Note: The purpose for including the center of slab deflections is to adjust the measurements at the joint for natural slab bending. This is believed to provide a more realistic value for load transfer efficiency.)

The FWD measurements are not to be obtained when the temperature is greater than 77°F as the joints and cracks are likely to be closed tightly and high load transfer will typically be measured.

It is preferable to make FWD measurements within six months after load transfer restoration is completed.

2. DATE OF LOAD TRANSFER EFFICIENCY TESTS Provide day, month, and year (last two digits) when tests were conducted, before and after the load restoration.

Construction Data Sheet 39. Undersealing Data for Pavements with Portland Cement Concrete Surfaces

This data sheet is used for reporting information on undersealing operations performed on an existing pavement.

1. DATE UNDERSEALING BEGAN This is the date on which undersealing operations on the test section began.

2. DATE UNDERSEALING COMPLETE This is the date on which all undersealing operations on the test section were completed.

3. TYPE OF MIXTURE USED IN UNDERSEALING A code to identify the type of material used to underseal the pavement.

4-8. MIX DESIGN OF PORTLAND CEMENT GROUT Spaces are provided to record mix design information for a portland cement grout used to underseal the pavement. This includes type of cement, the ratio of cement to sand by weight, the water/cement ratio by weight, additive type (enter "N" if none is used), and amount of additive in percent by weight of cement.

9. FLUIDITY OF PORTLAND CEMENT GROUT The fluidity of the grout, to the nearest 0.2 seconds, as measured by Test Method ASTM C939-81.

10. CUBE COMPRESSIVE STRENGTH OF PORTLAND CEMENT GROUT The compressive strength of 2 inch cube specimens as measured by Test Methods AASHTO T106 or ASTM C109 in psi.

11. CURING PERIOD FOR PORTLAND CEMENT GROUT Number of days for which the grout cubes were cured before compressive strength testing by Test Methods AASHTO T106 or ASTM C109 was performed.

12. DETERMINATION OF AREA TO BE UNDERSEALED A code to record the means for determining the required areal extent of the undersealing efforts. Codes are provided on the data sheet.

Construction Data Sheet 40. Undersealing Data for Pavements with Portland Cement Concrete Surfaces, Continued

This data sheet is for continuation of Construction Data Sheet 39, Undersealing Data for Pavements with Portland Cement Concrete Surfaces.

1. DEPTH OF UNDERSEALING HOLE FROM TOP OF THE SLAB The thickness of the slab at the subsealing hole to the nearest tenth of an inch.

2. MAXIMUM ALLOWABLE PUMPING PRESSURE The maximum pumping pressure allowable during subsealing to the nearest psi.

3. MAXIMUM SURGE PRESSURE The maximum surge pressure allowed to initiate undersealing to the nearest psi.

4. SLABS IN TEST SECTION For jointed concrete pavements record the number of slabs in the test section (to the nearest whole number) and the number of slabs undersealed.

5. AVERAGE NUMBER OF HOLES PER SLAB UNDERSEALED The average number of holes per slab in the jointed concrete test sections that were undersealed.

6. TYPICAL NUMBER OF UNDERSEALING HOLES NEAR JOINT OR CRACK The average number of undersealing holes per slab within one 18 inches of a joint or crack.

7. AVERAGE VOLUME OF MATERIAL PUMPED PER HOLE The average volume of pumped material per hole, to the nearest 0.1 cubic feet.

8. MONITORING OF LIFT Code to identify the method used for monitoring the undersealing work and amount of lift. A space is provided for describing a method other than those listed.

9. TYPICAL TIME BETWEEN UNDERSEALING AND REOPENING TO TRAFFIC The approximate time in hours between the time of subsealing and allowing traffic over the project.

10. WERE DEFLECTION MEASUREMENTS TAKEN BEFORE AND AFTER UNDERSEALING A code to identify whether or not deflection measurements were taken before and/or after undersealing.

11. TIME OF DAY WHEN DEFLECTION MEASUREMENTS WERE CONDUCTED Provide the hour of the day at which the deflection measurements started and ended, for measurements before and after undersealing, in military time. If measurements were taken for more than one day, enter earliest starting time and latest ending time.

Construction Data Sheet 41. Subdrainage Retrofit Data for Pavements with Portland Cement Concrete Surfaces

This data sheet used is for reporting information on subdrainage systems installed in an existing pavement.

1. DATE SUBDRAINAGE PLACEMENT BEGAN This is the date on which subdrainage installation on the test section began.

2. DATE SUBDRAINAGE PLACEMENT COMPLETE This is the date on which subdrainage installation on the test section was completed.

3. TYPE OF DRAINAGE PIPE A code to record the type of pipe used as subdrains. A space is provided for entering a type other than those listed. If the drainage system does not employ pipes, enter "9".

4. DIAMETER OF PIPE The diameter or width of the subdrain pipe to the nearest tenth of an inch. If the drainage system does not employ pipes, leave blank.

5. DEPTH OF PIPE BELOW TOP OF PAVEMENT SURFACE The average depth from the top of the pavement surface to the top of the subdrain pipe, to the nearest tenth of an inch. If the drainage system does not employ pipes, leave blank.

6. HORIZONTAL PLACEMENT OF PIPE FROM OUTER EDGE OF PAVEMENT The approximate horizontal distance between the edge of the full depth pavement surface and the centerline of the subdrain pipe, to the nearest tenth of an inch. If the drainage system does not employ pipes, leave blank.

7. TYPE OF PRIMARY FILTER USED A code to identify the type of primary filter material used to prevent clogging of the drain.

8. MAXIMUM PARTICLE SIZE OF PRIMARY FILTER MATERIAL If the primary filter material is granular in composition, enter the maximum aggregate size used, to the nearest tenth of an inch.

9. GRADATION OF THE PRIMARY FILTER MATERIAL If the primary filter material is granular in composition, enter the gradation of the filter material expressed in terms of percent by weight passing each of four listed standard sieve sizes.

10. PERMEABILITY OF PRIMARY FILTER MATERIAL The average permeability of the primary filter material in feet per day.

11. TYPE AND LOCATION OF SECONDARY FILTER MATERIAL A code to record the use of a secondary filter material, if applicable.

12. AVERAGE OUTLET INTERVAL The approximate average distance in feet between adjacent subdrainage outlets.

13. PRIMARY PURPOSE OF SUBDRAINAGE INSTALLATION A code to identify the primary reason for which subdrains were installed.

GPS INVENTORY DATA SHEETS

It is essential that the data sheets contained in Chapter 2, Inventory Data Collection for LTPP, of the LTPP Data Collection Guide be completed for the project site. Also, Sheet 1 of Chapter 6, Maintenance Data Collection, of the Guide should be completed as appropriate to report historical maintenance treatments on the project.

Tables 5 and 6 listed the inventory and maintenance data sheets that should be completed for rehabilitation SPS-9A test sites on HMA and Portland Cement Concrete pavements, respectively.

Since the inventory data reported on these forms are primarily project level data, i.e., related to all test sections on the site, "00" should be used for the last two digits (furthest to the right) of the SHRP SECTION ID number on these forms. The two digits, furthest to the left, of the SHRP SECTION ID number on the GPS data forms should be the SPS PROJECT CODE. However, when test section-specific information is reported, the appropriate test section number should be entered on the data sheet.

The following inventory data sheets shall be completed, if applicable, following the guidelines for the GPS test sections except as noted.

Sheet 1	Project and section identification. All location information should be referenced to the starting point (station 0+00) of the first test section encountered in the direction of travel on the project.
Sheet 2	Geometric, Shoulder and Drainage Information
Sheet 3	Layer Descriptions. Complete a separate layer table for each test section. See note below on project level layering method.
Sheet 4	Age and Major Pavement Improvements
Sheet 5	Portland Cement Concrete Layers Joint Data
Sheet 6	Portland Cement Concrete Layers Joint Data (continued)
Sheet 7	Portland Cement Concrete Layers Reinforcing Steel Data
Sheet 8	Portland Cement Concrete Layers Mixture Data
Sheet 9	Portland Cement Concrete Layers Mixture Data (continued)
Sheet 10	Portland Cement Concrete Layers Mixture Data (continued)
Sheet 11	Portland Cement Concrete Layers Strength Data
Sheet 12	Plant Mixed Asphalt Bound Layers Aggregate Properties

Sheet 13	Plant Mixed Asphalt Bound Layers Aggregate Properties (continued)
Sheet 14	Plant Mixed Asphalt Bound Layers Asphalt Cement Properties
Sheet 15	Plant Mixed Asphalt Bound Layers Asphalt Cement Properties (continued)
Sheet 16	Plant Mixed Asphalt Bound Layers Original Mixture Properties
Sheet 17	Plant Mixed Asphalt Bound Layers Original Mixture Properties (continued)
Sheet 18	Plant Mixed Asphalt Bound Layers Construction Data
Sheet 19	Unbound or Stabilized Base or Subbase Material Description
Sheet 20	Unbound or Stabilized Base or Subbase Material Description (continued)
Sheet 21	Subgrade Data
Sheet 22	Subgrade Data (continued).

On sheets 21 and 22, enter the properties of the most predominant subgrade type, i.e. subgrade type upon which the majority of test sections are located. In cases where a known variation in the subgrade along the project occurs, these data sheets should be completed as "section specific data" for each test section.

Sheet 1, Historical Maintenance Information, from Chapter 6, Maintenance Data Collection, of the LTPP Data Collection Guide should be completed to the extent possible by the participating highway agency, and if possible, a separate sheet should be completed for each test section on the project. The SPS PROJECT CODE and TEST SECTION NUMBER should be used as the SHRP SECTION ID number on this data sheet. If available historical maintenance information does not specifically address maintenance of each test section, then Sheet 1 should be completed to the extent possible using a "00" code for the last two digits of the SHRP SECTION ID number to indicate that the information represents project level data. As complete history of the maintenance activity on each test section is of importance, every effort should be made to obtain this information.

Detailed information on maintenance activities performed prior to the start of construction on the SPS test sections, if available, should be reported on other pertinent data sheets contained in Chapter 6 of the LTPP Data Collection Guide.

This chapter provides data sheets and instructions for their use in collecting inventory data that should remain essentially constant over the monitoring period (unless the pavement is rehabilitated). Exceptions are material properties which change over time, such as asphalt concrete stiffness, in situ strength, and moisture content of base, subbase, and subgrade materials.

These properties may be monitored on selected projects on a more frequent basis. The inventory data sheets appear in numerical sequence at the end of this chapter.

The inventory data sheets are those from the original LTM Data Collection Guide, modified to reflect evolution in planning for long-term monitoring of pavements. This was done partially to maintain some consistency with the LTM pilot study data bases, but primarily to take advantage of the work already accomplished for the FHWA during the LTM studies, and during studies for NCHRP Project 1-19.

The data sheets provide for collection of detailed information on variability of materials and layer thicknesses, as such variability is known to contribute heavily to pavement deterioration. It is recognized that replicate test data is often unavailable, so single test results in these cases should be entered as the mean and other values left blank. However, whenever possible, data on variability should be obtained.

Data for a particular LTPP test site may not be available for the specific 500 foot section being monitored. Usually the data for a test site is available as part of a larger construction project that includes the 500 foot test section being monitored. An example is that a LTPP test site is within a long section of road that was constructed in one mile increments, in which case the data items should be taken from the one mile section records. When the section's record are not available, information for these sections should come from the State Highway Agency's records such as Project Notes, As-Built Plans, Construction Diary, Project Files (Design/Construction Plans, etc.) and the state's standards or Standard Practices used at the time of construction.

As discussed previously, spaces are provided for a broad array of data elements, but it is recognized that much of the data will not be available. However, available data should be entered (even data that is not identified as minimum) and every effort should be taken to obtain data indicated by an asterisk (*). When the data element is not applicable to or represents something that does not exist on the test section (i.e., reinforcement data for a plain concrete pavement), enter an "N" to indicate that the data element is not applicable. If the data element is applicable, but the value is unknown (i.e., not available in project records), enter a "U" to indicate that the value is unknown. Many data items will require codes to be entered. Unless otherwise noted in the following instructions, the codes are listed or referenced on the data sheets.

Data Section Common for All Data Sheets

A common set of project identification data appears in the upper right hand corner of every data sheet. These data items are described below.

State Assigned ID

The State assigned ID is an identification number assigned by the State Highway Agency (SHA) used solely to facilitate filing of the projects for the SHA's convenience, and may be cross-referenced with the construction project number. A State Highway Agency can use any system for assigning these identification numbers.

State Code

The State code is a number used to identify the state or Canadian province in which the pavement section is located (see Table A.1, Appendix A for codes).

SHRP Section ID

The SHRP section ID is a four-digit identification number assigned by SHRP. This number is used to facilitate the computer filing of the projects and will identify the section in the field. It will be cross- referenced with the State assigned ID.

Sheet 1 Project and Section Identification

This data sheet is to be filled out from project records for each test section for which long-term monitoring is planned.

1. Date of Data Collection or Update A set of numbers to identify the month and year in which the 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 (83 for 1983, etc.).

2. State Highway Agency (SHA) District Number A number used to identify the SHA district in which the pavement test section is located.

3. County or Parish A 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". Canadian agencies should write the county name on the sheet (these will be entered into the records later).

4. Functional Class A number used to identify the functional classification of the highway for which the pavement section is a sample (see Appendix A, Table A.2).

5. Route Signing A numeric code to identify the designation that precedes the number of the highway where the SHA project is located (e.g., an interstate highway would be coded as 1, per code on Sheet 1).

6. Route Number The number assigned to the highway where the SHA project is located (e.g., I-280).

7. LTPP Experiment Code A code indicating which of the nine General Pavement Studies (GPS) experiments described in Table A.3, Appendix A for the LTPP program that the pavement section fits. If not part of the LTPP GPS, the experiment type may be entered as "00." Other codes may be introduced later for Specific Pavement Studies (SPS).

8. Type of Pavement A code identifying the general type of pavement structure (such as asphalt concrete pavement with granular base, jointed plain concrete pavement, etc.) The pavement type codes are listed in Appendix A, Table A.4.

9. Number of Through Lanes A number indicating the total number of through lanes (exclusive of ramps and access roads) in the direction of travel.

10. Direction of Travel The general direction of traffic flow along the entire route which includes the test section.

11. Section Location Starting Point The locations of the starting point of the test section are to be identified by milepoint, elevation, latitude, and longitude.

    Milepoints 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 hundredth of a mile. Canadian agencies should convert kilometer points to milepoints.

12. 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.

13-14. Latitude and Longitude (North and West, respectively) are to be given in degrees, minutes, and seconds to the nearest hundredth of a second when this type of accuracy is possible. This value may be improved at a later date through the use of advanced methods.

15. Space is provided to enter *Additional Location Information* (*Significant Landmarks*). This type of information will be useful for field crews locating the project during monitoring activities.

16. HPMS Sample Number This is 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.

17. HPMS Section Subdivision A 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.

Sheet 2 Geometric, Shoulder, and Drainage Information

The data to be entered on this data sheet may be obtained from as-built plans and/or project files, but values should be checked at the site whenever possible through visual observation.

1. Lane Width The width of the lane to be monitored, to the nearest whole number of feet.

2. Monitoring Site Lane Number A 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 A code indicating whether the subsurface drainage is continuous along the section or was provided at intermittent locations. Enter "N" if no subsurface drainage is provided.

4. Subsurface Drainage Type A 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.

   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 Codes indicating the type of shoulder surfaces for the outside and inside shoulders. See Appendix A, Table A.5 for codes (same codes as pavement surface).

6. Total Width The total (paved and unpaved) widths of the outside and inside shoulders to the nearest whole number of feet.

7. Paved Width The paved widths of the outside and inside shoulders to the nearest whole number of feet.

8. Shoulder Base Type Codes identifying the types of base material used in the shoulders (See Table A.6, Appendix A for codes).

9. Shoulder Surface Thickness The average thicknesses of the inside and outside shoulder surfaces to the nearest tenth of an inch.

10. Shoulder Base Thickness The average base thicknesses along the shoulders to the nearest tenth of an inch.

    Additional Data for PCC Shoulders Spaces are provided for entering joint and reinforcing data for shoulders with PCC surfaces.

11. Average Joint Spacing Average joint spacing for PCC shoulders to the nearest whole foot. If joints were not provided, enter "N".

12. Skewness of Joints The average deviation of the contraction joint across the shoulder from a right angle with the edge. This is measured in feet to the nearest tenth. If joints are not skewed, enter "N".

13. Joints Match Pavement Joints? Codes to indicate whether the joints in the shoulder were constructed to match the joints in the adjacent pavement slab.

14. Reinforced? Codes to indicate whether the PCC shoulder slab is reinforced or not.

15. Diameter of Longitudinal Drainpipes The inside diameter to the nearest tenth of an inch of the longitudinal drainpipes used for subsurface drainage. If there is no longitudinal drainage, enter "N".

16. Spacing of Laterals The average spacing in feet for subdrainage laterals. Enter "N" if there are no subdrainage laterals.

Sheet 3 Layer Descriptions

This data sheet is to be filled out from project records for each test section for which long-term monitoring is planned. As all subsequent data sheets refer back to this one, special care should be taken in filling it out.

1. Layer Numbers Nine or fewer layers may be identified, with Number 1 as the subgrade and the last number identifying the surface layer.

2. Layer Description A layer description code is to be entered for each of the layers in the system. For Hot Mixed Asphalt Concrete (HMAC) layers, separate lifts having the same mixture are not to be identified as separate layers. Where HMAC is used as a base for PCC pavement, it should be described by Code 05.

   Many highway agencies cover poor subgrade soils with one to three feet of select material. Such an embankment should be reported as a subbase, Code 06.

3. Material Type Classification A code identifying the type of materials in each layer of the pavement structure, including the subgrade should be entered for material type classification. Codes for surfacing materials, base and subbase materials, subgrade soils, and thin seals and interlayers are identified in Tables A.5, A.6, A.7, and A.8, respectively. Embankment fill (Layer Description Code 11) refers to nonselect or select fill used to build up the roadbed, and appropriate codes are to be used to identify the materials.

4. Layer Thickness Four numbers can be provided to indicate the minimum, maximum, mean, and standard deviation of thickness for each specific layer in inches (enter to the nearest tenth of an inch). If only a single specified design value for thickness is available from project records, enter it as the "mean value". For SHRP LTPP, a number of bore holes will be made for sampling materials, so careful thickness measurements are to be made, and the mean thickness will be verified or revised and variability information added as a result of these field measurements. See Appendix B for standard deviation equation. (Detailed data is not to be filled out on subsequent data sheets for seal coats, interlayers, porous friction courses or HMAC layers 0.75 inch or less in thickness).

5. Layer Type A letter code to indicate the set of data sheets required to be filled out for a particular layer should be entered for layer type. This data item is meant to be used purely for the convenience of the person(s) filling out the data forms to avoid potential confusion over which data sheets are required for a given project. Layer type codes and the descriptions of required sheets are shown in Note 4 on the data sheet.

6. Depth Below Surface to "Rigid" Layer A number should be entered to indicate the mean depth from the pavement surface to the top of a relatively rigid rock, stone, or dense shale formation (enter to nearest tenth of a foot). If such a formation does not exist, enter "N" in the space provided. If such a layer was not encountered at the depths bored, or it is not known whether it exists or not, enter a "U" for unknown.

Sheet 4 Age and Major Pavement Improvements

This data sheet is to be filled out from project records for each test section for which long-term monitoring is planned.

1. Date of Latest (Re)Construction Month and year in which construction or reconstruction (if any was done) of the pavement to be monitored was completed. The first two digits represent the numerical sequence of the month as it occurs during the year and the second two digits are the last two digits in the year.

2. Date Subsequently Opened to Traffic The month and year that the pavement was originally opened to traffic (not the date when project was accepted). The first two digits represent the numerical sequence of the month as it occurs during the year and the second two digits are the last two digits in the year.

3. Latest (Re)Construction Cost Per Lane Mile The total average original construction or reconstruction cost in thousands of dollars per lane-mile for the project that includes the test section, exclusive of non-pavement costs such as bridges, culverts, lighting, and guard rails. This cost is to be reported as a cost indexed to the year reported in the data entry for "Date of Latest (Re)Construction".

   Major Improvements Since Latest (Re)Construction Space is provided for identifying six major improvement activities by year in which they were accomplished. This does not include bridges, culverts, lighting, etc.

4. Year The last two digits of the year in which the major improvement occurred.

5. Work Type Code A code to identify the type of maintenance work accomplished (Appendix A, Table A.17).

6. Work Quantity The quantity of work in appropriate units (refer to Table A.17 for units).

7. Thickness For improvements that increase the thickness of the pavement structure (such as "surface treatment, single layer" or a "surface treatment, double layer", etc.), enter thickness to the nearest tenth of an inch.

8. Total Cost The costs for the major improvements, exclusive of non-pavement costs, reported in thousands of dollars per lane- mile.

   Additional Roadway Widening Information The following data items are applicable only if the roadway has been widened.

9. Year when Roadway Widened The last two digits in the year (82 for 1982, etc.) when the roadway was widened. If the roadway has not been widened, enter "N".

10. Original Number of Lanes The original number of lanes in the survey direction prior to roadway widening. If the roadway has not been widened, enter "N".

11. Final Number of Lanes The final number of lanes after the roadway has been widened. If the roadway has not been widened, enter "N".

12. Lane Number of Lane Added Lane number added when roadway was widened. The outside lane is Lane 1, the next lane is Lane 2, etc. If the roadway has not been widened, enter "N".

Sheet 5 Portland Cement Concrete Layers, Joint Data

This sheet is filled out from project records for each PCC layer identified on Sheet 3, except for continuously reinforced concrete pavements (CRCP) without joints. Where dowels or other mechanical load transfer devices are not provided at joints, enter "N" in the spaces for describing these devices.

1. Layer Number The portland cement concrete layer for which a description is provided (from Sheet 3).

2-3. Average Contraction Joint Spacing The average spacing in feet (to the nearest tenth of a foot) between consecutive contraction joints (length of the concrete slab) of the pavement under survey. A space is provided to write in a description of any Random Joint Spacing.

4. Built-in Expansion Joint Spacing The mean spacing in feet between consecutive expansion joints of the pavement under survey. If there are no expansion joints in the original construction, enter "N".

5. Skewness of Joints The average deviation of the contraction joint across the slab from a right angle with the edge, measured in feet per lane. If joints are not skewed, enter "N".

6. Transverse Contraction Joint Load Transfer System The mechanism by which a portion of the moving load is transferred across the transverse contraction joint to the adjacent slab. A space is provided to write in a description of another load transfer system if different from those for which codes are provided.

7. Round Dowel Diameter The outer diameter of the round dowel bars used as the load transfer device across a contraction joint of the pavement under survey. This number is to be entered to the nearest hundredth of an inch.

8. Dowel or Mechanical Load Transfer Device Spacing The average center-to-center distance in inches between mechanical load transfer devices (round or I-beam dowels, star lugs, etc.) across the contraction joint of the PCC layer being described.

9. Average Intermediate Sawed Joint Spacing The average distance between joints that have been sawed at intervals between contraction joints (called "warping joints" by some SHAs) for jointed reinforced concrete pavements. The distance is to be entered to the nearest tenth of a foot. If no intermediate sawed joints have been provided, enter "N".

10-11. Dimensions for I-Beam Dowel Bars The Height and Width of I-beam dowel bars to the nearest hundredth of an inch. If I-beam dowel bars were not used, enter "N".

12. Distance of Nearest Dowel (or Mechanical Load Transfer Device) From Outside Lane-Shoulder Edge The distance of the nearest dowel or mechanical load transfer device from the outside lane-shoulder edge to the nearest tenth of an inch.

13. Dowel Length The mean length in inches of the round or I-beam dowel bars across contraction joints in the PCC layer being described.

14. Dowel Coating The material covering the dowel bar surfaces when installed in the concrete slab. A space is provided to write in a description if some dowel coating was used other than those for which codes are provided.

15. Method Used to Install Mechanical Load Transfer Devices The method used to install the dowels, I-beams, or other mechanical load transfer device. Space is provided for describing another method if the method used differs from those for which codes are provided.

Sheet 6 Portland Cement Concrete Layers, Joint Data (continued)

This sheet is for continuation of Sheet 5 to provide additional information on the joints in a PCC layer, and is filled out for each PCC layer identified on Sheet 3, except for CRCP pavements without joints. These additional data items are described below.

1. Layer Number The portland cement concrete layer for which a description is being provided (from Sheet 3).

2. Method Used to Form Transverse Joints A code is entered which describes whether the contraction joints were constructed by sawing the hardened slab at the proper time, or by placing an insert in the slab surface while the concrete is plastic, or by any other construction method used to form the joint. Space is provided for describing another method if none of those for which codes were provided was used.

3. Type of Longitudinal Joint A code is entered which indicates how the longitudinal joint between the lanes was formed. Space is provided for describing another way of forming the joints if none of those for which codes are provided was used.

4. Type of Shoulder-Traffic Lane Joint A code is entered which describes how the joint between the concrete shoulder and the traffic lane was formed. "Tied concrete curb" indicates that a curb was provided in lieu of a shoulder. Space is provided for describing another way of forming the joints if none of those for which codes are provided was used.

5. Transverse Joint Sealant Type The type of joint sealant used in the transverse joints. Space is provided for describing another type of sealant if none of those for which codes were provided was used.

6-7. Transverse Joint Sealant Reservoir The mean as-constructed Width and Depth of the transverse joint sealant reservoir to the nearest hundredth of an inch.

8-9. Longitudinal Joint Sealant Reservoir The average Width and Depth of the as-built longitudinal joint sealant reservoir to the nearest hundredth of an inch. If butt or keyed joints were used without a sealant reservoir, enter "0.00" in both of the spaces provided.

10. Tie Bar Diameter The nominal diameter of the tie bars used across longitudinal joints between lanes entered to the nearest hundredth of an inch.

11. Tie Bar Length The mean length in inches of the tie bars used across the longitudinal joint between the lanes.

12. Tie Bar Spacing The mean center-to-center spacing between consecutive tie bars across the longitudinal joint between the lanes to the nearest tenth of an inch.

13-14. Shoulder-Traffic Lane Joint Sealant Reservoir The average Width and Depth of the as-built joint sealant reservoir between the shoulder and traffic lane. If butt or keyed joints were used without a sealant reservoir, enter "0.00" in both of the spaces provided.

15-17. Shoulder-Traffic Lane Joint Tie Bars The outer Diameter of the tie bars across the joint between the shoulder and the traffic lane to the nearest hundredth of an inch, the mean Length of the tie bars to the nearest inch, and the average center-to-center distance (Spacing) in inches between consecutive tie bars across the concrete shoulder-traffic lane joint. If no concrete shoulder exists, enter "N" for these data entry spaces.

Sheet 7 Portland Cement Concrete Layers, Reinforcing Steel Data

This sheet is filled out from project records for each reinforced PCC layer identified on Sheet 3.

1. Layer Number The reinforced portland cement concrete layer for which a description is being provided (from Sheet 3).

2. Type of Reinforcing The type of reinforcing used in the PCC layer being described. A space is provided for entering a written description of a reinforcing type other than deformed bars or welded wire fabric.

3. Transverse Bar Diameter The nominal diameter of the transverse bars to the nearest hundredth of an inch.

4. Transverse Bar Spacing The mean center-to-center spacing between transverse bars to the nearest tenth of an inch.

5. Longitudinal Bar Diameter The nominal diameter of the longitudinal bars to the nearest hundredth of an inch.

6. Design Percentage of Longitudinal Steel The percentage of reinforcing steel of the PCC cross-section required in the design to the nearest hundredth of one percent.

7. Depth to Reinforcement From Slab Surface The mean depth (to the nearest tenth of an inch) of the concrete cover over the reinforcing steel.

8. Longitudinal Bar Spacing The mean center-to-center spacing between longitudinal bars to the nearest tenth of an inch.

9. Yield Strength of Reinforcing The mean yield strength of the reinforcing steel of the bars to the nearest tenth of a kip per square inch. If tests were not conducted for the steel used, enter the minimum yield strength allowed for the grade of steel used.

10. Method Used to Place Reinforcement The method used to install reinforcing steel bars or wire fabric during pavement construction. These methods include presetting the reinforcement on chairs, placing it mechanically by means of special equipment used for that purpose, or by placing them between layers of concrete. A space is also provided to describe another method of placement if a code was not provided for the method used.

11. Lap Length of Longitudinal Steel Splices The length to the nearest inch of the longitudinal reinforcing steel overlap at a CRCP construction joint. If the rigid pavement is not CRCP, enter "N".

Sheet 8 Portland Cement Concrete Layers, Mixture Data

This data sheet is to be filled out from project records for each PCC layer identified on Sheet 3.

1. Layer Number The portland cement concrete layer for which a description is provided (from Sheet 3).

2-5. Mix Design The oven dry weights in pounds of Coarse Aggregate, Fine Aggregate, Cement, and the weight of Water provided by the mix design for a cubic yard of concrete.

6. Type Cement Used The type of cement used in the slab concrete. These cement type codes appear in Table A.11 in Appendix A.

7. Alkali Content of Cement The alkali content of the cement to the nearest tenth of one percent.

8-10. Entrained Air Content The Mean, Minimum, and Maximum values of entrained air (percent of mixture volume) as measured (by Test Methods AASHTO T121, AASHTO T152, AASHTO T196, ASTM C138, ASTM C173, or ASTM C231) during construction to the nearest tenth of one percent.

11-13. Admixtures The Types and Amounts (in percent by weight of cement to the nearest thousandth) of admixtures used in the concrete. The codes for concrete admixtures appear in Table A.12 in Appendix A, and space is provided for identifying an admixture type for which a code was not provided.

14-18. Slump The Mean of the slump measurements made, the Maximum and Minimum values, the Standard Deviation from the mean, all to the nearest tenth of an inch, and the Number of Tests from which the values are obtained. The slump test is described in AASHTO T119 or ASTM C143. The maximum and minimum values and standard deviation of slump should be left blank if only one test result is available. The equation for standard deviation is given in Appendix B.

Sheet 9 Portland Cement Concrete Layers, Mixture Data (continued)

This data sheet is filled out from project records for each PCC layer identified on Sheet 3.

1. Layer Number The portland cement concrete layer for which a description is provided (from Sheet 3).

2-4. Composition of Coarse Aggregate The types and percentages by weight of up to three separate materials in the coarse aggregate (that portion of an aggregate retained on the No. 4 sieve) used in the concrete mix. Space is provided for description of another type if none of the types for which codes are provided were 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.

5. Geologic Classification of Coarse Aggregate The geologic classification of the natural stone used as coarse aggregate in the concrete. These codes appear in Table A.9 and provide identification as to which of the three major classes of rock the coarse aggregate belongs to and the type of rock within those classes. If a "blend" was used, enter the code for the geological classification for the material representing the majority of the coarse aggregate. If a "crushed slag", "manufactured lightweight", or "recycled concrete" was used as course aggregate, enter "N".

6-8. Composition of Fine Aggregate The types and percentages by weight of materials in the fine aggregate (passing the No. 4 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.

9. Insoluble Residue The percentage of insoluble residue (non- carbonate material) as determined using ASTM D3042.

10. Gradation of Coarse Aggregate The percent of course aggregate passing various standard sieve sizes to the nearest one percent. It is not expected that values will be available for all sieve sizes shown - the objective is to provide sufficient sieve sizes to accommodate testing and specification practices for most agencies.

11. Gradation of Fine Aggregate The percent of fine aggregate passing various standard sieve sizes to the nearest one percent. It is not expected that values will be available for all sieve sizes shown - the objective is to provide sufficient sieve sizes to accommodate testing and specification practices for most agencies.

12-13. Bulk Specific Gravities The mean bulk specific gravities (to the nearest thousandth) for coarse aggregate and fine aggregate. The bulk specific gravities for the aggregate fractions are measured using these laboratory procedures a) Coarse Aggregate - AASHTO T85 or ASTM C127, and b) Fine Aggregate - AASHTO T84 or ASTM C128.

Sheet 10 Portland Cement Concrete Layers, Mixture Data (continued)

This data sheet is for continuation of the data on Sheet 9, and is filled out for each PCC layer identified on Sheet 3. These additional data entries are discussed below.

1. Layer Number The portland cement concrete layer for which a description is provided (from Sheet 3).

2. Type of Paver Used A code to indicate whether a slip-form or side-form paver was used to place the concrete. The codes appear on the data sheet along with a space to describe a different type not listed. Enter "N" if a paver was not used (i.e., roller compacted concrete).

3-6. Aggregate Durability Test Results 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 and the units for reporting appear in Table A.13.

7. Method Used to Cure Concrete The method used to cure the concrete pavement. Space is provided for identifying another curing method if none of those with codes was used.

8. Method Used to Texture Concrete A code to indicate how the concrete surface was textured. Space is provided for identifying another texturing method if none of those with codes was used.

9-13. Elastic Modulus The Minimum, Maximum, Mean, and Standard Deviation of elastic moduli of the concrete in kips per square inch and the Number of Tests performed. The elastic moduli are obtained either through compression testing of cylindrical samples collected and tested during construction, or through relationships published by the ACI and others relating elastic modulus to compressive strength. In the event that only one test result is available, enter it as the "mean value". The standard deviation is left blank unless at least four test results are available. See Appendix B of the LTPP Data Collection Guidelines for standard deviation equation. The ACI formula in general use (ACI 318 - 83, Section 8.5) is:

$$E_c = \sqrt{57{,}000(f_c)} \qquad (2.1)$$

where:

E_c = Modulus of Elasticity, psi
f_c = 28-Day Compressive Strength, psi

14. Method for Determination of Elastic Modulus The test method used for measuring the elastic modulus of the mix; ASTM C469 (drilled core specimens), ASTM C469 (molded cylinders), ACI (Equation 2.1 above) or some other test procedure.

Sheet 11 Portland Cement Concrete Layers, Strength Data

This data sheet is used to provide strength data on cylinders or beams molded from plastic concrete during construction, and is filled out for each PCC layer identified on Sheet 3. These data entries are discussed below.

1. Layer Number The portland cement concrete layer for which a description is provided (from Sheet 3).

2-8. Flexural Strength The Type of Test (third-point or center-point loading), the Age of the sample at testing, the Number of Tests performed, and the Minimum, Maximum, Mean, and Standard Deviation of flexural strength tests, in psi. Testing for SHRP LTPP test sections which are built after 1988 should be done using third-point loading (AASHTO T97 or ASTM C78). The standard deviation of the flexural strength is calculated as shown in Appendix B.

9-14. Compressive Strength The Age of sample at testing, the Number of Tests performed, and the Minimum, Maximum, Mean, and Standard Deviation of compressive strength in psi, measured according to AASHTO T22 or ASTM C39. See Appendix B for standard deviation equation.

15-20. Splitting Tensile Strength The Age of the sample at testing, the Number of Tests, and the Minimum, Maximum, Mean, and Standard Deviation of splitting tensile strength in psi, measured according to AASHTO T198 or ASTM C496. See Appendix B for standard deviation equation.

Sheet 12 Plant Mixed Asphalt Bound Layers, Aggregate Properties

This sheet is filled out from project records for each asphalt concrete layer identified on Sheet 3 that is thicker than 0.75 inches. Detailed mixture data is not considered necessary for thin seal coats, porous friction treatments, etc. Although various SHAs discriminate between fine and coarse aggregates on the basis of different sieve sizes, the following definition (Ref. 20) is applied for SHRP studies: All aggregate retained on the No. 8 sieve is coarse aggregate and all aggregate passing the No. 8 sieve is fine aggregate. "Mineral filler" is defined (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 The asphalt concrete layer for which a description is provided (from Sheet 3).

2-4. Composition of Coarse Aggregate 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. Geologic Classification of Coarse Aggregate The geologic classification of the natural stone used as coarse aggregate in the concrete. These codes appear in Table A.9 and provide identification as to which of the three major classes of rock the coarse aggregate belongs to and the type of rock within those classes. If a "blend" was used, enter the code for the geological classification for the material representing the majority of the coarse aggregate. If a "crushed slag", "manufactured lightweight", or "recycled concrete" was used as course aggregate, enter "N".

6-8. Composition of Fine Aggregate 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.

9. Type of Mineral Filler The type of mineral filler used. The codes appear on the data sheet, including space for entering some other type for which a code was not provided.

10-13. Aggregate Durability Test Results 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.

14. Polish Value of Coarse Aggregates The accelerated polish value of the coarse aggregates used in the surface layer, as determined by AASHTO T279 (ASTM D3319).

Sheet 13 Plant Mixed Asphalt Bound Layers, Aggregate Properties (continued)

This data sheet is for continuation of data on Sheet 12, and is filled out for each AC layer identified on Sheet 3. These additional data items are described below.

1. Layer Number The asphalt cement concrete layer for which a description is provided (from Sheet 3).

2. Gradation of Combined Aggregates The percent passing on various standard sieve sizes to the nearest one percent. It is not expected that values will be available for all eighteen sieve sizes; the object is to provide sufficient sieve sizes to accommodate testing and specification practice for most agencies.

3-6. Bulk Specific Gravities 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 simply "bulk specific gravity of aggregate") is calculated as follows:

$$G_{sb} = \frac{P_1 + P_2 + P_3}{\frac{P_1}{G_1} + \frac{P_2}{G_2} + \frac{P_3}{G_3}} \quad (2.2)$$

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

7. Effective Specific Gravity of Aggregate Combination The mean calculated effective specific gravity to the nearest thousandth. 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:

$$G_{se} = \frac{100 - P_b}{\frac{100}{G_{MM}} - \frac{P_b}{G_b}} \quad (2.3)$$

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)

Sheet 14 Plant Mixed Asphalt Bound Layers, Asphalt Cement Properties

This data sheet is filled out from project records for each asphalt concrete layer identified on Sheet 3 that is thicker than 0.75 inches.

1. Layer Number The asphalt concrete layer described on this sheet (from Sheet 3).

2. Asphalt Grade The grade of asphalt cement used (See Table A.16). Space is provided on the data sheet for identifying another grade of asphalt cement not appearing in Table A.16.

3. Source The source for the asphalt cement. A list of asphalt refiners and processors is provided in Table A.14, Appendix A 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 The mean specific gravity of the asphalt cement (to the nearest thousandth) 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 for the original asphalt cement, tested prior to its use in the construction.

5. Viscosity of Asphalt at 140°F 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 The results in centistokes (to the nearest hundredth) from absolute viscosity testing using Test Method AASHTO T201 (or ASTM D2170) on samples of the original asphalt cement.

7. Penetration at 77°F The penetration (in tenths of a millimeter) from testing the original asphalt cement in the mixture at 77°F, 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 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, Appendix A. 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".

Quantity of Asphalt Modifier 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 The ductility in centimeters as measured by Test Method AASHTO T51 at 77°F (or ASTM D113).

11. Ductility at 39.2°F 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 The test speed in centimeters per minute for the ductility measurement taken at 39.2°F.

13. Penetration at 39.2°F 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 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.

Sheet 15 Plant Mixed Asphalt Bound Layers, Asphalt Cement Properties (continued)

This data sheet is for continuation of the data on Sheet 14, and is filled out for each asphalt concrete layer identified on Sheet 3 that is thicker than 0.75 inches. These additional data entries are discussed below.

1. Layer Number The asphalt concrete layer for which a description is provided (from Sheet 3).

   Laboratory Aged Asphalt Cement Properties: The following data items should be provided for laboratory aged asphalt cement samples, using virgin asphalt cement samples aged in accordance with the provisions of Test Method AASHTO T179 (or ASTM D1754) or Test Method AASHTO T240 (or ASTM D2872). Space is provided on the data sheet to indicate the aging process used, if other than those stated above.

2. Test Procedure Used to Measure Aging Effects The test procedure used to "age" the asphalt cement in the laboratory, and to measure the effects of the aging.

3. Viscosity of Asphalt at 140°F The mean of the results in poise from viscosity testing on laboratory aged asphalt cement samples using Test Method AASHTO T202 (or ASTM D2171).

4. Viscosity of Asphalt at 275°F The mean of the results in centistokes (to the nearest hundredth) from viscosity testing using Test Method AASHTO T201 (or ASTM D2170) on laboratory aged asphalt cement samples.

5. Ductility at 77°F The mean ductility in centimeters as measured by Test Method AASHTO T51 (or ASTM D113) on laboratory aged samples of the asphalt cement.

6. Ductility at 39.2°F The mean ductility in centimeters of laboratory aged asphalt specimens at 39.2°F, using the procedures of Test Method AASHTO T51 (or ASTM D113).

7. Test Rate for Ductility Measurement at 39.2°F The test rate to the nearest tenth of a centimeter per minute for ductility determination at 39.2 °F.

8. Penetration at 77°F The mean penetration (in tenths of millimeters) from testing the asphalt cement used in the mixture at 77°F, using a 100 gram load and a 5 second load duration, in accordance with Test Method AASHTO T49 (or ASTM D5).

9. Penetration at 39.2°F The results in mean penetration (in tenths of millimeters) from testing the asphalt cement used in the mixture at 39.2 °F, using a 200 gram load and 60 second load duration, in accordance with Test Method AASHTO T49 (or ASTM D5).

10. Ring and Ball Softening Point The mean of the results in °F from the ring and ball softening point test for bitumens (AASHTO T53).

11. Weight Loss The mean weight loss resulting from the laboratory aging process to the nearest one-tenth of one percent.

Sheet 16 Plant Mixed Asphalt Bound Layers, Original Mixture Properties

This data sheet is filled out from project records for each asphalt concrete layer identified on Sheet 3 that is thicker than 0.75 inches.

The following data items are derived from tests conducted on the mixture during or soon after construction. Calculations for calculated values (i.e., percent air voids) are 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 are filled out for those compacted in the laboratory and those compacted in the field. Although tests are conducted on core samples from the field for SHRP LTPP (and reported on other data sheets), data from project files are entered when available.

1. Layer Number The asphalt concrete layer described on the sheet (from Sheet 3).

2. Type of Samples A 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 The Maximum Specific Gravity (no air voids) 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 are used to calculate the effective specific gravity of aggregate using Equation 2.4 below. Once the effective specific gravity of the aggregate is established, it is used to calculate other maximum specific gravities for the mixture at other measured asphalt contents using Equation 2.5 below:

where:

$$G_{se} = \frac{100 - P_b}{\frac{100}{G_{mm}} - \frac{P_b}{G_b}} \quad (2.4)$$

$$G_{mm} = \frac{100}{\frac{P_s}{G_{se}} - \frac{P_b}{G_b}} \quad (2.5)$$

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 entered into the data base, but are needed to calculate the percent air voids for measured asphalt contents for individual extractions on cores.

4-6. Bulk Specific Gravity 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 for standard deviation equation.

7-9. Asphalt Content 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 one-tenth of a 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 for the standard deviation equation.

10-12. Percent Air Voids The Number of Samples and the Minimum, Maximum, Mean, and Standard Deviation of calculated air voids (to the nearest tenth of a percent) as a percent of the material volume. This data is frequently not available, but is 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:

$$P_a = 100 \frac{G_{mm} - G_{mb}}{G_{mm}} \quad (2.6)$$

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 for standard deviation equation.

13. Voids in Mineral Aggregate 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 as follows:

$$VMA = 100 - \frac{G_{mb}P_s}{G_{sb}} \qquad (2.7)$$

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 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:

$$P_{ab} = P_{ba}P_s = \frac{G_{se} - G_{sb}}{G_{sb}G_{se}} G_bP_s$$

where:

P_{ab}	=	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 The mean Marshall Stability (Test Method AASHTO T245 or ASTM D1559) in pounds for the mixture during laboratory mix design.

16. Number of Blows The number of blows of the compaction hammer that were applied to each end of the specimen during laboratory compaction.

17. Marshall Flow 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 The mean Hveem Stability or "stabilimeter value" as measured with the Hveem apparatus using Test Method AASHTO T246 (or ASTM D1561).

19. Hveem Cohesionmeter Value The cohesionmeter value, in grams per 25 mm width (or diameter) of specimen, obtained by Test Method AASHTO T246 (or ASTM D1561).

Sheet 17 Plant Mixed Asphalt Bound Layers, Original Mixture Properties (continued)

This data sheet provides for continuation of the data on Sheet 16, and is filled out for each asphalt concrete layer identified on Sheet 3. These additional data entries are discussed below.

1. Layer Number The asphalt concrete layer for which a description is provided (from Sheet 3).

2. Type Asphalt Plant The type of plant that produced the asphalt concrete mixture. Codes are provided on the data sheet.

3. Type of Antistripping Agent The type of antistripping agent used in the mixture. The codes are provided in Table A.21 in Appendix A.

4-5. Amount of Antistripping Agent A code to indicate whether the antistripping agent is liquid or solid. Also, the amount of antistripping agent used in the mixture by weight to the nearest tenth of a percent of weight of asphalt if the agent is liquid and weight of aggregate if it is solid.

6. Moisture Susceptibility Test Type The type of moisture susceptibility test used during the test program. If a procedure other than those provided was used, space is provided to specify a name or reference for the test.

7-10. Moisture Susceptibility Test Results The mean Hveem Stability Number or Percent Stripped and the Tensile Strength Ratio or Index of Retained Strength. Space is provided to record these results in varying forms, depending on the test procedure used.

Sheet 18 Plant Mixed Asphalt Bound Layers, Construction Data

This sheet is filled out from project records for each asphalt concrete layer identified on Sheet 3 that is thicker than 0.75 inches.

1. Layer Number The asphalt concrete layer for which the compaction data is described on this sheet (from Sheet 3).

2. Mean Mixing Temperature The mean temperature of the mixture during mixing at the plant in °F.

3-5. Laydown Temperatures The Number of Temperature Measurements taken and the Minimum, Maximum, Mean, and Standard Deviation of temperatures measured. See Appendix B for the standard deviation equation.

6-31. Compaction Data Spaces are provided to enter the following for each asphalt concrete lift:

a. Description of the roller used (code from data sheet) and number of coverages for breakdown, intermediate, and final compactions. A "coverage" in this case is defined as one trip of the roller across the pavement.
b. Mean air temperature in °F while compaction is accomplished.
c. The mean compacted thickness in inches to the nearest tenth.
d. The mean curing period in hours before a new lift is placed or opened to traffic.

Codes appear on the data sheet for steel-wheeled tandem, pneumatic- tired, single-drum vibratory, and double-drum vibratory rollers. For each type of roller, spaces are provided to describe significant characteristics for up to four different rollers. Steel-wheeled tandem rollers are described by their gross weights to the nearest tenth of a ton. Pneumatic-tired rollers are described by their gross weight and mean tire pressure in psi. Vibratory rollers are described by their gross weight in tons to the nearest tenth, frequency in vibrations per minute, amplitude in inches to the nearest thousandth, and roller speed in miles per hour to the nearest tenth of a mile.

If compaction data is unavailable, enter "U" in these spaces. If partial data is available, fill in the available data and enter a "U" where data is not available, but would be applicable. Enter "N" in spaces that are not applicable (i.e., if there was no fourth lift, enter "N" in its spaces). Use only the "roller descriptions and codes" required.

Sheet 19 Unbound or Stabilized Base or Subbase Material Descriptions

This data sheet is filled out from project records for each base or subbase layer identified on Sheet 3. Note that a stabilized subgrade (treated with lime, cement, asphalt, etc.,) is considered to be subbase and entries for this layer should be made on this data sheet and the next.

1. Layer Number The base or subbase layer described on this sheet (from Sheet 3).

2. AASHTO Soil Classification The AASHTO soil classification for the base or subbase material (before stabilization). The code numbers appear in Appendix A, Table A.10.

3. Atterberg Limits The plasticity index (PI), liquid limit (LL), and plastic limit (PL) determined by AASHTO T90 and T89 or ASTM D4318.

4. Maximum Lab Dry Density The maximum laboratory dry density in pounds per cubic foot for the base or subbase material in the layer of interest.

5. Optimum Lab Moisture Content The optimum moisture content obtained in the laboratory to the nearest one-tenth of a percent for the base or subbase layer.

6. Test Used to Measure Maximum Dry Density The test method used to establish the maximum dry density and optimum moisture content. Space is provided for identifying another test method used, if different from the listed test methods.

7. Compactive Energy for "Other" Method The compactive energy in foot-pounds per cubic inch applied if some test method was used other than those listed under Item 6, above. If the test method used was listed under Item 6, above, this space is to be left blank.

8-10. In Situ Dry Density (PCF) The Number of Samples tested, and the Minimum, Maximum, Mean, and Standard Deviation of field measurements of dry density in pounds per cubic foot for the base or subbase layer. See Appendix B for standard deviation equation.

11-13. In Situ Moisture Content The Number of Samples tested, and the Minimum, Maximum, Mean, and Standard Deviation of field measurements of base or subbase moisture in percent of dry weight of the material. This moisture content data is to be based on the same tests as for the dry density data in Items 8 through 10, above. See Appendix B for standard deviation equation.

14-15. Gradation of Base or Subbase Material (Coarse and Fine Aggregates) The percentage of material passing on various standard sieve sizes to the nearest one percent. It is not expected that values will be available for all seventeen sieve sizes; the object is to provide sufficient sieve sizes to accommodate testing practices for most agencies.

Sheet 20 Unbound or Stabilized Base or Subbase Material Descriptions (continued)

This data sheet is for continuation of the data on Sheet 19, and is filled out for each base or subbase layer identified on Sheet 3. These additional data entries are discussed below.

1. Layer Number The base or subbase layer for which a description is provided (from Sheet 3).

2-3. Type and Percent Stabilizing Agent (for Stabilized Layers Only) The types of stabilizing agents and the average percent of each by dry weight of soil mixed into the base or subbase material in the layer of interest. An average of measured percentages is used whenever available. If percentages have not been measured, the specified percentage should be entered. If neither measured nor specified data are available, but the layer is known to have been stabilized, a percentage should be estimated based on practice at the

time the stabilized base or subbase layer was constructed. If only one stabilizing agent was used, leave the spaces for "Stabilizing Agent 2" blank. If the base or subbase material was not stabilized, enter "N". Codes are provided on the data sheet for stabilizing agents commonly in use and space is provided to identify an agent not listed.

4. Admixture The type of admixture and the percent added by weight of the base or subbase material, as measured by ASTM D4373.

5-7. Compressive Strength The Number of Tests performed and the Minimum, Maximum, Mean, and Standard Deviation of compressive strength in psi. See Appendix B for standard deviation equation.

8. Type of Compression Test The type of compressive test used. Codes are provided on the data sheet.

9. Confining Pressure The confining pressure applied during the compressive strength test. If the test is unconfined, enter "0.0".

10. Calcium Carbonate Content The percent by weight of the base or subbase material that is composed of calcium carbonate, as determined by ASTM D4373.

11. California Bearing Ratio (CBR) The mean CBR-value as determined by Test Method AASHTO T193 or ASTM D3668.

12. Resistance (R-Value) The mean R-Value as determined by Test Method ASTM D2844.

13-14. Modulus of Subgrade Reaction (k-Value) The mean k-Value in pci (pounds per square inch per inch of deflection) measured at the top of the base or subbase after it is compacted in place, and the Type of Test used. Either the repeated load test (AASHTO T221 or ASTM D1195) or the static load test (AASHTO T222) may be used.

Sheet 21 Subgrade Data

This data sheet is for entering subgrade data from project records, and is filled out for each test section. If there are substantial variations in subgrade characteristics throughout the project, additional subgrade data sheets are provided for each subgrade type. Location information, such as station boundaries, are provided on these extra data sheets underneath the SHRP Section ID data item. Note that a portion of subgrade that is treated (or stabilized) with lime, cement, asphalt, or such agents, is considered a subbase layer and its details should be reported on other data sheets provided for bases and subbases.

As variations in soil type with depth are common (especially where a select fill has been used as an embankment), judgement is required in selecting subgrade soil samples for testing. Some considerations include: 1) relative thicknesses of soil strata that differ in general characteristics and 2) depth. Subgrade soils near the surface will generally have more of an effect on pavement performance than soils at a greater depth.

1. AASHTO Soil Classification The AASHTO Soil Classification for the subgrade material. These codes are provided in Appendix A, Table A.10.

2. CBR The California Bearing Ratio (CBR) for the subgrade soil (Test Method AASHTO T193 or ASTM D3668).

3. Resistance (R-Value) The mean resistance R-value as determined by test method AASHTO T190 or ASTM D2844.

4-5. Modulus of Subgrade Reaction (k-Value) The mean modulus of subgrade reaction in pci (pounds per square inch per inch of deflection) for the in situ subgrade, and the Type of Test used. Either the repeated load test (AASHTO T221 or ASTM D1195) or the static load test (AASHTO T222 or ASTM D1196) may be used.

6. Percent Passing No. 40 Sieve The average of percentages passing the No. 40 sieve from available sieve test results for samples from the first five feet of subgrade. Enter to the nearest tenth of one percent.

7. Percent Passing No. 200 Sieve The average of percentages passing the No. 200 sieve from available sieve test results for samples from the first five feet of subgrade. Enter to the nearest tenth of one percent.

8. Plasticity Index The average of plasticity indices measured for samples from the first five feet of the subgrade (Test Methods AASHTO T90 or ASTM D4318).

9. Liquid Limit The average of the liquid limits measured for samples from the first five feet of subgrade (Test Methods AASHTO T89 or ASTM D4318).

10. Maximum Laboratory Dry Density The maximum laboratory dry density in pounds per cubic foot for the subgrade material.

11. Optimum Laboratory Moisture Content The optimum moisture content obtained in the laboratory to the nearest one-tenth of a percent for the subgrade.

12. Test Used to Measure Maximum Dry Density A code to indicate whether standard AASHTO, modified AASHTO, or some other test method was used to establish the maximum dry density and optimum moisture content.

13. Compactive Energy for "Other" Method The compactive energy in foot-pounds per cubic inch applied if some test method was used other than standard AASHTO or modified AASHTO. If standard or modified AASHTO was used, leave this space blank.

14-16. In Situ Dry Density The Number of Tests conducted, and the Minimum, Maximum, Mean, and Standard Deviation of field measurements of dry density in place for the subgrade as a percentage of the maximum lab dry density. See Appendix B for standard deviation equation. In situ dry density may be measured successfully by several procedures; including the "rubber-balloon method" (AASHTO T205), the "sand-cone method" (AASHTO T191), or "nuclear methods" (AASHTO T238).

17-19. In Situ Moisture Content The Number of Tests conducted, and the Minimum, Maximum, Mean, and Standard Deviation of field measurements of subgrade moisture content as a percent of the optimum moisture content obtained in the laboratory. This moisture content data is to be based on the same tests as for the dry density data above. Values should be recorded to the nearest tenth of a percent.

20-22. In Situ Dry Density The Number of Tests conducted, and the Minimum, Maximum, Mean, and Standard Deviation of field measurements of dry density in pounds per cubic foot for the subgrade. See Appendix B for standard deviation equation. This data item need not be entered if both the maximum laboratory dry density and the in situ dry density as a percent of maximum have been reported.

23-25. In Situ Moisture Content The Number of Tests conducted, and the Minimum, Maximum, Mean, and Standard Deviation of field measurements of subgrade moisture in percent of dry weight of the material. This moisture content data is to be based on the same tests as for the dry density data above, and need not be entered if the optimum laboratory moisture content and the in situ moisture content as a percent of optimum have been reported. Values should be recorded to the nearest tenth of a percent.

Sheet 22 Subgrade Data (continued)

This data sheet is for continuation of the data on Sheet 21 and is completed for each test section.

1-4. Relative Density of Cohesionless Free-Draining Soil For cohesionless free-draining soils only: 1) minimum and maximum densities in pcf (to the nearest tenth) as determined by Test Method ASTM D2049 (Measured Density), 2) mean relative density in percent (to the nearest tenth) and number of tests conducted, 3) minimum and maximum mean relative densities in percent (to the nearest tenth) and 4) standard deviation of relative density in percent (to the nearest tenth). The calculated relative densities and standard deviation of relative density are related to the "in situ dry densities" in pcf recorded on Sheet 20, and are calculated using those field densities and the minimum and maximum densities from Test Method D2049.

If the subgrade soil has more than 12 percent by weight passing the No. 200 sieve or is otherwise known to not be free-draining, enter "N" in those spaces.

5. Soil Suction A value for soil suction to the nearest tenth of a ton per square foot (AASHTO T273).

6. Expansion Index The Expansion Index as determined by a proposed ASTM "Test Method for Expansion Index of Soils". This test method was in final ballot by ASTM Committee D-18 in December 1987, and is expected to be adopted at a high probability level. The "Expansion Index" has been included as a data element as it appears to offer high potential for "explaining" the effects of expansive soils on pavement performance in future predictive models.

7-8. Swell Pressure A value to the nearest pound per square inch for swell pressure, and a code to identify the test used.

9. Percent by Weight Finer Than 0.02mm The percent by weight (to the nearest tenth) of the subgrade sample having soil "grains" finer in size than 0.02 millimeters. This value is generally obtained by hydrometer analysis (ASTM Test Method D422). This data item is only required in "Freeze Zones" where frost is expected to penetrate into the subgrade.

10. Average Rate of Heave During Standard Laboratory Freezing Test The average rate of heave in millimeters per day (to the nearest tenth) of the subgrade soil as measured by a standard laboratory freeze test (reference not available - used by U.S. Army Corps. of Engineers). This data item is only required in "Freeze Zones" where frost is expected to penetrate into the subgrade.

11. Frost Susceptibility Classification Code The frost susceptibility classification of the subgrade soil as indicated by Figure 2.1 in the GPS Data Collection Guide. The codes appear on the data sheet. A value for "Average Rate of Heave" is required for classification, although "Percent by Weight Finer Than 0.02mm" is indicative and significant to the heave rate. This data item is only required in "Freeze Zones" where frost is expected to penetrate into the subgrade.

GPS REHABILITATION DATA SHEETS

Rehabilitation Data Sheet 61 should be used to provide information on shoulder treatments.

Rehabilitation Data Sheet 61, Restoration of AC Shoulders

This data sheet is for describing work to restore existing shoulders. All data items pertain to the characteristics of the restored AC shoulder.

1. Shoulder Restored A code to indicate whether the outside, inside, or both shoulders were restored. Codes are provided on the data sheet. Note that Data Items 2. to 7. pertain to restored inside and/or outside shoulders. Data Items 8. to 14. pertain to restored outside shoulders only.

2. Surface Type The type of restored shoulder surface (See Table A.5, Appendix A for codes).

3. Total Width The total (paved and unpaved) width of the restored shoulder to the nearest whole number of feet.

4. Paved Width The total paved width of the restored shoulder to the nearest whole number of feet.

5. Shoulder Base Type The type of base material used in the restored shoulder (See Table A.6, Appendix A for codes).

6. Surface Thickness The average thickness of the restored shoulder surface at the outside lane-shoulder edge to the nearest tenth of an inch.

7. Base Thickness The average thickness of the restored shoulder base at the outside lane-shoulder edge to the nearest tenth of an inch.

8. Type of Shoulder Restoration A code to identify the procedure used to restore the shoulder. Codes are provided on the data sheet.

9. Type of AC Materials The type of asphalt concrete materials used in the shoulder restoration. Codes are provided on the data sheet.

10. Thickness of AC Material Removed by Cold Milling If cold milling was used, the thickness of the AC removal, to the nearest tenth of an inch.

11. AC Overlay Thickness If an AC overlay was placed on the shoulder, the thickness of the overlay to the nearest tenth of an inch.

12. Lane/Shoulder Joint Sealant The method used to seal the joint separating the shoulder and traffic lane. Codes are provided on the data sheet.

13. Lane/Shoulder Joint Sealant Reservoir The average Width and Depth of the as-built joint sealant reservoir between the restored shoulder and traffic lane. If butt or keyed joints were used without a sealant reservoir, enter "0.0" in both of the spaces provided.

14. Type of Joint Sealant. A code to indicate whether the sealant was poured (molded in place) or preformed (compression-type). Codes are provided on the data sheet.

GPS MAINTENANCE DATA SHEETS

The only data sheets to be completed as part of the construction data for SPS-9A projects from the GPS series of maintenance data sheets are sheet 1 concerning historical maintenance information and sheet 5 concerning crack sealing. This sheets should only be completed if historical maintenance records exist of if crack sealing is performed on the test sections as a part of the overlay construction operations. Other maintenance data sheets may need to be completed (if required) as part of the historical data (prior to overlay construction) and monitoring data (after construction).

Maintenance Data Sheet 1 Historical Maintenance Information

Space is provided for identifying a maximum of six maintenance activities by year in which they were accomplished. If more than six maintenance activities were performed since pavement construction, this sheet must be repeated. Historical maintenance information consists of data collected on or near the monitoring site up to the time that site specific data collection using SHRP guidelines begins. This data will frequently be very difficult to obtain from existing records for pre-SHRP monitoring work, but it is extremely important that every effort be made to retrieve it.

1. Year The year in which the maintenance activity occurred. Enter the last two digits of the year (83 for 1983, etc.).

2. Maintenance Case Number The State Highway Agency assigned case number for the specific maintenance being reported. If no number was assigned, leave this space blank.

3. Work Type Code A code entered to identify the type of maintenance work accomplished. The work type codes appear in Table A.17 in Appendix A.

4. Maintenance Location Code A code entered to identify where on the roadway the maintenance was conducted. These codes appear in Table A.18 in Appendix A.

5. Maintenance Material Code A code entered for identifying the maintenance materials used (such as "preformed joint fillers," "hot liquid asphalt," etc.). These codes appear in Table A.19 in Appendix A.

6. Work Quantity The quantity of work performed for the complete project in the appropriate units as listed in Table A.17 (See item 1.3).

7. Thickness The thickness entered to the nearest tenth of an inch for those maintenance activities that increase the thickness of the pavement structure (such as "surface treatment, single layer," or "surface treatment, double layer," etc.). Localized treatments (such as patching) should be marked as to average depth of material placed. Leave this space blank for treatments that do not increase the pavement thickness (such as fog seal).

8. Total Cost The total costs for the maintenance work, reported in thousands of dollars per lane-mile. This should be calculated using the number of lanes and estimated total length over which the maintenance treatment was applied. All non-pavement items (guardrail, lighting, etc.) should be excluded. To be consistent with other cost data, this information should include only cost of materials. Labor, traffic control, or other incidental costs should be excluded.

Maintenance Data Sheet 5 Crack Sealing Data for Pavements with Asphalt Concrete Surfaces

This data sheet is for reporting the details of sealing individual cracks to prevent moisture intrusion into the underlying layers. If a seal coat is used over a broad area for crack sealing, it should be reported on Maintenance Data Sheets 3 and 4.

1. Dates: The month, day, and year the maintenance activity began and the month, day and year it was completed.

2. Average Crack Severity Level: The average severity of the cracks in the test section. Codes are provided on the data forms. Reference to the Distress Identification Manual should be used to establish severity level.

3. Primary Type of Cracks: A code entered to describe the primary type of crack prevalent over the monitored test section. Codes are provided in Table A.22 of Appendix A. A complete description of each type of crack is available in the Distress Identification Manual.

4. Type of Material Used to Seal Cracks: A code entered to record the type of material used to seal the cracks in the pavement surface. Codes are provided on the data sheet. If a proprietary crack/joint sealant or some other type not coded is used, spaces are provided to record information to identify the material.

5. Ambient Conditions at Time of Crack Sealing: The low and high air temperatures observed during crack sealing activities in degrees Fahrenheit, and a code entered to indicate whether the surface was dry or wet at the time the cracks were sealed.

6. Approximate Total Length of Cracks Sealed: The approximate total linear feet of individual cracks sealed within the test section to the nearest foot. For SHRP LTPP studies, only the total linear feet of cracks sealed in the outer lane are to be recorded.

7. Method Used to Clean Crack Prior to Sealing: A code entered to record the procedure used to clean the debris from cracks prior to sealing. Codes are provided on the data sheet, and a space is provided for entering a method for which no code is provided.

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-9A experiment are listed in the "Specific Pavement Studies: Materials Sampling and Testing Requirements, Experiment SPS-9A, SUPERPAVE™ Asphalt Binder Study", December, 1995.

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.

CLIMATIC DATA

The procedures used for collection and storage of climate and environmental data for GPS test sections should be followed for SPS-9A 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 below. 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.

Table 7. Guidelines on Initial Monitoring Measurement on SPS-9A Test Sites.

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

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.

APPENDIX A

DATA SHEETS FOR SPS-9A

SPS-9 CONSTRUCTION DATA SHEET 1 PROJECT AND SECTION 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 (ft) [__ __ __ __ __.]

*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-9 CONSTRUCTION DATA SHEET 2 GEOMETRIC, SHOULDER AND DRAINAGE INFORMATION	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

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

*2. MONITORING SITE LANE NUMBER [__]
(LANE 1 IS OUTSIDE LANE, NEXT TO SHOULDER LANE 2 IS NEXT TO LANE 1, ETC.)

3. TYPE OF PAVEMENT (See Table A.4 of the SHRP Data Collection Guide) [__ __]

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

5. 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
6. SURFACE TYPE Turf... 1 Granular.... 2 Asphalt Concrete... 3 Concrete... 4 Surface Treatment... 5 Other (Specify)... 6 _____	[__]	[__]
7. TOTAL WIDTH (ft)	[__ __.]	[__ __.]
8. PAVED WIDTH (ft)	[__ __.]	[__ __.]
9. SHOULDER BASE TYPE (CODES-TABLE A.6)	[__ __]	[__ __]
10. SURFACE THICKNESS (in)	[__ __.__]	[__ __.__]
11. SHOULDER BASE THICKNESS (in)	[__ __.__]	[__ __.__]
12. DIAMETER OF LONGITUDINAL DRAINPIPES (in)		[__ __.__]
13. SPACING OF LATERALS (ft)		[__ __ __.]

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9A 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 and Fill..... **4**

If a section contains both cut and fill portions (code 4 above), enter the details of the cut and fill locations on SPS-1 Construction Data Sheet 11.

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9 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 (in)			
			AVERAGE	MINIMUM	MAXIMUM	STD. DEV.
1	SUBGRADE(7)	[__ __]				
2	[__ __]	[__ __]	[_ _ _._]	[_ _ _._]	[_ _ _._]	[_ _ _._]
3	[__ __]	[__ __]	[_ _ _._]	[_ _ _._]	[_ _ _._]	[_ _ _._]
4	[__ __]	[__ __]	[_ _ _._]	[_ _ _._]	[_ _ _._]	[_ _ _._]
5	[__ __]	[__ __]	[_ _ _._]	[_ _ _._]	[_ _ _._]	[_ _ _._]
6	[__ __]	[__ __]	[_ _ _._]	[_ _ _._]	[_ _ _._]	[_ _ _._]
7	[__ __]	[__ __]	[_ _ _._]	[_ _ _._]	[_ _ _._]	[_ _ _._]
8	[__ __]	[__ __]	[_ _ _._]	[_ _ _._]	[_ _ _._]	[_ _ _._]
9	[__ __]	[__ __]	[_ _ _._]	[_ _ _._]	[_ _ _._]	[_ _ _._]
10	[__ __]	[__ __]	[_ _ _._]	[_ _ _._]	[_ _ _._]	[_ _ _._]
11	[__ __]	[__ __]	[_ _ _._]	[_ _ _._]	[_ _ _._]	[_ _ _._]
12	[__ __]	[__ __]	[_ _ _._]	[_ _ _._]	[_ _ _._]	[_ _ _._]
13	[__ __]	[__ __]	[_ _ _._]	[_ _ _._]	[_ _ _._]	[_ _ _._]
14	[__ __]	[__ __]	[_ _ _._]	[_ _ _._]	[_ _ _._]	[_ _ _._]
15	[__ __]	[__ __]	[_ _ _._]	[_ _ _._]	[_ _ _._]	[_ _ _._]

5 DEPTH BELOW SURFACE TO "RIGID" LAYER (ft) [__ __.__]
(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-9A 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]	[__ __ __.]
*3.	Crushed Slag... **4** Manufactured Lightweight... **5**	[__]	[__ __ __.]
*4.	Other (Specify)... **6** _____	[__]	[__ __ __.]

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

*8. TYPE OF MINERAL FILLER [__]
Stone Dust... **1** Hydrated Lime... **2** Portland Cement... **3**
Fly Ash... **4** None ... **5**
Other (Specify)... **6** _____

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-9A CONSTRUCTION DATA SHEET 6 PLANT-MIXED ASPHALT BOUND LAYERS SUPERPAVE 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]	[__ __ __.]
*3.	Crushed Slag... **4** Manufactured Lightweight... **5**	[__]	[__ __ __.]
*4.	Other (Specify)... **6** _____	[__]	[__ __ __.]
	COMPOSITION OF FINE AGGREGATE	TYPE	PERCENT
*5.	Natural Sand... **1** Crushed or Manufactured Sand	[__]	[__ __ __.]
*6.	(From Crushed Gravel or Stone)... **2**	[__]	[__ __ __.]
*7.	Recycled Concrete... **3** Other... **4** (Specify) _____	[__]	[__ __ __.]

*8. TYPE OF MINERAL FILLER [__]
Stone Dust... **1** Hydrated Lime... **2** Portland Cement... **3**
Fly Ash... **4** None ... **5**
Other (Specify)... **6** _____

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) [__.__ __ __]

		One Face	Two Faces
14.	Angularity		
	Coarse (% Fractured Faces)	[__ __.__]	[__ __.__]
	Fine (% Voids)		[__ __.__]
		Test Type	Result
15.	Soundness		
	Coarse (Type of Test From A.13, % loss)	[0 3]	[__ __.__]
	Fine (Type of Test From A.13, % loss)	[0 3]	[__ __.__]
16.	Toughness of Coarse Aggregate (% loss LAR)	[0 1]	[__ __.__]
17.	Deleterious Materials (Clay Lumps and Friable Particles of Fine Aggregates)		
	(Type of Test From A.13, % loss)	[0 9]	[__ __.__]
18.	Clay Content (Sand Equivalent, ratio)		[__.__]
19.	Thin, Elongated Particles (%)		[__.__]

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9A CONSTRUCTION DATA SHEET 7 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-9A CONSTRUCTION DATA SHEET 8 PLANT-MIXED ASPHALT BOUND LAYERS SUPERPAVE ASPHALT BINDER PROPERTIES	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

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

*2. ASPHALT GRADE (Specify Design SHRP PG Grading) PG [__ __] - [__ __]

*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. DYNAMIC SHEAR RHEOMETER COMPLEX MODULUS AND PHASE ANGLE (**kPa,DEG**)

(Tank Asphalt) (AASHTO TP5) [__ __ .__ __] [__ __]

6. DYNAMIC SHEAR RHEOMETER COMPLEX MODULUS AND PHASE ANGLE (**kPa,DEG**)

(RTFO Asphalt) (AASHTO TP5) [__ __ .__ __] [__ __]

7. DYNAMIC SHEAR RHEOMETER COMPLEX MODULUS AND PHASE ANGLE (**kPa,DEG**)

(PAV Asphalt) (AASHTO TP5) [__ __ __ __ __] [__ __]

8. BENDING BEAM RHEOMETER STIFFNESS MODULUS AND SLOPE (**MPa,RATIO**)

(PAV Asphalt) (AASHTO TP1) [__ __ __ __] [__.__ __ __]

9. DIRECT TENSION TENSILE STRENGTH AND TENSILE STRAIN (**kPa,RATIO**)

(PAV Asphalt) (AASHTO TP3) [__ __ __ __.__] [__.__ __ __]

PREPARER _____ EMPLOYER _____ DATE _____

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

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

*2. TYPE OF MIX DESIGN [__]
Marshall... 1 HVEEM...2 SUPERPAVE...3
Other (Specify)...4 _____

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

4. BULK SPECIFIC GRAVITY (ASTM D1188) [__.__ __ __]

5. ASPHALT CONTENT (PERCENT WEIGHT OF TOTAL MIX) [__.__ __ __]
(AASHTO T164 OR ASTM D2172)

6. PERCENT AIR VOIDS [__ __.__]

7. VOIDS IN MINERAL AGGREGATE (PERCENT) [__ __.__]

8. EFFECTIVE ASPHALT CONTENT (PERCENT) [__ __.__]

9. MARSHALL STABILITY (lb) (AASHTO T245 OR ASTM D1559) [__ __ __ __.]

10. NUMBER OF BLOWS [__ __.]

11. MARSHALL FLOW (0.01 in) [__ __.]
(AASHTO T245 OR ASTM D1559)

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

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

14. SUPERPAVE Gyratory Compaction N_{design} [__ __ __.]

15. ASPHALT GRADE (SEE ASPHALT CODE SHEET, TABLE A.16) [__ __]

16. SUPERPAVE Asphalt Binder Grade [P G __ __ - __ __]

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9A CONSTRUCTION DATA SHEET 10 PLANT-MIXED ASPHALT BOUND LAYERS SUPERPAVE 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. FREQUENCY SWEEP (Complex Modulus, **MPa** & Phase Angle, δ)

4°C		**20°C**		**40°C**	
[__ __ __]	[__ __.__]	[__ __ __]	[__ __.__]	[__ __ __]	[__ __.__]

*16. UNIAXIAL STRAIN (Axial Stress, **kPa** & Strain, **mm/mm**)

4°C		**20°C**		**40°C**	
[__ __ __]	[__.__ __]	[__ __ __]	[__.__ __]	[__ __ __]	[__.__ __]

*17. VOLUMETRIC STRAIN (Confining Pressure, **kPa** & Axial Strain, **mm/mm**)

4°C		**20°C**		**40°C**	
[__ __ __]	[__.__ __]	[__ __ __]	[__.__ __]	[__ __ __]	[__.__ __]

*18. SIMPLE SHEAR

	4°C	**20°C**	**40°C**
Axial Stress, **kPa**	[__ __ __]	[__ __ __]	[__ __ __]
Shear Stress, **kPa**	[__ __ __]	[__ __ __]	[__ __ __]
Shear Strain **mm/mm**	[__.__ __]	[__.__ __]	[__.__ __]

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

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

*21. (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-9A CONSTRUCTION DATA SHEET 11 CUT-FILL SECTION LOCATIONS	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

ORDER	*1 CUT-FILL TYPE[1]	TEST SECTION STATION NUMBER	
		*2 START	*3 END
1	_____	0 + 0 0	__ __ __ __ + __ __
2	_____	__ __ __ __ + __ __	__ __ __ __ + __ __
3	_____	__ __ __ __ + __ __	__ __ __ __ + __ __
4	_____	__ __ __ __ + __ __	__ __ __ __ + __ __
5	_____	__ __ __ __ + __ __	__ __ __ __ + __ __
6	_____	__ __ __ __ + __ __	__ __ __ __ + __ __
7	_____	__ __ __ __ + __ __	__ __ __ __ + __ __
8	_____	__ __ __ __ + __ __	__ __ __ __ + __ __
9	_____	__ __ __ __ + __ __	__ __ __ __ + __ __
10	_____	__ __ __ __ + __ __	__ __ __ __ + __ __

NOTES:

1. Indicate the type of subgrade construction with one of the following:

   Cut... **1** Fill... **2**

2. Use one line for each cut or fill zone present within the section boundaries.

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9A CONSTRUCTION DATA SHEET 12 PLANT-MIXED ASPHALT BOUND LAYERS PLACEMENT DATA	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

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

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

3. SURFACE PREPARATION PRIOR TO PLACEMENT OF OVERLAY [__]
   None..... **1** Broomed..... **2** Broomed + Asphaltic Tack Coat.... **3**
   Asphaltic Tack Coat (only).... **4**

4. TACK COAT
   Material Type None..... **1** SS-1.... **2** SS-1H.... **3** CRS-1.... **4** [__ __]
   CRS-2.... **5** CMS-2.... **6** CMS-2H.. **7** CSS-1.... **8** CSS-1H... **9**
   Other.... **10** (Specify) _____

5. TACK COAT DILUTION
   (**Percent**) [__ __]
   Mixing Rate Parts Diluent [__ __] TO Parts Asphalt [__ __]

6. TACK COAT APPLICATION RATE (**Gal/Sq. Yd.**) [__.__ __]

7. 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_____

8. MANUFACTURER OF ASPHALT CONCRETE PAVER _____

9. MODEL DESIGNATION OF ASPHALT CONCRETE PAVER _____

10. SINGLE PASS LAYDOWN WIDTH (**Feet**) [__ __.__]

11. Layer No.	12. Material Type Classification Code	13. Nominal Lift Placement Thickness				14. Tack Coat Between Lifts? (Y/N)	15. Transverse Joint Station
		1st Lift	2nd Lift	3rd Lift	4th Lift		
[__ __]	[__ __]	[__.__]	[__.__]	[__.__]	[__.__]	[__]	[__+__ __]
[__ __]	[__ __]	[__.__]	[__.__]	[__.__]	[__.__]	[__]	[__+__ __]
[__ __]	[__ __]	[__.__]	[__.__]	[__.__]	[__.__]	[__]	[__+__ __]

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

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

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9A CONSTRUCTION DATA SHEET 13 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 (**in**)	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-9A CONSTRUCTION DATA SHEET 14 PLANT-MIXED ASPHALT BOUND LAYERS DENSITY AND PROFILE DATA	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

1. NUCLEAR DENSITY MEASUREMENTS

LAYER TYPE	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** Other ... **3** [___]

Profile Index (in/mile) [___ ___.___]

Interpretation Method Manual.. **1** Mechanical.. **2** Computer.. **3** [___]

Height of Blanking Band (in) [___.___ ___]

Cutoff Height (in) [___.___ ___]

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

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9A CONSTRUCTION DATA SHEET 15 LAYER THICKNESS MEASUREMENTS	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

LAYER THICKNESS MEASUREMENTS (**inch**) SHEET _____ OF _____

STATION NUMBER	OFFSET (**inch**)	DENSE GRADED AGGREGATE BASE	SURFACE AND BINDER	SURFACE FRICTION LAYER
__+__ __	__ __ __ __ __ __ __ __ __ __ __ __ __ __ __	__ __.__ __ __.__ __ __.__ __ __.__ __ __.__	__ __.__ __ __.__ __ __.__ __ __.__ __ __.__	__ __.__ __ __.__ __ __.__ __ __.__ __ __.__
__+__ __	__ __ __ __ __ __ __ __ __ __ __ __ __ __ __	__ __.__ __ __.__ __ __.__ __ __.__ __ __.__	__ __.__ __ __.__ __ __.__ __ __.__ __ __.__	__ __.__ __ __.__ __ __.__ __ __.__ __ __.__
__+__ __	__ __ __ __ __ __ __ __ __ __ __ __ __ __ __	__ __.__ __ __.__ __ __.__ __ __.__ __ __.__	__ __.__ __ __.__ __ __.__ __ __.__ __ __.__	__ __.__ __ __.__ __ __.__ __ __.__ __ __.__
__+__ __	__ __ __ __ __ __ __ __ __ __ __ __ __ __ __	__ __.__ __ __.__ __ __.__ __ __.__ __ __.__	__ __.__ __ __.__ __ __.__ __ __.__ __ __.__	__ __.__ __ __.__ __ __.__ __ __.__ __ __.__
__+__ __	__ __ __ __ __ __ __ __ __ __ __ __ __ __ __	__ __.__ __ __.__ __ __.__ __ __.__ __ __.__	__ __.__ __ __.__ __ __.__ __ __.__ __ __.__	__ __.__ __ __.__ __ __.__ __ __.__ __ __.__
__+__ __	__ __ __ __ __ __ __ __ __ __ __ __ __ __ __	__ __.__ __ __.__ __ __.__ __ __.__ __ __.__	__ __.__ __ __.__ __ __.__ __ __.__ __ __.__	__ __.__ __ __.__ __ __.__ __ __.__ __ __.__
__+__ __	__ __ __ __ __ __ __ __ __ __ __ __ __ __ __	__ __.__ __ __.__ __ __.__ __ __.__ __ __.__	__ __.__ __ __.__ __ __.__ __ __.__ __ __.__	__ __.__ __ __.__ __ __.__ __ __.__ __ __.__
LAYER NUMBER[1]		__ __	__ __	__ __

[1] from Sheet 4

PREPARER ____________________ EMPLOYER ____________________ DATE ____________________

SPS-9A CONSTRUCTION DATA SHEET 16 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 _____

SPS-9A CONSTRUCTION DATA SHEET 17 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 (**inch**) [__ __.]

Nominal Second Lift Placement Thickness (**inch**) [__ __.]

Nominal Third Lift Placement Thickness (**inch**) [__ __.]

Nominal Fourth Lift Placement Thickness (**inch**) [__ __.]

DENSITY DATA IS RECORDED ON SAMPLING DATA SHEET 13

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

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9A CONSTRUCTION DATA SHEET 18 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 (**inch**) [__ __.]
(For Fill Sections Only)

DENSITY DATA IS RECORDED ON SAMPLING DATA SHEET 13

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

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9A CONSTRUCTION DATA SHEET 19 SUBGRADE EXCAVATION AND BACKFILLING SKETCH	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9A CONSTRUCTION DATA SHEET 20 PRE-OVERLAY SURFACE PREPARATION SKETCH	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9A CONSTRUCTION DATA SHEET 21 PRE-OVERLAY CONDITION SUMMARY	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

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

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

3. PRIMARY DISTRESS OCCURRENCE PATCHED (code from Table A.22) [__ __]
   Other (Specify)_____
   _____

4. SECONDARY DISTRESS OCCURRENCE PATCHED (code from Table A.22) [__ __]
   Other (Specify)_____
   _____

5. SUMMARY OF PATCHING

	NUMBER	TOTAL AREA (**SQ. FT**)
Surface Only	[__ __]	[__ __ __ __]
Surface and partial base replacement	[__ __]	[__ __ __ __]
Full depth	[__ __]	[__ __ __ __]

6. METHOD USED TO DETERMINE LOCATION AND SIZES OF PATCHES [__]
   Deflection.... **1** Coring.... **2** Visual..... **3** Other..... **4**
   (specify)_____
   _____

7. METHOD USED TO FORM PATCH BOUNDARIES [__]
   None ..... **1** Saw Cut..... **2** Air Hammer..... **3** Cold Milling..... **4**
   Other..... **5** (Specify)_____
   _____

8. COMPACTION EQUIPMENT [__]
   None ..... **1** Pneumatic roller.... **2** Vibratory Plate Compactor. **3** [__]
   Vibratory Roller. **4** Steel Wheel Roller.. **5** Truck Tire..... **6**
   Hand Tools..... **7** Other..... **8** (Specify)_____
   _____

9. PATCH MATERIAL [__]
   Hot Mix Asphalt Concrete.. **1** Plant Mix with Cutback Asphalt, Cold Laid.. **2**
   Plant Mix with Emulsified Asphalt,Cold Laid. **3** Road Mix with Cutback Asphalt. **4**
   Road Mix with Emulsified Asphalt.. **5** Portland Cement Concrete.. **6** Other.. **7**
   (Specify)_____

10. MINIMUM TIME FROM MATERIAL PLACEMENT TO OPENING TO TRAFFIC (**Hrs**) [__ __]

11. MAXIMUM MATERIAL TEMPERATURE FOR TRAFFIC OPENING (if used) (**°F**) [__ __ __]

12. AIR TEMPERATURE DURING PLACEMENT OPERATIONS
    High Temperature (**°F**) [__ __ __]

    Low Temperature (**°F**) [__ __ __]

13. PREDOMINATE ROAD SURFACE MOISTURE CONDITION DURING PLACEMENT OPERATIONS [__]
    Dry..... **1** Moist..... **2** Wet..... **3**

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9A CONSTRUCTION DATA SHEET 22 RUT LEVEL-UP TREATMENT	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

1. DATE LEVEL-UP LAYER APPLIED (**Month-Day-Year**) [__ __-__ __-__ __]

2. PLACEMENT LOCATION OF LEVEL-UP LAYER [__]
   Outside Rut.... **1** Inside Rut.... **2** Both Ruts.... **3** Full Lane Width... **4**

3. LENGTH OF TEST SECTION COVERED [__]
   Full Length of Test Section **1**
   Partial Length of Test Section .... **2** (enter start and end station numbers)

   Outside Wheel Path Rut: Start Station __+__ __ End Station __+__ __
   Inside Wheel Path Rut: Start Station __+__ __ End Station __+__ __

4. AVERAGE RUT DIMENSIONS (**inch**)

	DEPTH	WIDTH
Outside Wheel Path Rut	[__.__]	[__ __.__]
Inside Wheel Path Rut	[__.__]	[__ __.__]

5. RUT PREPARATION PRIOR TO APPLICATION OF LEVEL-UP [__]
   None..... **1** Broomed..... **2** Broomed + Asphaltic Tack Coat.... **3**
   Asphaltic Tack Coat (only).... **4**
   Wheel Path Milling..... **5** DEPTH [__.__] WIDTH [__ __.__]
   Other.....**6** (Specify)_____
   _____

6. COMPACTION EQUIPMENT [__]
   None ..... **1** Pneumatic roller.... **2** Vibratory Plate Compactor. **3** [__]
   Vibratory Roller.. **4** Steel Wheel Roller.. **5** Truck Tire..... **6**
   Hand Tools..... **7** Other..... **8** (Specify)_____
   _____

7. TYPE OF LEVEL-UP MATERIAL
   Hot Mix Asphalt Concrete... **1** Plant Mix with Cutback Asphalt, Cold Laid..... **2**
   Plant Mix with Emulsified Asphalt, Cold Laid. **3** Road Mix with Cutback Asphalt. **4**
   Road Mix with Emulsified Asphalt..... **5**
   Other... **6** (Specify) _____

8. MAXIMUM TOP SIZE AGGREGATE (**inch**) [__.__ __]

9. MINIMUM TIME FROM MATERIAL PLACEMENT TO OPENING TO TRAFFIC (**Hrs**) [__ __]

10. MAXIMUM MATERIAL TEMPERATURE FOR TRAFFIC OPENING (if used) (**°F**) [__ __ __]

11. AIR TEMPERATURE DURING PLACEMENT OPERATIONS
    High Temperature (**°F**) [__ __ __]

    Low Temperature (**°F**) [__ __ __]

12. PREDOMINATE ROAD SURFACE MOISTURE CONDITION DURING PLACEMENT OPERATIONS [__]
    Dry..... **1** Moist..... **2** Wet..... **3**

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9A CONSTRUCTION DATA SHEET 23 PREPARATION OF MILLED TEST SECTIONS	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

1. DATE OF MILLING OPERATION (**Month-Day-Year**) [__ __-__ __-__ __]

2. MANUFACTURER OF MILLING MACHINE (**Specify**) _____

3. MILLING MACHINE MODEL DESIGNATION (**Specify**) _____

4. WIDTH OF CUTTING HEAD (**inch**) [__ __ __.__]

5. TOTAL MILLED DEPTH (**inch**)

Location	No. Measrmnts	Maximum	Minimum	Std. Dev.	Average
Inside lane edge	__ __.	__ __.__	__ __.__	__ __.__	[__ __.__]
Outside lane edge	__ __.	__ __.__	__ __.__	__ __.__	[__ __.__]

MILLED SURFACE CHARACTERISTICS

6. Macro Texture [__]
   Fine Macro Texture (**≤¼ inch**)... **1** Coarse Macro Texture (**>¼ inch**)... **2**

7. Estimate of extent of test section surface area delaminated (**Percent**) [__ __]

8. Height of Ridge Between Parallel Passes? (**inch**) [__.__]

9. Other Comments? (**Yes, No**) [____]
   Comments _____

10. WERE PATCHES PLACED AFTER MILLING? (**Yes, No**) [__]
    (If yes complete Construction Data Sheet 19)

11. LENGTH OF TIME MILLED SURFACE WAS OPENED TO TRAFFIC? (**Hrs.**) [__ __ __]

12. LAYER NUMBER OF MILL REPLACEMENT [__ __]

13. NOMINAL THICKNESS OF MILL REPLACEMENT MATERIAL (**inch**) [__ __.__]

14. TYPE OF MILL REPLACEMENT LAYER MATERIAL [__]
    "Virgin" Asphalt Concrete ..... **1** Recycled Asphalt Concrete.... **2**
    Other... **3** (Specify) _____

15. WAS ADJACENT TRAVEL LANE MILLED TO SAME DEPTH AS TEST LANE? (**Yes, No**) [__]
    IF NO, WIDTH MILLED SAME DEPTH AS TEST LANE (**ft**) [__ __.__ __]

16. COMMENTS _____

PREPARER _____ EMPLOYER _____ DATE _____

August 1995

SPS-9A CONSTRUCTION DATA SHEET 24 ASPHALT PATCHING OF PCC PAVEMENTS	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

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

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

3. PRIMARY DISTRESS OCCURRENCE PATCHED (code from Table A.22) [__ __]
   Other (Specify) _____

4. SECONDARY DISTRESS OCCURRENCE PATCHED (code from Table A.22) [__ __]
   Other (Specify) _____

5. SUMMARY OF PATCHING

	NUMBER	TOTAL AREA (**SQ. ft**)
Surface Only	[__ __]	[__ __ __ __]
Surface and partial base replacement	[__ __]	[__ __ __ __]
Full depth	[__ __]	[__ __ __ __]

6. METHOD USED TO DETERMINE LOCATION AND SIZES OF PATCHES [__]
   Deflection.... **1** Coring.... **2** Visual..... **3** Other..... **4**
   (specify) _____

7. METHOD USED TO FORM PATCH BOUNDARIES [__]
   None ..... **1** Saw Cut..... **2** Air Hammer..... **3** Cold Milling..... **4**
   Other..... **5** (Specify) _____

8. COMPACTION EQUIPMENT [__]
   None ..... **1** Pneumatic roller.... **2** Vibratory Plate Compactor. **3** [__]
   Vibratory Roller. **4** Steel Wheel Roller.. **5** Truck Tire..... **6**
   Hand Tools..... **7** Other..... **8** (Specify) _____

9. PATCH MATERIAL [__]
   Hot Mix Asphalt Concrete.. **1** Plant Mix with Cutback Asphalt, Cold Laid.. **2**
   Plant Mix with Emulsified Asphalt,Cold Laid. **3** Road Mix with Cutback Asphalt. **4**
   Road Mix with Emulsified Asphalt.. **5** Portland Cement Concrete.. **6** Other.. **7**
   (Specify) _____

10. MINIMUM TIME FROM MATERIAL PLACEMENT TO OPENING TO TRAFFIC (**Hrs**) [__ __]

11. MAXIMUM MATERIAL TEMPERATURE FOR TRAFFIC OPENING (if used) (**°F**) [__ __ __]

12. AIR TEMPERATURE DURING PLACEMENT OPERATIONS
    High Temperature (**°F**) [__ __]
    Low Temperature (**°F**) [__ __]

13. PREDOMINATE ROAD SURFACE MOISTURE CONDITION DURING PLACEMENT OPERATIONS [__]
    Dry..... **1** Moist..... **2** Wet..... **3**

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9A CONSTRUCTION DATA SHEET 25 PARTIAL DEPTH PATCHING FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

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

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

3. PRIMARY DISTRESS OCCURRENCE PATCHED (code from Table A.22) [__ __]
   Other (Specify) _____
   _____

4. SECONDARY DISTRESS OCCURRENCE PATCHED (code from Table A.22) [__ __]
   Other (Specify) _____
   _____

5. PATCHES
   Total Square (**ft**) [__ __ __ __]

   Number [__ __.]

   Average Depth, (**inch**) [__ __.__]

6. METHOD USED FOR PATCH BOUNDARY DETERMINATION [__]
   Visual... **1** Ball Peen Hammer, Steel Rod, Chain or Equivalent... **2**
   Delam-Tech... **3** Other (Specify)... **4** _____

7. METHOD USED TO CUT BOUNDARIES [__]
   Diamond Blade Saw... **1** Carbide Blade Saw... **2** None... **3** Air Hammer... **4**
   Cold Milling... **5** Other (Specify)... **6** _____

8. METHOD USED TO BREAK UP AND/OR REMOVE DETERIORATED CONCRETE [__]
   Jackhammer.... **1** Cold Milling... **2**
   Other (Specify)... **3** _____

9. METHOD FOR FINAL CLEANING OF PATCH AREA [__]
   None... **1** Sandblasting... **2** Waterblasting... **3**
   Other (Specify)... **4** _____

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9A CONSTRUCTION DATA SHEET 26 PARTIAL DEPTH PATCHING FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES, CONTINUED	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

1. PATCH MATERIAL USED [__]
   Portland Cement Concrete... **1** Polymer Concrete... **2** Epoxy Mortar... **3**
   Other (Specify)... **5** _____

2. BONDING AGENT [__]
   None... **1** Cement Grout... **2** Epoxy Resin... **3**
   Other (Specify)... **4** _____

3. MIXTURE DESIGN FOR PATCH MATERIAL, (**lbs/cu yd.**)
   Coarse Aggregate [__ __ __ __.]
   Fine Aggregate [__ __ __ __.]
   Cement [__ __ __ __.]
   Water [__ __ __ __.]

4. MAXIMUM SIZE OF COARSE AGGREGATE, (**inch**) [__.__]

5. CEMENT TYPE USED [__ __]
   (See Cement Type Codes, Tables A.11)

6. AIR CONTENT, PERCENT BY VOLUME
   Mean [__ __.__]
   Range: Min [__ __.__]
   Max [__ __.__]

7. ADMIXTURES [__ __]
   (See Cement Additive Codes, Table A.12) [__ __]

8. SLUMP, (**inch**)
   Mean [__.__]
   Range: Min [__.__]
   Max [__.__]

9. COMPRESSIVE STRENGTH OF PATCH MATERIAL, (**psi**) [__ __ __ __.]

   Curing Time, Days [__ __]
   If Unavailable, and Other Strength Test Conducted,
   Alternate Test [_____]

   Type of Loading [_____]

   Age, **Days** [__ __]; Strength, (**psi**) [__ __ __ __.]

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9A CONSTRUCTION DATA SHEET 27 PARTIAL DEPTH PATCHING FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES, CONTINUED	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

1. CURING METHOD — METHOD 1 [__ __] METHOD 2 [__ __]

   None... **1** Membrane Curing Compound... **2** Burlap Curing Blankets... **3**
   Waterproof Paper Blankets... **4** White Polyethylene Sheeting... **5**
   Burlap-Polyethylene Blankets... **6** Insulating Layers... **7**
   Cotton Mat Curing... **8** Hay... **9**
   Other (Specify)... **10** _____

2. APPROXIMATE TIME BETWEEN PATCHING AND OPENING TO TRAFFIC, **HOURS** [__ __]

3. AMBIENT CONDITIONS AT TIME OF PATCHING — LOW [__ __ __.]

   Air Temperature **°F** — HIGH [__ __ __.]

   Surface Moisture - Dry = **1**, Wet = **2** [__]

4. METHOD OF CONSOLIDATING MATERIALS [__]
   Vibrators... **1** Vibrating Screeds... **2** Troweling... **3**
   Rodding/Tamping... **4** Rolling... **5**
   Other (Specify)... **6** _____

5. FINISHING METHOD [__]
   Screeding... **1** Hand-Troweling... **2** Machine-Troweling... **3**
   Other (Specify)... **4** _____

6. JOINT FORMING METHOD
   Shoulder [__]

   Transverse [__]

   Longitudinal [__]

   None... **1** Polyethylene Strip Insert... **2** Styrofoam Insert... **3**
   Fiberboard Insert... **4** Sawing... **5** Forms... **6**
   Other (Specify)... **7** _____

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9A CONSTRUCTION DATA SHEET 28 JOINT RESEALING DATA FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

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

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

3. METHOD OF REMOVING OLD SEALANT [__]
   Not Removed... **1** Joint Plow - V-Shaped... **2** Joint Plow - Rectangular.... **3**
   High Pressure Water Blasting... **4** Diamond Blade Saw... **5**
   Carbide Blade Saw... **6** Pull-Out of Old Compression Sealant... **7**
   Not Previously Sealed... **8**
   Other (Specify)... **9** _____

4. NEW SEALANT RESERVOIR DIMENSIONS, **(inch)**
   Width [__.__]

   Depth (From Top of Slab to Top of Backer Rod or Tape) [__ __.__]

5. BOND BREAKER UNDER SEALANT [__]
   None... **1** Nonreactive Adhesive Backed Tape... **2** Backer Rod... **3**
   Other (Specify)... **4** _____

6. WERE JOINT SIDEWALLS REFACED? [__]
   No... **1** Yes - One-Blade... **2** Yes - Two-Blade... **3**
   Other (Specify)... **4** _____

7. CLEANING OF SIDEWALLS [__]
   None... **1** Air Blast... **2** Sand Blast... **3** Water Blast ... **4**
   Other (Specify)... **5** _____

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9A CONSTRUCTION DATA SHEET 29 JOINT RESEALING DATA FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES, CONTINUED	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

1. TYPE OF CONTRACTION JOINT SEALANT [__]
(AASHTO OR ASTM SPECIFICATIONS)

D1850 (ASTM) Concrete Joint Sealer, Cold-Application Type... **1**
D1190 (ASTM) - M173 (AASHTO) Concrete Joint Sealer, Hot-Poured Elastic Type... **2**
D3406 (ASTM) - M282 (AASHTO) Joint Sealants, Hot-Poured, Elastomeric-Type, for PCC Pavements... **3**
D3405 (ASTM) - M301 (AASHTO) Joint Sealants, Hot-Poured for Concrete and Asphalt Pavements... **4**
D3542 (ASTM) Preformed Polychloroprene Elastomeric Joint Seals for Bridges... **5**
D2628 (ASTM) Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements... **6**
Other (Describe - if Silicone Material is Used Federal Spec. TT-S-001543A, Georgia D.O.T. Spec 833.06, or Equal Applies... **7**

_____
_____

Manufacturer Information on Type of Pressure Relief Joint Sealant
Manufacturer Name [_____]
Manufacturer Sealant Name [_____]

2. AVERAGE DEPTH OF TOP OF SEALANT PLACEMENT
BELOW PAVEMENT SURFACE, (**inch**) [__.__]

3. ARE EXPANSION JOINTS SEALED DIFFERENTLY THAN CONTRACTION JOINTS? [__]
Yes... **1** No... **2**

If Yes, Enter the code from Item 1, or describe below [__]

Other [_____
_____
_____]

4. TOTAL LINEAR **FEET** OF JOINTS SEALED
Transverse Joints [__ __ __ __.__]

Longitudinal Joints [__ __ __ __.__]

NOTE: IF DIFFERENT MATERIALS OR METHODS ARE USED REPEAT SHEETS 26 AND 27 FOR EACH RECORDING THEIR LENGTHS IN ITEM NO. 4.

PREPARER _____ EMPLOYER _____ DATE _____

April 1991 (Heading revised October 1992)

SPS-9A CONSTRUCTION DATA SHEET 30 CRACK SEALING DATA FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

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

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

3. NEW SEALANT RESERVOIR DIMENSIONS, **Inches** If Used

   Width [__.__]

   Depth (From Top of Slab to Top of Backer Rod or Tape) [__.__]

4. BOND BREAKER UNDER SEALANT, If Used [__]
   None... **1** Nonreactive Adhesive Backed Tape... **2** Backer Rod... **3**
   Other (Specify)... **4** _____

5. CLEANING OF CRACKS [__]
   None... **1** Routing... **2** Air Blast... **3** Steel Wire Brush... **4**
   Brooming... **5** Other (Specify)... **6** _____

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9A CONSTRUCTION DATA SHEET 31 CRACK SEALING DATA FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES, CONTINUED	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

1. TYPE OF SEALANT [__]
(AASHTO OR ASTM SPECIFICATIONS)

D1850 (ASTM) Concrete Joint Sealer, Cold-Application Type... **1**
D1190 (ASTM) - M173 (AASHTO) Concrete Joint Sealer, Hot-Poured Elastic Type... **2**
D3406 (ASTM) - M282 (AASHTO) Joint Sealants, Hot-Poured, Elastomeric-Type, for PCC Pavements... **3**
D3405 (ASTM) - M301 (AASHTO) Joint Sealants, Hot-Poured for Concrete and Asphalt Pavements... **4**
D3542 (ASTM) Preformed Polychloroprene Elastomeric Joint Seals for Bridges... **5**
D2628 (ASTM) Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements... **6**
Other (Describe - if Silicone Material is Used Federal Spec. TT-S-001543A, Georgia D.O.T. Spec 833.06, or Equal Applies... **7**

_____

_____

Manufacturer Information on Type of Pressure Relief Crack Sealant
Manufacturer Name [_____]
Manufacturer Sealant Name [_____]

2. AVERAGE DEPTH OF TOP OF SEALANT PLACEMENT
Below Pavement Surface, (**inch**) [__.__]

3. TOTAL LINEAR **FEET** OF CRACKS SEALED [__ __ __ __.__]

NOTE: IF DIFFERENT MATERIALS OR METHODS ARE USED REPEAT SHEETS 28 AND 29 FOR EACH RECORDING THEIR LENGTHS IN ITEM NO. 3.

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9A CONSTRUCTION DATA SHEET 32 DIAMOND GRINDING FOR PORTLAND CEMENT CONCRETE PAVEMENT SURFACES	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

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

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

3. REASON FOR GRINDING [__]
   Elimination of Faulting... **1** Elimination of Slab Warping... **2**
   Improve Skid Resistance... **3**
   Restoration of Transverse Drainage Slope... **4**
   Other (Specify)... **5** _____

4. AVERAGE DEPTH OF CUT, **(inch)** [__.__ __]

5. CUTTING HEAD WIDTH, **(inch)** [__ __ __.__ __]

6. AVERAGE GROOVE WIDTH, **(inch)** [__.__]

7. AVERAGE SPACING BETWEEN BLADES, **(inch)** [__.__]

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9A CONSTRUCTION DATA SHEET 33 FULL DEPTH REPAIR DATA FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

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

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

3. PRIMARY DISTRESS OCCURRENCE PATCHED OR REPLACED WITH NEW SLAB [__ __]
   (See Table A.22 for Type Codes)
   Other (Specify) _____

4. SECONDARY DISTRESS OCCURRENCE PATCHED OR REPLACED WITH NEW SLAB [__ __]
   (See Table A.22 for Type Codes)
   Other (Specify) _____

5. PATCHES

	NUMBER	**SQ. FEET**
SLAB ONLY	[__ __]	[__ __ __ __]
SLAB AND BASE	[__ __]	[__ __ __ __]

6. PATCH MATERIAL USED [__]
   Portland Cement Concrete... **1** Polymer Concrete... **2** Epoxy Mortar... **3**
   Other (Specify)... **4** _____

7. SLABS REPLACED

	NUMBER	**SQ. FEET**
SLAB ONLY	[__ __]	[__ __ __ __]
SLAB AND BASE	[__ __]	[__ __ __ __]

8. METHOD FOR PATCH BOUNDARY DETERMINATION [__]
   Visual... **1** Coring... **2** Deflection... **3**
   State Standard or Specification... **4**
   Other (Specify)... **5** _____

9. CUTTING INSTRUMENT [__]
   Diamond Blade Saw... **1** Carbide Blade Saw... **2** Wheel Saw... **3**
   Air Hammer... **4**
   Other (Specify)... **5** _____

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9A CONSTRUCTION DATA SHEET 34 FULL DEPTH REPAIR DATA FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES, CONTINUED	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

1. SECURING LOAD TRANSFER DEVICES [__]
   None... **1** Grout Filler... **2** Epoxy filler... **3**
   Other... **4** _____

2. REINFORCING STEEL PLACED IN PATCH [__]
   No... **1** Yes... **2**

		TEMPERATURE STEEL	
		Transverse	Longitudinal
3.	REBAR NUMBER	[__ __]	[__ __]
4.	BAR LENGTHS, (**inch**)	[__ __.__]	[__ __.__]
5.	BAR SPACING, (**inch**)	[__ __.__]	[__ __.__]
		Dowel Bars	Tie Bars
6.	REBAR NUMBER	[__ __]	[__ __]
7.	BAR LENGTHS, (**inch**)	[__ __.__]	[__ __.__]
8.	BAR SPACING, (**inch**)	[__ __.__]	[__ __.__]

9. DOWEL COATINGS [__]
   None... **1** Paint and/or Grease... **2** Plastic... **3**
   Monel... **4** Stainless Steel... **5** Epoxy.... **6**
   Other (Specify)... **7** _____

10. NUMBER OF SAW CUTS PER PATCH (If Sawed) [__ __]

11. DEPTH OF TYPICAL BOUNDARY SAW CUT, (**inch**) [__ __.__]

12. CONCRETE BREAKUP [__]
    None... **1** Pneumatic Air Hammer... **2** Gravity Drop Hammer... **3**
    Sawing... **4**
    Other (Specify)... **5** _____

13. REMOVAL OF CONCRETE [__]
    Concrete Breakup and Cleanout... **1** Lift Out Intact Slab Section... **2**
    Other (Specify)... **3** _____

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9A CONSTRUCTION DATA SHEET 35 FULL DEPTH REPAIR DATA FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES, CONTINUED	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

1. METHOD OF REINFORCING STEEL PLACEMENT [__]
   Chairs... **1** Between Layers of Concrete... **2**

2. MIXTURE DESIGN FOR PATCH MATERIAL, (**lbs/cu yd.**)
   Coarse Aggregate [__ __ __ __.]
   Fine Aggregate [__ __ __ __.]
   Cement [__ __ __ __.]
   Water [__ __ __ __.]

3. CEMENT TYPE USED [__ __]
   (See Type Codes, Tables A.11)

4. AIR CONTENT, PERCENT BY VOLUME
   Mean [__ __.__]
   Range [__ __.__] to [__ __.__]

5. ADMIXTURES [__ __]
   (See Cement Additive Codes, Table A.12) [__ __]

6. SLUMP, (**inch**)
   Mean [__.__]
   Range [__.__] to [__.__]

7. FLEXURAL STRENGTH (MODULUS OF RUPTURE), **psi** [__ __ __ __]
   (Based on 3rd Point Loading) Curing Time, **Days** [__ __]
   If Unavailable, and Other Strength Test Conducted,
   Enter Alternate Test [_____]
   Type of Loading [_____]
   Age, **Days** [__ __]; Strength, **psi** [__ __ __ __]

8. AMBIENT CONDITIONS AT TIME OF PATCHING LOW [__ __ __.]
   Air Temperature **°F** HIGH [__ __ __.]
   Surface Moisture - Dry = **1**, Wet = **2** [__]

9. MAXIMUM SIZE OF COARSE AGGREGATE, (**inch**) [__ __.__]

10. CONSOLIDATION OF MATERIALS [__]
    Internal Vibrators... **1** Vibrating Screeds... **2** Troweling... **3**
    Rolling... **4** Tamping... **5**
    Other (Specify)... **6** _____

12. FINISHING [__]
    Screeding... **1** Hand-Troweling... **2** Machine-Troweling... **3**
    Other (Specify)... **4** _____

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9A CONSTRUCTION DATA SHEET 36 FULL DEPTH REPAIR DATA FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES, CONTINUED	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

1. JOINT FORMING METHOD SHOULDER [__] TRANSVERSE [__] LONGITUDINAL [__]

   None... **1** Polyethylene Strip Insert... **2** Styrofoam Insert... **3**
   Fiberboard Insert... **4** Sawing... **5** Forms... **6**
   Other (Specify)... **7** _____

2. WAS BOND BREAKER USED BETWEEN ADJACENT LANES? [__]
   Yes... **1** No... **2**

3. CURING METHOD METHOD 1 [__ __]
   METHOD 2 [__ __]
   None... **1** Membrane Curing Compound... **2** Burlap Curing Blankets... **3**
   Waterproof Paper Blankets... **4** White Polyethylene Sheeting... **5**
   Burlap-Polyethylene Blankets... **6** Insulating Layers... **7**
   Cotton Mat Curing... **8** Hay... **9**
   Other (Specify)... **10** _____

4. APPROXIMATE TYPICAL TIME BETWEEN PATCHING AND OPENING TO TRAFFIC, **HOURS** [__ __.]

5. TYPE OF TRANSVERSE JOINTS IN PATCHES [__]
   OR SLABS [__]
   None... **1** All Expansion Joints... **2** All Contraction Joints... **3**
   Mixture of Expansion and Contraction Joints... **4**

6. WERE OLD JOINTS MATCHED? [__]
   Yes... **1** No... **2**

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9A CONSTRUCTION DATA SHEET 37 LOAD TRANSFER RESTORATION DATA FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

1. DATE LOAD TRANSFER RESTORATION BEGAN (**Month-Day-Year**) [__ __-__ __-__ __]

2. DATE LOAD TRANSFER RESTORATION COMPLETED (**Month-Day-Year**) [__ __-__ __-__ __]

3. NUMBER OF JOINTS IN TEST SECTION [__ __ __]

4. NUMBER OF JOINT LOAD TRANSFER RESTORATION LOCATIONS [__ __ __]

5. NUMBER OF DEVICES PER JOINT [__ __ __]

6. LOCATION OF DOWELS OR SHEAR DEVICES (**inch**)

(DISTANCE FROM THE OUTER LANE EDGE TO THE CENTER OF EACH DEVICE)

1st	[__ __ __]
2nd	[__ __ __]
3rd	[__ __ __]
4th	[__ __ __]
5th	[__ __ __]
6th	[__ __ __]
7th	[__ __ __]
8th	[__ __ __]
9th	[__ __ __]
10th	[__ __ __]
11th	[__ __ __]
12th	[__ __ __]
13th	[__ __ __]
14th	[__ __ __]

7. DIAMETER OF RETROFIT DOWEL BARS, (**inch**) [__.__ __]

8. MATERIAL USED TO BACKFILL SLOT/CORE HOLE [__]
   Cement Based Grout... **1** Polymer Concrete... **2**
   Epoxy Resin Grout... **3**
   Other (Specify)... **4** _____

9. BONDING AGENT USED BETWEEN EXISTING PCC AND BACKFILL MATERIAL [__]
   None... **1** Epoxy... **2** Cement/Water... **3**
   Other (Specify)... **4** _____

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9A CONSTRUCTION DATA SHEET 38 LOAD TRANSFER RESTORATION DATA FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES, CONTINUED	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

1. LOAD TRANSFER EFFICIENCY BEFORE AND AFTER RESTORATION

POINT DISTANCE (Feet)	LOAD TRANSFER EFFICIENCY (%) BEFORE RESTORATION APPROACH	BEFORE RESTORATION LEAVE	AFTER RESTORATION APPROACH	AFTER RESTORATION LEAVE
[__ __ __ __.]	[__ __ __.]	[__ __ __.]	[__ __ __.]	[__ __ __.]
[__ __ __ __.]	[__ __ __.]	[__ __ __.]	[__ __ __.]	[__ __ __.]
[__ __ __ __.]	[__ __ __.]	[__ __ __.]	[__ __ __.]	[__ __ __.]
[__ __ __ __.]	[__ __ __.]	[__ __ __.]	[__ __ __.]	[__ __ __.]
[__ __ __ __.]	[__ __ __.]	[__ __ __.]	[__ __ __.]	[__ __ __.]
[__ __ __ __.]	[__ __ __.]	[__ __ __.]	[__ __ __.]	[__ __ __.]
[__ __ __ __.]	[__ __ __.]	[__ __ __.]	[__ __ __.]	[__ __ __.]
[__ __ __ __.]	[__ __ __.]	[__ __ __.]	[__ __ __.]	[__ __ __.]
[__ __ __ __.]	[__ __ __.]	[__ __ __.]	[__ __ __.]	[__ __ __.]
[__ __ __ __.]	[__ __ __.]	[__ __ __.]	[__ __ __.]	[__ __ __.]

2. DATE OF LOAD TRANSFER EFFICIENCY TESTS
   BEFORE RESTORATION (**Month-Day-Year**) [__ __-__ __-__ __]
   AFTER RESTORATION (**Month-Day-Year**) [__ __-__ __-__ __]

PREPARER ________________ EMPLOYER ________________ DATE ________________

SPS-9A CONSTRUCTION DATA SHEET 39 UNDERSEALING DATA FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

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

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

3. TYPE OF MIXTURE USED IN SUBSEALING [__]
   Cement-Loam Top Soil Slurry... **1** Cement-Limestone Dust Slurry... **2**
   Cement-Pozzolan Slurry... **3** Cement-Fine Sand Slurry... **4**
   Other (Specify)... **5** _____

MIX DESIGN OF PORTLAND CEMENT GROUT (Items 4. to 8.)

4. CEMENT TYPE (SEE CEMENT TYPE CODES, TABLE A.11) [__ __]

5. CEMENT TO SAND RATIO (BY WEIGHT) [__.__]

6. WATER/CEMENT RATIO (BY WEIGHT) [__.__ __]

7. ADDITIVE TYPE (SEE TABLE A.12) [__ __]

8. AMOUNT OF ADDITIVE (BY PERCENT OF CEMENT WEIGHT) [__ __ __.]

9. FLUIDITY OF PORTLAND CEMENT GROUT [__ __.__]
   (Flow Cone Method ASTM C939) (**SEC**)

10. CUBE COMPRESSIVE STRENGTH OF PORTLAND CEMENT GROUT, (**psi**) [__ __ __ __.]

11. CURING PERIOD FOR PORTLAND CEMENT GROUT (**DAYS**) [__ __]

12. DETERMINATION OF AREA TO BE UNDERSEALED [__]
    Blanket Coverage... **1** Deflection Data... **2**
    Visual Signs of Pumping... **3**
    Other (Specify)... **4** _____

PREPARER _____ EMPLOYER _____ DATE _____

SPS-9A CONSTRUCTION DATA SHEET 40 UNDERSEALING DATA FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES, CONTINUED	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

1. DEPTH OF UNDERSEALING HOLE FROM TOP OF SLAB (**inch**) [__ __.__]

2. MAXIMUM ALLOWABLE PUMPING PRESSURE [__ __ __.]
   (Gauge at Plant) (**psi**)

3. MAXIMUM SURGE PRESSURE (**psi**) [__ __ __.]

4. SLABS IN TEST SECTION (JOINTED CONCRETE PAVEMENTS ONLY)
   Total Number [__ __ __.] Number Undersealed [__ __ __.]

5. AVERAGE NUMBER OF HOLES PER SLAB UNDERSEALED [__ __.]
   (JCP Only)

6. TYPICAL NUMBER OF UNDERSEALING HOLES NEAR JOINT OR CRACK [__ __.]
   (JCP Only)

7. AVERAGE VOLUME OF MATERIAL PUMPED PER HOLE [__ __.__]
   (**Cubic Feet**)

8. MONITORING OF LIFT [__]
   Deflection Device (e.g., Benkelman Beam)... **1** Maximum Pumping Time... **2**
   Appearance of Material in Adjacent Joints or Cracks... **3**
   Other (Specify)... **4** _____

9. TYPICAL TIME BETWEEN UNDERSEALING AND REOPENING TO TRAFFIC (**HOURS**) [__ __.]

11. WERE DEFLECTION MEASUREMENTS TAKEN BEFORE AND AFTER UNDERSEALING?
    Yes... **1** No... **2**
    BEFORE UNDERSEALING [__]
    AFTER UNDERSEALING [__]

12. TIME OF DAY WHEN DEFLECTION MEASUREMENTS WERE CONDUCTED (**HOURS**)

	STARTING TIME	ENDING TIME
BEFORE UNDERSEALING	[__ __ __ __]	[__ __ __ __]
AFTER UNDERSEALING	[__ __ __ __]	[__ __ __ __]

PREPARER _____ EMPLOYER _____ DATE _____

April 1991 (Heading revised October 1992)

SPS-9A CONSTRUCTION DATA SHEET 41 SUBDRAINAGE RETROFIT FOR PAVEMENTS WITH PORTLAND CEMENT CONCRETE SURFACES	* STATE CODE [__ __] * SPS PROJECT CODE [__ __] * TEST SECTION NO. [__ __]

1. DATE SUBDRAINAGE PLACEMENT BEGAN (**Month-Day-Year**) [__ __-__ __-__ __]

2. DATE SUBDRAINAGE PLACEMENT COMPLETED (**Month-Day-Year**) [__ __-__ __-__ __]

3. TYPE OF DRAINAGE PIPE [__]
   Clay Tile... **1** Concrete Tile... **2** Vitrified Clay... **3**
   Perforated Plastic Bituminous Fiber... **4** Perforated Corrugated Metal... **5**
   Corrugated Plastic Tubing... **6** Drainage Mat... **7**
   Other (Specify)... **8** _____

4. DIAMETER OF PIPE (**inch**) [__ __.__]

5. DEPTH OF PIPE BELOW TOP OF PAVEMENT SURFACE (**inch**) [__ __.__]

6. HORIZONTAL PLACEMENT OF PIPE FROM OUTER EDGE OF PAVEMENT (**inch**) [__ __.__]

7. TYPE OF PRIMARY FILTER USED [__]
   Graded Aggregate... **1** Uniformly Graded Aggregate (One Size)... **2**
   Woven Fabric... **3** Non-Woven Fabric... **4** Porous PCC... **5**
   Porous Bituminous Concrete... **6**
   Other (Specify)... **7** _____

8. MAXIMUM PARTICLE SIZE OF PRIMARY FILTER MATERIAL (**inch**) [__.__]

9. GRADATION OF PRIMARY FILTER MATERIAL

   % Passing #4 Sieve [__ __.__] % Passing #40 Sieve [__ __.__]

   % Passing #10 Sieve [__ __.__] % Passing #100 Sieve [__ __.__]

10. PERMEABILITY OF PRIMARY FILTER MATERIAL (**feet/day**) [__ __.__ __]

11. TYPE AND LOCATION OF SECONDARY FILTER MATERIAL [__]
    Fabric Encapsulating the Primary Filter Material... **1**
    Fabric Encapsulating the Drainage Pipe... **2**
    Other (Specify)... **3** _____

12. AVERAGE OUTLET INTERVAL (**ft**) [__ __ __]

13. PRIMARY PURPOSE OF SUBDRAINAGE INSTALLATION [__]
    Remove Free Water From Pavement Layers... **1**
    Cut Off Side-Hill/Through Hill Seepage... **2**
    Lower Water Table... **3**
    Other (Specify)... **4** _____

PREPARER _____ EMPLOYER _____ DATE _____

Revised December 15, 1989

***STATE ASSIGNED ID** [__ __ __ __]

SHEET 61

***STATE CODE** [__ __]

REHABILITATION DATA

***SHRP SECTION ID** [__ __ __ __]

LTPP PROGRAM

RESTORATION OF AC SHOULDERS

*** 1. SHOULDER RESTORED** [__]
- Outside 1
- Inside 2
- Both 3

		INSIDE SHOULDER	OUTSIDE SHOULDER
*** 2.**	**SURFACE TYPE (CODES-TABLE A.5)**	__	[__]
*** 3.**	**TOTAL WIDTH (FEET)**	__ __.	[__ __.]
*** 4.**	**PAVED WIDTH (FEET)**	__ __.	[__ __.]
*** 5.**	**SHOULDER BASE TYPE (CODES-TABLE A.6)**	__ __	[__ __]
*** 6.**	**SURFACE THICKNESS (INCHES)**	__ __.__	[__ __.__]
*** 7.**	**BASE THICKNESS (INCHES)**	__ __.__	[__ __.__]

*** 8. TYPE OF SHOULDER RESTORATION** [__]
- AC Overlay Without Removal of Existing AC..... 1
- Cold Milling and AC Overlay..... 2
- Complete Shoulder Removal and Replacement..... 3
- In-place Recycling and Overlay..... 4
- Other (Specify)_____ 5

*** 9. TYPE OF AC MATERIALS** [__]
- New Materials..... 1
- Hot Recycled Materials..... 2
- Cold Recycled Materials..... 3
- Other (Specify)_____ 4

***10. THICKNESS OF AC MATERIAL REMOVED BY COLD MILLING (IN)** [__.__]

***11. AC OVERLAY THICKNESS (IN)** [__.__]

12. LANE/SHOULDER JOINT SEALANT [__]
- None..... 1
- Sealed Without Providing Reservoir..... 2
- Saw Reservoir and Seal..... 3
- Other (Specify)_____ 4

13. LANE/SHOULDER JOINT SEALANT RESERVOIR
- WIDTH (INCHES) __.__
- DEPTH (INCHES) __.__

14. TYPE OF JOINT SEALANT __
- Poured..... 1
- Preformed..... 2

NOTE: DATA ITEMS 8. TO 14. PERTAIN ONLY TO THE RESTORED OUTSIDE SHOULDER.

PREPARER _____ EMPLOYER _____ DATE _____

*STATE ASSIGNED ID [__ __ __ __]

SHEET 1 *STATE CODE [__ __]

INVENTORY DATA *SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM _____

PROJECT AND SECTION IDENTIFICATION

* 1.DATE OF DATA COLLECTION OR UPDATE (MO/YR) [__ __/__ __]

* 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 State.....3
U. S. .....2 Other.....4

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

* 7.LTPP EXPERIMENT CODE (SEE TABLE A.3, APPENDIX A) [__ __.]

* 8.TYPE OF PAVEMENT (SEE CODES, TABLE A.4) [__ __.]

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

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

SECTION LOCATION STARTING POINT

*11.MILEPOINT ..... [__ __ __.__ __]
*12.ELEVATION ..... [__ __ __ __ __]
*13.LATITUDE ..... [__ __°__ __'__ __.__ __"]
*14.LONGITUDE .....[__ __ __°__ __'__ __.__ __"]

*15.ADDITIONAL LOCATION INFORMATION (SIGNIFICANT LANDMARKS):[_____

_____

_____]

16.HPMS SAMPLE NUMBER (HPMS ITEM 28)

__ __ __ __ __ __ __ __ __ __ __ __

17.HPMS SECTION SUBDIVISION (HPMS ITEM 29)

Revised June 13, 1988

***STATE ASSIGNED ID** [__ __ __ __]

SHEET 2 ***STATE CODE** [__ __]

INVENTORY DATA ***SHRP SECTION ID** [__ __ __ __]

LTPP PROGRAM _____

GEOMETRIC, SHOULDER AND DRAINAGE INFORMATION

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

*** 2.MONITORING SITE LANE NUMBER[1]** [__.]
(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

*** 4.SUBSURFACE DRAINAGE TYPE** [__.]

No Subsurface Drainage..1	Well System.....5
Longitudinal Drains.....2	Drainage Blanket with Longitudinal Drains...6
Transverse Drains.....3	
Drainage Blanket.....4	
Other (Specify)_____7	

SHOULDER DATA	INSIDE SHOULDER	**OUTSIDE SHOULDER**
*** 5. SURFACE TYPE**	__	[__]

Turf..... 1 Concrete..... 4
Granular..... 2 Surface Treatment. 5
Asphalt Concrete.. 3 Other (Specify)_____ 6

6.	TOTAL WIDTH (FEET)	__ __.	__ __.
7.	PAVED WIDTH (FEET)	__ __.	__ __.
8.	SHOULDER BASE TYPE (CODES-TABLES A.6)	__ __	__ __
9.	SURFACE THICKNESS (INCHES)	__ __.__	__ __.__
10.	BASE THICKNESS (INCHES)	__ __.__	__ __.__
	ADDITIONAL DATA FOR PCC SHOULDERS:		
11.	AVERAGE JOINT SPACING (FEET)	__ __ __.	__ __ __.
12.	SKEWNESS OF JOINTS (FEET)	__.__	__.__
13.	JOINTS MATCH PAVEMENT JOINTS? (YES - 1, NO - 2)	__	__
14.	REINFORCED? (YES - 1, NO - 2)	__	__

15.DIAMETER OF LONGITUDINAL DRAINPIPES (INCHES) __.__

16.SPACING OF LATERALS (FEET) __ __ __.

NOTES:
1. For the LTPP studies, only the outside lane will be studied, so the number "1" should always be entered.

Revised June 13, 1988

SHEET 3

INVENTORY DATA

LTPP PROGRAM

*STATE ASSIGNED ID [__ __ __ __]

*STATE CODE [__ __]

*SHRP SECTION ID [__ __ __ __]

LAYER DESCRIPTIONS

LAYER[1] NUMBER	*LAYER[2] DESCRIPTION	*MATERIAL[3] TYPE CLASSIFICATION	<------ LAYER THICKNESS (IN) ------> *MEAN	MIN.	MAX.	STD. DEV.	*LAYER[4] TYPE
1	SUBGRADE(7)	[__ __]					[__]
2	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._	[__]
3	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._	[__]
4	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._	[__]
5	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._	[__]
6	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._	[__]
7	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._	[__]
8	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._	[__]
9	[__ __]	[__ __]	[_ _ _._]	_ _ _._	_ _ _._	_ _ _._	[__]

*DEPTH BELOW SURFACE TO "RIGID" LAYER (FEET) [__ __.__]
(ROCK, STONE, DENSE SHALE)

NOTES:

1. Layer 1 is subgrade soil, last layer is existing surface.

2. Layer description codes:

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

3. The material type classification codes for surface, base or subbase, subgrade, and seal coat or interlayer materials appear in Tables A.5, A.6, A.7 and A.8, respectively.

4. Layer Types:
   - A - HMAC Layer (Requires sheets 12-18 to be filled out)
   - P - PCC Layer (Requires sheets 5-11 to be filled out)
   - B - Base/Subbase Layers (Requires sheets 19 and 20 to be filled out)
   - G - Subgrade (Requires sheets 21 and 22 to be filled out)

***STATE ASSIGNED ID** [__ __ __ __]

SHEET 4 ***STATE CODE** [__ __]

INVENTORY DATA ***SHRP SECTION ID** [__ __ __ __]

LTPP PROGRAM

AGE AND MAJOR PAVEMENT IMPROVEMENTS

*** 1.DATE OF LATEST (RE)CONSTRUCTION (MONTH/YEAR)** [__ __/__ __]

*** 2.DATE SUBSEQUENTLY OPENED TO TRAFFIC (MONTH/YEAR)** [__ __/__ __]

3.LATEST (RE)CONSTRUCTION COST PER LANE MILE (IN THOUSANDS OF DOLLARS)[1] __ __ __ __ __.

MAJOR IMPROVEMENTS SINCE LATEST (RE)CONSTRUCTION

*** 4.** YEAR	*** 5.** WORK TYPE CODE (TABLE A.17)	*** 6.** WORK QUANTITY (TABLE A.17 for units)	7. THICKNESS (INCHES)	8. TOTAL COST[1] (THOUSANDS OF DOLLARS PER LANE-MILE)
[__ __]	[__ __]	[__ __ __ __ __.]	__ __.__	__ __ __.
[__ __]	[__ __]	[__ __ __ __ __.]	__ __.__	__ __ __.
[__ __]	[__ __]	[__ __ __ __ __.]	__ __.__	__ __ __.
[__ __]	[__ __]	[__ __ __ __ __.]	__ __.__	__ __ __.
[__ __]	[__ __]	[__ __ __ __ __.]	__ __.__	__ __ __.
[__ __]	[__ __]	[__ __ __ __ __.]	__ __.__	__ __ __.

*** 9.YEAR WHEN ROADWAY WIDENED** [__ __]

***10.ORIGINAL NUMBER OF LANES (ONE DIRECTION)** [__]

***11.FINAL NUMBER OF LANES (ONE DIRECTION)** [__]

***12.LANE NUMBER OF LANE ADDED[2]** [__]

NOTES 1. Cost is to represent pavement structure cost. Non-pavement costs such as cut and fill work, work on bridges, culverts, lighting, and guard rails are to be excluded.

2. A lane created by roadway widening should not be used for SHRP LTPP unless the pavement structure under the entire lane was constructed at the same time and is uniform.

*STATE ASSIGNED ID [__ __ __ __]

SHEET 5 *STATE CODE [__ __]

INVENTORY DATA *SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM _____

PORTLAND CEMENT CONCRETE LAYERS

JOINT DATA

* 1.LAYER NUMBER (FROM SHEET 3) [__]

* 2.AVERAGE CONTRACTION JOINT SPACING (FEET) [__ __ __.__]

3. (RANDOM JOINT SPACING, IF ANY:_____)

* 4.BUILT-IN EXPANSION JOINT SPACING (FEET) [__ __ __ __.]

* 5.SKEWNESS OF JOINTS (FT/LANE) [__.__]

* 6.TRANSVERSE CONTRACTION JOINT LOAD TRANSFER SYSTEM [__]

Round Dowels.....1
Aggregate Interlock.....2
I-Beams.....3
Star Lugs.....4
Other (Specify)_____5

* 7.ROUND DOWEL DIAMETER (INCHES) [__.__ __]

* 8.DOWEL OR MECHANICAL LOAD TRANSFER DEVICE SPACING (INCHES) [__ __.]

9.AVERAGE INTERMEDIATE SAWED JOINT SPACING (FEET) __ __.__

DIMENSIONS FOR I-BEAM DOWEL BARS

10. HEIGHT, (INCHES) ..... __.__ __

11. WIDTH, (INCHES) ..... __.__ __

12.DISTANCE OF NEAREST DOWEL (OR MECHANICAL LOAD TRANSFER DEVICE) FROM OUTSIDE LANE-SHOULDER EDGE (INCHES) __ __.__

13.DOWEL LENGTH (INCHES) __ __.

14.DOWEL COATING __

Paint and/or Grease.....1
Plastic.....2
Monel.....3
Stainless Steel.....4
Epoxy.....5
Other (Specify)_____6

15.METHOD USED TO INSTALL MECHANICAL LOAD TRANSFER DEVICES __

Preplaced on Baskets.....1
Mechanically Installed.....2
Other (Specify)_____3

***STATE ASSIGNED ID** [__ __ __ __]

SHEET 6 ***STATE CODE** [__ __]

INVENTORY DATA ***SHRP SECTION ID** [__ __ __ __]

LTPP PROGRAM _____

PORTLAND CEMENT CONCRETE LAYERS

JOINT DATA (CONTINUED)

*** 1.LAYER NUMBER (FROM SHEET 3)** [__]

*** 2.METHOD USED TO FORM TRANSVERSE JOINTS** [__]

Sawed.....1 Metal Insert
Plastic Insert.....2 (i.e., Uni-Tube).....3
Other (Specify)_____4

*** 3.TYPE OF LONGITUDINAL JOINT (BETWEEN LANES)** [__]

Butt.....1 Sawed Weakened Plane.....3
Keyed.....2 Insert Weakened Plane.....4
Other (Specify)_____5

*** 4.TYPE OF SHOULDER-TRAFFIC LANE JOINT** [__]

Butt.....1 Insert Weakened Plane.....4
Keyed.....2 Tied Concrete Curb.....5
Sawed Weakened Plane.....3
Other (Specify)_____6

5.TRANSVERSE JOINT SEALANT TYPE (AS BUILT) __

Preformed (Open Web).....1 Rubberized Asphalt.....3
Asphalt.....2 Low-Modulus Silicone.....4
Other (Specify)_____5

TRANSVERSE JOINT SEALANT RESERVOIR (AS BUILT)

6. WIDTH, (INCHES) ..... __.__ __
7. DEPTH, (INCHES) ..... __.__ __

LONGITUDINAL JOINT SEALANT RESERVOIR (AS BUILT)

8. WIDTH, (INCHES) ..... __.__ __
9. DEPTH, (INCHES) ..... __.__ __

10.BETWEEN LANE TIE BAR DIAMETER (INCHES) __.__ __

11.BETWEEN LANE TIE BAR LENGTH (INCHES) __ __.

12.BETWEEN LANE TIE BAR SPACING (INCHES) __ __.__

SHOULDER-TRAFFIC LANE JOINT SEALANT RESERVOIR (AS BUILT)

13. WIDTH, (INCHES) ..... __.__ __
14. DEPTH, (INCHES) ..... __.__ __

SHOULDER-TRAFFIC LANE JOINT TIE BARS (FOR CONCRETE SHOULDER)

15. DIAMETER (INCHES) __.__ __
16. LENGTH (INCHES) __ __.
17. SPACING (INCHES) __ __.

Revised June 13, 1988

	***STATE ASSIGNED ID**	[__ __ __ __]
SHEET 7	***STATE CODE**	[__ __]
INVENTORY DATA	***SHRP SECTION ID**	[__ __ __ __]
LTPP PROGRAM		

PORTLAND CEMENT CONCRETE LAYERS
REINFORCING STEEL DATA

*** 1.LAYER NUMBER (FROM SHEET 3)** [__]

*** 2.TYPE OF REINFORCING** [__]
Deformed Bars.....1
Welded Wire Fabric.....2
Other (specify)_____3

*** 3.TRANSVERSE BAR DIAMETER (INCHES)** [__.__ __]

*** 4.TRANSVERSE BAR SPACING (INCHES)** [__ __.__]

*** 5.LONGITUDINAL BAR DIAMETER (INCHES)** [__.__ __]

*** 6.DESIGN PERCENTAGE OF LONGITUDINAL STEEL (%)** [__.__ __]

7.DEPTH TO REINFORCEMENT FROM SLAB SURFACE (INCHES) [__.__]

8.LONGITUDINAL BAR SPACING (INCHES) __ __.__

9.YIELD STRENGTH OF REINFORCING (KSI) __ __.__

10.METHOD USED TO PLACE REINFORCEMENT __
Preset on Chairs.....1
Mechanically.....2
Between Layers of Concrete.....3
Other (Specify)_____4

11.LAP LENGTH OF LONGITUDINAL STEEL SPLICES (INCHES) __ __.
(CRCP ONLY)

	***STATE ASSIGNED ID**	[__ __ __ __]
SHEET 8	***STATE CODE**	[__ __]
INVENTORY DATA	***SHRP SECTION ID**	[__ __ __ __]
LTPP PROGRAM		

PORTLAND CEMENT CONCRETE LAYERS
MIXTURE DATA

*** 1.LAYER NUMBER (FROM SHEET 3)** [__]

MIX DESIGN (LB./YD^3 - OVEN DRIED WEIGHT)

*** 2. Coarse Aggregate** ..... [__ __ __ __.]
*** 3. Fine Aggregate** ..... [__ __ __ __.]
*** 4. Cement** ..... [__ __ __ __.]
*** 5. Water** ..... [__ __ __ __.]

*** 6.TYPE CEMENT USED (See Cement Type Codes, Table A.11)** [__ __]
(If Other, Specify_____)

*** 7.ALKALI CONTENT OF CEMENT, (PERCENT BY WEIGHT OF CEMENT)** [__ __.__]

ENTRAINED AIR CONTENT, (PERCENT) (AASHTO T121, T152, OR T196)

*** 8. Mean** ..... [__.__]
Range:
9. Minimum Value ..... __.__
10. Maximum Value ..... __.__

	TYPE CODE	**AMOUNT**
***11.ADMIXTURE #1**	[__ __]	[__ __ __.__ __ __]
***12.ADMIXTURE #2**	[__ __]	[__ __ __.__ __ __]
***13.ADMIXTURE #3**	[__ __]	[__ __ __.__ __ __]

(See Cement Admixture Codes, Table A.12)
(If Other, Specify _____)

SLUMP (Inches) (AASHTO T119 OR ASTM C143)

14. Mean..... __.__
Range:
15. Minimum Value..... __.__
16. Maximum Value..... __.__
17. Standard Deviation..... __.__
18. Number of Tests..... __ __ __.

***STATE ASSIGNED ID** [__ __ __ __]

SHEET 9 ***STATE CODE** [__ __]

INVENTORY DATA ***SHRP SECTION ID** [__ __ __ __]

LTPP PROGRAM

PORTLAND CEMENT CONCRETE LAYERS
MIXTURE DATA (CONTINUED)

*** 1. LAYER NUMBER (FROM SHEET 3)** [__]

	COMPOSITION OF COARSE AGGREGATE		**TYPE**	**PERCENT**
*** 2.**	Crushed Stone..1	Manufactured	[__]	[__ __ __.]
*** 3.**	Gravel.....2	Lightweight.....5	[__]	[__ __ __.]
*** 4.**	Crushed Gravel.3	Recycled Concrete..6	[__]	[__ __ __.]
	Crushed Slag...4			
	Other (Specify)_____7			

*** 5. GEOLOGIC CLASSIFICATION OF COARSE AGGREGATE** [__ __.]
(SEE GEOLOGIC CLASSIFICATION CODES, TABLE A.9)

	COMPOSITION OF FINE AGGREGATE	**TYPE**	**PERCENT**
*** 6.**	Natural Sand.....1	[__]	[__ __ __.]
*** 7.**	Crushed or Manufactured Sand (From	[__]	[__ __ __.]
*** 8.**	Crushed Gravel or Stone).....2	[__]	[__ __ __.]
	Recycled Concrete.....3		
	Other (Specify)_____4		

9. INSOLUBLE RESIDUE, PERCENT (ASTM D3042) __ __ __.

10. GRADATION OF COARSE AGGREGATE

11. GRADATION OF FINE AGGREGATE

Sieve Size	% Passing	Sieve Size	% Passing
2".....	__ __ __	No. 4.....	__ __ __
1 1/2".....	__ __ __	No. 8.....	__ __ __
1".....	__ __ __	No. 10.....	__ __ __
7/8".....	__ __ __	No. 16.....	__ __
3/4".....	__ __ __	No. 30.....	__ __
5/8".....	__ __ __	No. 40.....	__ __
1/2".....	__ __	No. 50.....	__ __
3/8".....	__ __	No. 80.....	__ __
		No. 100....	__ __
		No. 200....	__ __

BULK SPECIFIC GRAVITIES:

12. Coarse Aggregate (AASHTO T85 or ASTM C127) __.__ __ __

13. Fine Aggregate (AASHTO T84 or ASTM C128) __.__ __ __

*STATE ASSIGNED ID [__ __ __ __]

SHEET 10 *STATE CODE [__ __]

INVENTORY DATA *SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM _____

PORTLAND CEMENT CONTRETE LAYERS
MIXTURE DATA (CONTINUED)

* 1.LAYER NUMBER (FROM SHEET 3) [__]

* 2.TYPE OF PAVER USED [__]
Slip-Form Paver.....1 Side-Form.....2
Other (Specify)_____3

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

	TYPE OF AGGREGATE	TYPE OF TEST	RESULTS
3.	Coarse	__ __	__ __ __.__
4.	Coarse	__ __	__ __ __.__
5.	Coarse	__ __	__ __ __.__
6.	Coarse and Fine	__ __	__ __ __.__

7.METHOD USED TO CURE CONCRETE __
Membrane Curing Compound....1 Burlap-Polyethylene Blanket.5
Burlap Curing Blankets.....2 Cotton Mat Curing.....6
Waterproof Paper Blankets...3 Hay.....7
White Polyethylene Sheeting.4
Other (Specify)_____8

8.METHOD USED TO TEXTURE CONCRETE __
Tine.....1 Grooved Float.....4
Broom.....2 Astro Turf.....5
Burlap Drag.....3
Other (Specify)_____6

ELASTIC MODULUS (KSI)

9.	MEAN	__ __ __ __ __.
10.	MINIMUM	__ __ __ __ __.
11.	MAXIMUM	__ __ __ __ __.
12.	NUMBER OF TESTS	__ __.
13.	STD. DEV.	__ __ __ __ __.

14.METHOD FOR DETERMINATION OF ELASTIC MODULUS __
Compression Test on Cores (ASTM C469).....1
Compression Test on Cylinders Molded
During Construction (ASTM C469).....2
Calculated Using ACI Relation Between
Elastic Modulus and Compressive Strength
(ACI 318, Section 8.5) 3
Other (Specify)_____4

	***STATE ASSIGNED ID**	[__ __ __ __]
SHEET 11	***STATE CODE**	[__ __]
INVENTORY DATA	***SHRP SECTION ID**	[__ __ __ __]
LTPP PROGRAM		

PORTLAND CEMENT CONCRETE LAYERS
STRENGTH DATA

* 1. **LAYER NUMBER (FROM SHEET 3)** [__]

FLEXURAL STRENGTH[1] (MODULUS OF RUPTURE) (PSI)

* 2. **TYPE OF TEST** ..... [__]
THIRD-POINT LOADING (AASHTO T97 OR ASTM C78) 1
CENTER-POINT LOADING (AASHTO T177 OR ASTM C293) .. 2

* 3. **AGE (DAYS)** ..... [__ __ __.]

* 4. **MEAN** ..... [__ __ __ __ __.]

5. MINIMUM ..... __ __ __ __ __.

6. MAXIMUM ..... __ __ __ __ __.

7. NUMBER OF TESTS ..... __ __.

8. STD. DEV ..... __ __ __ __ __.

COMPRESSIVE STRENGTH OF CONCRETE (PSI)
(TEST METHOD AASHTO T22 OR ASTM C39)

* 9. **AGE (DAYS)** ..... [__ __ __.]

*10. **MEAN** ..... [__ __ __ __ __.]

11. MINIMUM ..... __ __ __ __ __.

12. MAXIMUM ..... __ __ __ __ __.

13. NUMBER OF TESTS ..... __ __.

14. STD. DEV ..... __ __ __ __ __.

SPLITTING TENSILE STRENGTH OF CONCRETE (PSI)
(TEST METHOD AASHTO T198 0R ASTM C496)

15. AGE (DAYS) ..... [__ __ __.]

16. MEAN ..... [__ __ __ __ __.]

17. MINIMUM ..... __ __ __ __.

18. MAXIMUM ..... __ __ __ __.

19. NUMBER OF TESTS ..... __ __.

20. STD. DEV ..... __ __ __ __.

NOTE 1: For new construction of test sections for SHRP LTPP, use third point loading.

*STATE ASSIGNED ID [__ __ __ __]

SHEET 12 *STATE CODE [__ __]

INVENTORY DATA *SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM _____

PLANT MIXED ASPHALT BOUND LAYERS
AGGREGATE PROPERTIES

* 1. LAYER NUMBER (FROM SHEET 3) [__]

	COMPOSITION OF COARSE AGGREGATE		TYPE	PERCENT
* 2.	Crushed Stone.....1	Crushed Slag.....4	[__]	[__ __ __.]
* 3.	Gravel.....2	Manufactured	[__]	[__ __ __.]
* 4.	Crushed Gravel.....3	Lightweight.....5	[__]	[__ __ __.]
	Other (Specify)_____6			

* 5. GEOLOGIC CLASSIFICATION OF COARSE AGGREGATE [__ __.]
(SEE GEOLOGIC CLASSIFICATION CODES, TABLE A.9)

	COMPOSITION OF FINE AGGREGATE	TYPE	PERCENT
* 6.	Natural Sand.....1	[__]	[__ __ __.]
* 7.	Crushed or Manufactured Sand (From	[__]	[__ __ __.]
* 8.	Crushed Gravel or Stone).....2	[__]	[__ __ __.]
	Recycled Concrete.....3		
	Other (Specify)_____4		

* 9. TYPE OF MINERAL FILLER [__]

Stone Dust.....1	Portland Cement....3	
Hydrated Lime.....2	Fly Ash.....4	
Other (Specify)_____5		

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

	TYPE OF AGGREGATE	TYPE OF TEST	RESULTS
10.	Coarse	__ __	__ __ __.__ __ __
11.	Coarse	__ __	__ __ __.__ __ __
12.	Coarse	__ __	__ __ __.__ __ __
13.	Coarse	__ __	__ __ __.__ __ __

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

*STATE ASSIGNED ID [__ __ __ __]

SHEET 13 *STATE CODE [__ __]

INVENTORY DATA *SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM

PLANT MIXED ASPHALT BOUND LAYERS

AGGREGATE PROPERTIES (CONTINUED)

* 1.LAYER NUMBER (FROM SHEET 3) [__]

* 2. GRADATION OF COMBINED AGGREGATES

Sieve Size or No.	% Passing	Sieve Size or No.	% Passing
2".....	[__ __ __]	No. 4.....	[__ __]
1 1/2".....	[__ __ __]	No. 8.....	[__ __]
1".....	[__ __ __]	No. 10.....	[__ __]
7/8".....	[__ __ __]	No. 16.....	[__ __]
3/4 ".....	[__ __ __]	No. 30.....	[__ __]
5/8".....	[__ __ __]	No. 40.....	[__ __]
1/2".....	[__ __ __]	No. 50.....	[__ __]
3/8".....	[__ __]	No. 80.....	[__ __]
		No. 100.....	[__ __]
		No. 200.....	[__ __]

BULK SPECIFIC GRAVITIES:

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

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

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

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

7.EFFECTIVE SPECIFIC GRAVITY OF AGGREGATE COMBINATION (Calculated) __.__ __ __

*STATE ASSIGNED ID [__ __ __ __]

SHEET 14 *STATE CODE [__ __]

INVENTORY DATA *SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM _____

PLANT MIXED ASPHALT BOUND LAYERS
ASPHALT CEMENT PROPERTIES

* 1. LAYER NUMBER (FROM SHEET 3) [__]

* 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) [__.__ __ __]

ORIGINAL ASPHALT CEMENT PROPERTIES

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

* 6. VISCOSITY OF ASPHALT AT 275°F (CENTISTOKES)
(AASHTO T201) [__ __ __ __.__ __]

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

ASPHALT MODIFIERS (SEE TYPE CODE, TABLE A.15)

	TYPE	QUANTITY(%)
* 8. MODIFIER #1	[__ __].	[__ __].
* 9. MODIFIER #2	[__ __].	[__ __].

(IF OTHER, SPECIFY TYPE _____)

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

11. DUCTILITY AT 39.2°(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".

***STATE ASSIGNED ID** [__ __ __ __]

SHEET 15 ***STATE CODE** [__ __]

INVENTORY DATA ***SHRP SECTION ID** [__ __ __ __]

LTPP PROGRAM

PLANT MIXED ASPHALT BOUND LAYERS

ASPHALT CEMENT PROPERTIES (CONTINUED)

* **1.LAYER NUMBER (FROM SHEET 3)** [__]

LABORATORY AGED ASPHALT CEMENT PROPERTIES

2.TEST PROCEDURE USED TO MEASURE AGING EFFECTS __

ASTM D1754 - THIN FILM OVEN TEST.....1
ASTM D2872 - ROLLING THIN FILM OVEN TEST...2
OTHER (SPECIFY)_____3

3.VISCOSITY OF ASPHALT AT 140°F (POISE) (AASHTO T202) __ __ __ __ __ __.

4.VISCOSITY OF ASPHALT AT 275°F (CENTISTOKES) (AASHTO T201) __ __ __ __.__ __

5.DUCTILITY AT 77°F (CM) (AASHTO T51) __ __ __.

6.DUCTILITY AT 39.2°F (CM) (AASHTO T51) __ __ __.

7.TEST RATE FOR DUCTILITY MEASUREMENT AT 39.2°F (CM/MIN) __ __.__

8.PENETRATION AT 77°F, 100 g., 5 Sec. (TENTHS OF A MM) (AASHTO T49) __ __ __.

9.PENETRATION AT 39.2°F, 200 g., 60 Sec. (TENTHS OF A MM) (AASHTO T49) __ __.

10.RING AND BALL SOFTENING POINT (°F) (AASHTO T53) __ __ __.

11.WEIGHT LOSS (PERCENT) __.__

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

***STATE ASSIGNED ID** [__ __ __ __]

SHEET 16 ***STATE CODE** [__ __]

INVENTORY DATA ***SHRP SECTION ID** [__ __ __ __]

LTPP PROGRAM

PLANT MIXED ASPHALT BOUND LAYERS

ORIGINAL MIXTURE PROPERTIES

* **1.LAYER NUMBER (FROM SHEET 3)** [__]

* **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 D1561) __ __ __ __.

***STATE ASSIGNED ID** [__ __ __ __]

SHEET 17 ***STATE CODE** [__ __]

INVENTORY DATA ***SHRP SECTION ID** [__ __ __ __]

LTPP PROGRAM _____

PLANT MIXED ASPHALT BOUND LAYERS

ORIGINAL MIXTURE PROPERTIES

CONTINUED

*** 1.LAYER NUMBER (FROM SHEET 3)** [__]

*** 2.TYPE ASPHALT PLANT** [__]

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

OTHER (SPECIFY)_____3

*** 3.TYPE OF ANTISTRIPPING AGENT USED**
(SEE TYPE CODES, TABLE A.21) [__ __]
(Other, Specify_____)

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

*** 5. (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.)** [__ __.__]

6.MOISTURE SUSCEPTIBILITY TEST TYPE __

1 - AASHTO T165 (ASTM D1075)
2 - TEXAS FREEZE-THAW PEDESTAL TEST (REF. 21)
3 - TEXAS BOILING TEST (REF. 22)
4 - REVISED LOTTMAN PROCEDURE (AASHTO T283)
5 - OTHER (SPECIFY) _____

MOISTURE SUSCEPTIBILITY TEST RESULTS:

7. HVEEM STABILITY NO. __ __

8. PERCENT STRIPPED __ __

9. TENSILE STRENGTH RATIO (AASHTO T283) __.__ __

10. INDEX OF RETAINED STRENGTH (AASHTO T165) __ __ __.

***STATE ASSIGNED ID** [__ __ __ __]

SHEET 18 ***STATE CODE** [__ __]

INVENTORY DATA ***SHRP SECTION ID** [__ __ __ __]

LTPP PROGRAM _____

PLANT-MIXED ASPHALT BOUND LAYERS
CONSTRUCTION DATA

*** 1.LAYER NUMBER (SEE SHEET 3)** [__]

2.MEAN MIXING TEMPERATURE (°F) __ __ __.

LAYDOWN TEMPERATURES (°F)

3. MEAN ..... __ __ __ NUMBER OF TESTS ..... __ __
4. MINIMUM ..... __ __ __ MAXIMUM ..... __ __ __
5. STD. DEV. ..... __ __ __

	ROLLER CODE	#	ROLLER DESCRIPTION	GROSS WGT (TONS)	TIRE PRES. (PSI)	FREQ. (VIBR/MIN)	AMPLITUDE (IN)	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.Mean Air Temp (°F)	__ __ __.	__ __ __.	__ __ __.	__ __ __.
30.Compacted Thick.(in)	__.__	__.__	__.__	__.__
31.Curing Period(hours)	__ __.	__ __.	__ __.	__ __.

***STATE ASSIGNED ID** [__ __ __ __]

SHEET 19 ***STATE CODE** [__ __]

INVENTORY DATA ***SHRP SECTION ID** [__ __ __ __]

LTPP PROGRAM _____

UNBOUND OR STABILIZED BASE OR
SUBBASE MATERIAL DESCRIPTION

*** 1.LAYER NUMBER (FROM SHEET 3)** [__]

*** 2.AASHTO SOIL CLASSIFICATION (SEE CODES, TABLE A.10)** [__ __]

*** 3.ATTERBERG LIMITS (ASTM D4318)**
PI ..... [__ __.] LL ..... [__ __.] PL ..... [__ __.]

4.MAXIMUM LAB DRY DENSITY (PCF) __ __ __.

5.OPTIMUM LAB MOISTURE CONTENT (PERCENT) __ __.__

6.TEST USED TO MEASURE MAXIMUM DRY DENSITY __
Standard AASHTO T99.....1 ASTM D558.....4
Modified AASHTO T180.....2 ASTM D4223.....5
AASHTO T134 (SOIL-CEMENT)..3
Other (SPECIFY)_____6

7.COMPACTIVE ENERGY FOR 'OTHER' METHOD
(FT.-LBS./CU.IN.) __ __.__

IN SITU DRY DENSITY (PCF)

8. MEAN ..... __ __ __ NUMBER OF SAMPLES .... __ __
9. MINIMUM ..... __ __ __ MAXIMUM ..... __ __ __
10. STD. DEV. ..... __ __ __

IN SITU MOISTURE CONTENT (PERCENT OF DRY WEIGHT)

11. MEAN ..... __ __ __ NUMBER OF SAMPLES .... __ __
12. MINIMUM ..... __ __ __ MAXIMUM ..... __ __ __
13. STD. DEV. ..... __ __ __

14.COARSE GRADATION OF BASE/SUBBASE MATL.

15.

Sieve Size or No.	% Passing
1 1/2".....	__ __ __
1".....	__ __ __
7/8".....	__ __ __
3/4 ".....	__ __ __
5/8".....	__ __ __
1/2".....	__ __ __
3/8".....	__ __

FINE GRADATION OF BASE/SUBBASE MATL.

Sieve Size or No.	% Passing
No. 4.....	__ __
No. 8.....	__ __
No. 10.....	__ __
No. 16.....	__ __
No. 30.....	__ __
No. 40.....	__ __
No. 50.....	__ __
No. 80.....	__ __
No. 100.....	__ __
No. 200.....	__ __

	***STATE ASSIGNED ID**	[__ __ __ __]
SHEET 20	***STATE CODE**	[__ __]
INVENTORY DATA	***SHRP SECTION ID**	[__ __ __ __]
LTPP PROGRAM		

UNBOUND OR STABILIZED BASE OR

SUBBASE MATERIAL DESCRIPTION (CONTINUED)

*** 1.LAYER NUMBER (FROM SHEET 3)** [__]

TYPE AND PERCENT STABILIZING AGENT (FOR STABILIZED LAYERS ONLY)

*** 2. STABILIZING AGENT 1** **TYPE CODE** [__] **PERCENT** [__ __.__]
*** 3. STABILIZING AGENT 2** **TYPE CODE** [__] **PERCENT** [__ __.__]

STABILIZING AGENT TYPE CODES

Asphalt Cement..... 1	Lime..... 5
Emulsified Asphalt.... 2	Fly Ash, Class C..... 6
Cutback Asphalt..... 3	Fly Ash, Class N..... 7
Portland Cement..... 4	
Other (Specify) _____	8

*** 4.ADMIXTURES:** **TYPE** [__] **PERCENT** [__ __.]

Calcium Chloride..... 1	Magnesium Chloride.... 3
Sodium Chloride..... 2	
Other (Specify) _____	4

COMPRESSIVE STRENGTH (PSI)

*** 5. MEAN .....**	[__ __ __]	NUMBER OF TESTS	__ __
6. MINIMUM	__ __ __	MAXIMUM	__ __ __
7.		STD. DEV.	__ __ __

*** 8.TYPE OF COMPRESSION TEST** [__]

AASHTO T167 (ASTM D1074)....1	AASHTO T220.....2
AASHTO T24 (ASTM D1633).....2	AASHTO T234 (ASTM D2850).4
Other (Specify) _____	5

*** 9.CONFINING PRESSURE (PSI)[1]** [__ __.__]

10.CALCIUM CARBONATE CONTENT (PERCENT) (ASTM D4373) __ __ __.

11.CALIFORNIA BEARING RATIO (CBR) (AASHTO T193 OR ASTM D3668) __ __ __.

12.RESISTANCE (R-VALUE) (ASTM D2844) __ __ __.

13.MODULUS OF SUBGRADE REACTION (K-VALUE) (PSI/SQ.IN.) __ __ __.

14. TYPE OF TEST __

AASHTO T221 OR ASTM D1195... 1 AASHTO T222..... 2

NOTE 1: If the test is unconfined, enter "0.0".

	***STATE ASSIGNED ID**	[__ __ __ __]
SHEET 21	***STATE CODE**	[__ __]
INVENTORY DATA	***SHRP SECTION ID**	[__ __ __ __]
LTPP PROGRAM		

SUBGRADE DATA

* **1.AASHTO SOIL CLASSIFICATION (SEE CODES, TABLE A.10)** [__ __]
2.CALIFORNIA BEARING RATIO (CBR) (AASHTO T193 OR ASTM D3668) __ __ __.
3.RESISTANCE (R-VALUE) (AASHTO T190 OR ASTM D2844) __ __ __.
4.MODULUS OF SUBGRADE REACTION (K-VALUE) (PSI/SQ.IN.) __ __ __.
5. TYPE OF TEST __
AASHTO T221 OR ASTM D1195... 1 AASHTO T222..... 2
6.PERCENT PASSING NO. 40 SIEVE __ __.__
7.PERCENT PASSING NO. 200 SIEVE __ __.__
8.PLASTICITY INDEX (AASHTO T90 OR ASTM D4318) __ __.
9.LIQUID LIMIT (AASHTO T89 OR ASTM D4318) __ __.
10.MAXIMUM LAB DRY DENSITY (PCF) __ __ __.
11.OPTIMUM LAB MOISTURE CONTENT (PERCENT) __ __.__
12.TEST USED TO MEASURE MAXIMUM DRY DENSITY __
STANDARD AASHTO (T-99)..... 1 MODIFIED AASHTO (T-180).. 2
Other (Specify)_____3
13.COMPACTIVE ENERGY FOR "OTHER" METHOD (FT.-LBS./CU.IN.) __ __.__

IN SITU DRY DENSITY (PERCENT OF OPTIMUM)

14.	MEAN ..... __ __ __	NUMBER OF TESTS	__ __
15.	MINIMUM ..... __ __ __	MAXIMUM	__ __ __
16.		STD. DEV.	__ __ __

IN SITU MOISTURE CONTENT (PERCENT OF OPTIMUM)

17.	MEAN ..... __ __ __.__	NUMBER OF TESTS	__ __
18.	MINIMUM ..... __ __ __.__	MAXIMUM	__ __ __.__
19.		STD. DEV.	__ __ __.__

IN SITU DRY DENSITY (PCF)

20.	MEAN ..... __ __ __	NUMBER OF TESTS	__ __
21.	MINIMUM ..... __ __ __	MAXIMUM	__ __ __
22.		STD. DEV.	__ __ __

IN SITU MOISTURE CONTENT (PERCENT OF DRY WEIGHT)

23.	MEAN ..... __ __ __	NUMBER OF TESTS	__ __
24.	MINIMUM ..... __ __ __	MAXIMUM	__ __ __
25.		STD. DEV.	__ __ __

*STATE ASSIGNED ID [__ __ __ __]

SHEET 22 *STATE CODE [__ __]

INVENTORY DATA *SHRP SECTION ID [__ __ __ __]

LTPP PROGRAM _____

SUBGRADE DATA (CONTINUED)

RELATIVE DENSITY OF COHESIONLESS FREE-DRAINING SOILS
(ASTM D2049)

MEASURED DENSITIES FROM LABORATORY TESTS (PCF):

1. MINIMUM ..... __ __ __.__ MAXIMUM ..... __ __ __.__

RELATIVE DENSITIES (PERCENT):

2. MEAN ..... __ __.__ NUMBER OF TESTS ..... __ __
3. MINIMUM ..... __ __.__ MAXIMUM ..... __ __.__
4. STD. DEV. ..... __ __.__

5. SOIL SUCTION (TSF) (AASHTO T273) __ __ __.__

6. EXPANSION INDEX __ __ __.
(NEW TEST UNDER COMMITTEE BALLOT BY ASTM IN DEC. 1987)

SWELL PRESSURE (PSI)
7. TEST VALUE __ __ __.
8. TEST CODE __
AASHTO T190 OR ASTM D2844.1 AASHTO T258, Method 1..2
Other _____3

9. PERCENT BY WEIGHT FINER THAN 0.02MM[1] __ __.__

10. AVERAGE RATE OF HEAVE DURING STANDARD
LABORATORY FREEZING TEST (MILLIMETERS/DAY)[1] __ __.__

11. FROST SUSCEPTIBILITY CLASSIFICATION CODE[1] __

Negligible.....1	Medium.....4
Very Low.....2	High.....5
Low.....3	Very High.....6

NOTE 1: This data is only required in "Freeze Zones" where frost may be expected to penetrate into the subgrade.

Revised June 13, 1988

***STATE ASSIGNED ID** __ __ __ __

SHEET 1 | ***STATE CODE** __ __

MAINTENANCE DATA | ***SHRP SECTION ID** __ __ __ __

LTPP PROGRAM

HISTORICAL MAINTENANCE INFORMATION[1]

1 ***YEAR**	2 ***MAINT. CASE NO.** (CASE)	3 ***WORK TYPE CODE** (TABLE A.17)	4 ***MAINTENANCE LOCATION CODE** (TABLE A.18)	5 ***MAINT. MATERIAL CODE** (TABLE A.19)	6 ***WORK QUANTITY**	7 ***THICKNESS** (INCHES)	8 ***TOTAL COST**[2] (THOUSANDS OF DOLLAR PER LANE-MILE)
__ __	__ __ __	__ __	__ __	__ __	__ __ __ __ __.	__ __.__	__ __ __.
__ __	__ __ __	__ __	__ __	__ __	__ __ __ __ __.	__ __.__	__ __ __.
__ __	__ __ __	__ __	__ __	__ __	__ __ __ __ __.	__ __.__	__ __ __.
__ __	__ __ __	__ __	__ __	__ __	__ __ __ __ __.	__ __.__	__ __ __.
__ __	__ __ __	__ __	__ __	__ __	__ __ __ __ __.	__ __.__	__ __ __.
__ __	__ __ __	__ __	__ __	__ __	__ __ __ __ __.	__ __.__	__ __ __.

Note 1. This data will frequently be very difficult to convert from existing records for pre-SHRP monitoring work, but it is sufficiently important that every effort should be made to obtain it.

Note 2. Maintenance costs should be converted to thousands of dollars per lane-mile for uniformity with other cost data.

***STATE ASSIGNED ID** [__ __ __ __]

SHEET 5 ***STATE CODE** [__ __]

MAINTENANCE DATA ***SHRP SECTION ID** [__ __ __ __]

LTPP PROGRAM _____

CRACK SEALING DATA FOR PAVEMENT WITH ASPHALT CONCRETE SURFACES

1. ***DATE WORK BEGAN** (MONTH/DAY/YEAR) [__ __ /__ __ /__ __]
   ***DATE WORK WAS COMPLETED** (MONTH/DAY/YEAR) [__ __ /__ __ /__ __]

2. ***AVERAGE CRACK SEVERITY LEVEL** (SEE DISTRESS IDENTIFICATION MANUAL)
   (LOW = 1, MODERATE = 2, HIGH = 3) [__]

3. ***PRIMARY TYPE OF CRACKS** (SEE TABLE A.22 FOR TYPE CODES) [__ __]
   (SEE DISTRESS IDENTIFICATION MANUAL FOR DESCRIPTION)

4. ***TYPE OF MATERIAL USED TO SEAL CRACKS** [__]

ASPHALT CEMENT.....1	EMULSIFIED ASPHALT CEMENT WITH SAND.....5
EMULSIFIED ASPHALT CEMENT..2	
CUTBACK ASPHALT CEMENT.....3	PROPRIETARY CRACK/JOINT SEALANT.....6
EMULSIFIED ASPHALT CEMENT SLURRY SEAL.....4	MODIFIED ASPHALT.....7

   OTHER (SPECIFY) _____ 8
   DATA SOURCE - ACTUAL = 1 PLANS/SPECS = 2 JUDGEMENT = 3 [__]
   IF 6 OR 7 ABOVE, COMPLETE FOLLOWING:
   MANUFACTURER NAME [_____]
   MANUFACTURER SEALANT NAME [_____]

5. ***AMBIENT CONDITIONS AT TIME OF CRACK SEALING**
   AIR TEMPERATURES (^{o}F) LOW __ __ __.
   HIGH __ __ __.
   ***SURFACE MOISTURE** - DRY = 1, WET = 2 [__]
   DATA SOURCE - ACTUAL = 1 PLANS/SPECS = 2 JUDGEMENT = 3 __

6. APPROXIMATE TOTAL LENGTH OF CRACKS SEALED, FEET __ __ __ __.

7. METHOD USED TO CLEAN CRACK PRIOR TO SEALING __

NONE.....1	STEEL WIRE BRUSH.....4
COMPRESSED AIR.....2	BROOMING.....5
ROUTING.....3	HOT AIR LANCE.....6

   OTHER (SPECIFY) _____ 7
   DATA SOURCE - ACTUAL = 1 PLANS/SPECS = 2 JUDGEMENT = 3 __

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

PAVEMENT CORE LOG AT C-TYPE CORE LOCATIONS

SAMPLING DATA SHEET 2

IRP 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.)	*6*	*6*	*6*	*6*	*6*	*6*
Core Sample No.						
Depth (Inches)						
Material Description						
Material Code						
Core Size (inch Diam)	*6*	*6*	*6*	*6*	*6*	*6*
Core Sample No.						
Depth (Inches)						
Material Description						
Material Code						
Core Size (inch Diam.)	*6*	*6*	*6*	*6*	*6*	*6*
Core Sample No.						
Depth (Inches)						
Material Description						
Material Code						
Core Size (inch Diam.)	*6*	*6*	*6*	*6*	*6*	*6*
Core Sample No.						
Depth (Inches)						
Material Description						
Material Code						
Remarks						

GENERAL REMARKS: _____

CERTIFIED VERIFIED AND APPROVED DATE

_____ _____ _____-____-19___

ɪeld Crew Chief SHRP Representative Month- Day- Year

ɪfiliation:_____ Affiliation:_____

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

A-TYPE BORE HOLE LOG

SAMPLING DATA SHEET 4-1

RP REGION _____ STATE _____ ***STATE CODE*** __ __

SHRP 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

RP 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_____ ***NUCLEAR DENSITY GAUGE I.D.***_____ ***TEST DATE***___-___-____

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

LOCATION NO:_____ DATE OF LAST MAJOR CALIBRATION___-___-___

Note: Use additional sheets if necessary

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

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 _____

SHOULDER PROBE LOG

SAMPLING DATA SHEET 9

:P REGION _____ STATE _____ ***STATE CODE*** __ __

: EXPERIMENT NO _____ ***SPS PROJECT CODE*** __ __

.OUTE/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

RP 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) _____

X 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 Affiliation:_____ SHRP Representative Affiliation:_____ Month- Day- Year

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

BULK SAMPLING OF SUBGRADE AND UNBOUND GRANULAR MATERIALS

SAMPLING DATA SHEET 12

RP 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					

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 _____

LABORATORY SHIPMENT SAMPLES INVENTORY

FIELD OPERATIONS INFORMATION FORM 1

RP 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 VERIFIED AND APPROVED DATE

_____ _____ _____-____-19___

eld Crew Chief SHRP Representative Month- Day- Year

filiation:_____ Affiliation:_____

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

SUMMARY OF MATERIAL SAMPLES SENT TO EACH LABORATORY

FIELD OPERATIONS INFORMATION FORM 2-1

LTPP REGION _____ STATE _____ ***STATE CODE*** __ __

SPS 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:_____

APPENDIX B

SHRP-LTPP DATA COLLECTION STANDARD CODES

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

APPENDIX A - STANDARD CODES

This appendix provides standard codes to simplify entry of data during collection and the subsequent storage and processing of this data. These codes are tabulated as follows:

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.

Table A.3 - Experiment Type Definitions for the General Pavement Studies

(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 study are those in which the structural 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).

(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.

Table A.3 - Experiment Type Definitions for the General Pavement Studies (Continued)

(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.

(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.

Note: The number in parentheses in the above paragraphs refer to the material codes found in Tables A.5, A.6, A.7, and A.8 unless indicated otherwise.

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

Table A.4 - Pavement Type Codes (Continued)

Type of Pavement	Code
*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").

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
Plain Portland Cement Concrete (only used for SPS-7 overlays of CRCP)	90
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

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

Table A.8 - Material Type Codes for Thin Seals and Interlayers

	Code
Grout	70
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

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 Specimen 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

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

	Code
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
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

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

	Code
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.

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

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

	Code
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
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
Mill Existing Pavement and Overlay with Hot-Mix Recycled Asphalt Concrete (sq. yards)	55
Mill Existing Pavement and Overlay with Cold-Mix Recycled Asphalt Concrete (sq. yards)	56

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.

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
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

Table A.21 - Anti-Stripping Agent Type Codes (Continued)

	Code
Emery 1765-6860	39
Emery 6886B	40
Husky Anti-Strip	41
Indulin AS-Special	42
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
No Antistripping Agent Used	00

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