LONG TERM PAVEMENT PERFORMANCE PROGRAM DIRECTIVE

For The Technical Direction Of The LTPP Program

Program Area: **MATERIALS** Directive Number: **M-6**

Date: **April 4, 1994** Supersedes: **N/A**

Subject: **Guidelines for Samples Receipt and Processing (L01 - L06)**
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INTRODUCTION

The FHWA-LTPP Laboratory Material Testing Contractors (LMTC) will be under the technical operational control of the FHWA Contracting Officers Technical Representative (COTR). However, an essential activity of the LMTC is the establishment and continuous communication between the COTR, FHWA-LTPP Regional Engineers (RE), and FHWA-LTPP Regional Coordination Office Contractor (RCOC). Such communication and coordination will assure timely execution of the work and the transmission of testing results.

The RE and the RCOC will provide coordination between the LMTC and the state/provincial highway agency. The RE (or his designee) and the designated RCOC materials testing related staff will work with the LMTC to assure that the correct number and types of sample are being received from the state/provincial highway agency laboratory. Coordination between the COTR, RE, RCOC and the LMTC is essential to resolve any issues that may occur during the testing process.

The RCOC will also work jointly with the RE to insure data integrity and quality assurance throughout the laboratory testing program. Specific responsibilities include: checking field data packets for completeness and accuracy, transmitting incorrect field sampling data packets to the state/province highway agency (or their designee) for correction, direct contact with the LMTC to (1) resolve inconsistencies in the field sampling data packet, (2) approve pavement layering information and laboratory test assignments, and (3) perform other quality assurance checks. However, ultimate approval to proceed with laboratory testing activities is the sole responsibility of the COTR.

Table 1 provides a list of all appropriate agencies and their addresses/phone numbers for use in this coordination process.

SAMPLE HANDLING AND RECORD KEEPING

As discussed previously, the LMTC is required to keep close coordination with the COTR, RE and RCOC personnel from the time of receiving the samples from the field/laboratory to the final disposal of the material samples. Timely transmission of information between the LMTC and the COTR, RE and RCOC personnel must be maintained using the standard guidelines and forms discussed in this section.

Table 1. Contact Names and Addresses for FHWA LTPP Materials Testing.

CONTACT NAME	ADDRESS/PHONE NUMBER
Mr. Aramis López, Jr. COTR	FHWA / LTPP Division, HNR-40 6300 Georgetown Pike McLean, VA 22101-2296 Phone: 703-285-2013 Fax: 703-285-2767
Mr. Allen Palmer Braun Intertec Inc. FHWA-LTPP Laboratory Supervisor Engineer North Central/Western Region	Mailing Address: P.O. Box 39108 Minneapolis, MN 55439-0108 Shipping Address: 6801 Washington Ave. Sth. Minneapolis, MN 55439-0108 Phone: 612-942-4893 Fax: 612-941-4151
Mr. Richard Boudreau Law Engineering, Inc. FHWA-LTPP Laboratory Supervisor Engineer Southern/North Atlantic Region	Mailing/Shipping Address (for all but SPS-3 samples): 396 Plasters Ave., N.E. Atlanta, GA 30324 Phone: 404-873-4761 Fax: 404-872-5927 Mailing/Shipping Address (SPS-3 samples): 4634 South 36th. Place Phoeniz, AZ 85040 Attn: Mr. James Carusone Phone: 602-437-0250 Fax: 602-437-3675 (Note: All coordination for SPS-3 samples can be handled directly with Mr. Carusone. However, please send a copy of all correspondence to Mr. Boudreau).

Table 1. Contact Names and Addresses for FHWA LTPP Materials Testing.

CONTACT NAME	ADDRESS/PHONE NUMBER
Mr. Dick Ingberg FHWA-LTPP RE North Central Region	c/o Braun Intertec Pavement Inc., 1983 Sloan Place St. Paul, MN 55117-2004 Phone: 612-776-2210 Fax: 612-776-7201
Mr. Homer Wheeler (outgoing) FHWA-LTPP RE Southern Region	c/o Brent Rauhut Engineering, Inc. 8240 MoPac, Suite 220 Austin, TX 78759 Phone: 512-346-7477 Fax: 512-346-8750
Mr. Cal Berge FHWA-LTPP RE Western Region	c/o Nichols Consulting Engineers, Chtd. 1885 S. Arlington Blvd. Suite 111 Reno, NV 89509 Phone: 702-329-5018 Fax: 702-329-5098
Mr. Ivan Pecnik FHWA-LTPP RE North Atlantic Region	c/o Pavement Management Systems, Ltd. 415 Lawrence Bell Drive Unit #3 Amherst, NY 14221 Phone: 716-631-5205 Fax: 716-632-4808
Dr. Gene Skok Project Manager FHWA-LTPP North Central Region RCOC	Braun Intertec Pavement Inc., 1983 Sloan Place St. Paul, MN 55117-2004 Phone: 612-776-7522 Fax: 612-776-7201
Dr. Brent Rauhut Project Manager FHWA-LTPP Southern Region RCOC	Brent Rauhut Engineering, Inc. 8240 MoPac, Suite 220 Austin, TX 78759 Phone: 512-346-0870 Fax: 512-346-8750

Table 1. Contact Names and Addresses for FHWA LTPP Materials Testing.

CONTACT NAME	ADDRESS/PHONE NUMBER
Mr. Jim Nichols Project Manager FHWA-LTPP Western Region RCOC	Nichols Consulting Engineers, Chtd. 1885 S. Arlington Blvd. Suite 111 Reno, NV 89509 Phone: 702-329-4955 Fax: 702-329-5098
Dr. Bill Phang Project Manager FHWA-LTPP North Atlantic Region RCOC	Pavement Management Systems, Ltd. 415 Lawrence Bell Drive Unit #3 Amherst, NY 14221 Phone: 716-631-0804 Fax: 716-632-4808

Sample Receipt Procedure

Inspection and Receiving Log. The field material samples will be shipped by the state/province highway agency (or their designee) to either Law Engineering Inc. or Braun Intertec. At the present time, the materials samples from the North Atlantic and Southern LTPP Regions will be shipped to Law Engineering and the materials samples from the North Central and Western LTPP Regions will be sent to Braun Intertec. The state/province highway agency (or their designee) will also mail a complete packet of field data sheets for the LTPP pavement section(s). Field Operations Forms provide an inventory of material samples shipped to the Laboratory Testing Contractor. Field Operations Forms also give pavement layer numbers assigned in the field (field layer number).

Upon receipt of the material samples, the samples shall be inspected by the Laboratory Chief for completeness of the shipment (as compared to the data shown on the Field Operations Forms provided in the packet for the pavement section/SPS project). The sample shipment shall also be checked for damage, contamination, sufficient quantity, proper identification (LTPP Section ID, Sample Location Number, LTPP Sample Number, Field Set Number, and Field Layer Number) as shown on the field forms, and properly completed field forms. Regardless of the condition and size of the samples, they must be logged in by accurately using the information from the Field Operations Forms provided in the packet sent by the state/province highway department. Individual sample tags and markings should be checked against the Field Operations Forms also.

Sample Receipt Report. The LMTC shall use Forms L01, L02, and L03 to prepare the sample receipt report for each LTPP pavement section/SPS project. These forms (L01, L02 and L03) are contained in Attachment A of this document. It is imperative that LTPP sample identification (LTPP Section

ID, Sample Location Number, LTPP Sample Number) as well as the Field Set Number and any unique laboratory control number (assigned by the LMTC) shall remain attached to the sample/sample container at all times. In the event it becomes necessary to remove the identification label or tag during the processing, steps shall be taken to insure that the relationship between the sample and its identification is not lost but the identification is restored to the sample at the end of each step of processing. The Laboratory Supervisor Engineer shall be responsible to train and provide necessary instructions to the Laboratory Chief and laboratory technicians associated with the LMTC so that strict adherence to these guidelines is achieved.

In order to complete the sample receipt process, the following general data items must be completed on each sheet as follows:

Sheet No. - All data sheets from the laboratory material testing work on a particular SPS project should be assigned sequential numbers starting from 1 for the sample receipt report (Form L01) followed by the sample inspection report (Form L02); preliminary laboratory test assignment (Form L03); laboratory test assignments (Form L04) and so on in increasing order through all of the appropriate L-type laboratory testing forms.

Laboratory Performing Test - The laboratory where the laboratory materials test is conducted shall be written on this line when completing the forms.

Laboratory Identification Code - Record the laboratory identification code number assigned by the RCOC to the participating laboratory.

Region - It should show one of the four LTPP regions in which the project is located as follows:

NA = North Atlantic Region
S = Southern Region
W = Western Region
NC = North Central Region

State - Record the two letter abbreviation as shown in Table C.2.1 of the ***"LTPP Interim Guide for Laboratory Materials Handling and Testing,"*** of the state, District of Columbia, Puerto Rico or the Canadian Province in which the field material sampling and testing was conducted.

State Code - Record the two-digit code as shown in Table C.2.1 of the ***"LTPP Interim Guide for Laboratory Materials Handling and Testing"***.

SPS Experiment No - Record the SPS experiment designation for the pavement sections represented by the sample shipment.

SPS Project Code - The two digit SPS project code. The first digit (from the left) of this code should either be a O (zero), for the first project constructed in a state, or a letter starting with A, B, etc. for

the second, third, etc. projects of the same SPS experiment constructed in the same state. The second digit corresponds to the SPS experiment number.

Test Section No - Record the two digit number assigned to the test section. This number shall be "00" for Project Level Information.

Field Set No - The field set number is a sequentially assigned number to indicate the different time periods in which material samples and field testing were conducted on the project. These time periods usually refer to different stages in the pavement life, such as prior to overlay construction, after overlay construction, end of test, etc. A field set number can apply to more than one day since sampling of SPS test sections usually requires more than one day. As a general rule, the same field set number should be applied to all material samples and field tests conducted in a continuous 30 day period, unless a construction event occurs between the two sampling sessions. Enter 1 for the first time that material sampling and field testing are conducted on the project.

Sampled By - This is used to identify the Drilling and Sampling Crew who performed the field material sampling and field testing work for this particular project.

Date (or Date Sampled) - All dates should be recorded as mm/dd/yy. This date should be the date on which the field material sampling and field testing was conducted.

At the bottom of each LTPP Standard Form, the following information must be entered:

Submitted By, Date - The signature (clearly written) is required of the FHWA-LTPP Laboratory Project Supervisor Engineer (or their designee) and the date of this signature. Underneath this signature, the agency affiliation of the person who signed the form should be identified.

Checked and Approved, Date - The signature (clearly written) is required of the FHWA-LTPP Representative who checked and approved the report and the date of this signature. Underneath this signature, the agency affiliation of the person who approved the form should be identified. For the L01-L04 form the signature of the RE (or their designee) is required. For Form L06, the signature of the COTR is required for approval of the form.

Form L01 "Sample Receipt"

The summary information about material samples required on Form L01 is based on the examination of the sample shipment received in the laboratory and comparison with the information provided by the state/province agency (or their designee) on the Field Operations Forms. The following information shall be entered on Form L01:

Number of Sample Containers Received - The number of cartons, boxes and other types of sample containers should be recorded. This is to be used for only one SPS project. If more than one SPS

project's samples are received at a time, each individual set of SPS project samples should be separated and all information recorded for each individual project.

Samples Received By - The name(s) of the laboratory personnel who received the samples should be written here along with the date the samples were received.

Authorized By - The name of the laboratory personnel who authorized the receipt of the samples and checked the sample shipment for completeness. The date of authorization shall also be included.

Work Initiated By - The name(s) of the laboratory personnel who initiated the laboratory handling and testing work and the date this work was initiated. (This can be the same individual for reviewing, authorizing, and initiating.)

Samples Checked With the Material Samples Inventory Received with the Shipment - This shall be answered with a "yes" if the number and type of samples received were consistent with the number and type of samples indicated on Field Operations Information Forms 1 and 2 received from the drilling and sampling crew in the field data packet. A "no" shall be placed here if the number and type of samples received are not consistent with Field Operations Information Forms 1 and 2. If the answer is "no", then the RE shall be notified and this problem resolved.

Total Number of -

1) AC CORES: Record the number of 4 inch, 6 inch and 12 inch cores, respectively, received by the laboratory.

   Record the number of AC cores out of the total number of AC cores to be sawed from:

   a) Bound base/subbase
   b) PCC and bound base/subbase
   c) PCC

   Record the total number of PCC cores to be sawed from bound base or subbase material.

2) BOUND BASE CORES: Record the total number of 4 inch bound base cores received.

3) BOUND SUBBASE (INCLUDING TREATED SUBGRADE) CORES: Record the total number of 4 inch bound subbase cores received.

4) UNBOUND BASE SAMPLES: Record the total number of unbound base samples received.

   (a) BAGS (BULK)
   (b) JARS (MOISTURE)

5) UNBOUND SUBBASE SAMPLES: Record the total number of unbound subbase samples

received.

(a) BAG (BULK)
(b) JARS (MOISTURE)

6) SUBGRADE SAMPLES: Record the total number of granular subgrade samples received.

(a) BAGS (BULK)
(b) JARS (MOISTURE)
(c) THIN-WALLED TUBES
(d) SPLITSPOON SAMPLES

7) PCC CORES: Record the number of PCC core samples received from the drilling and sampling crew.

8) PCC BEAMS: Record the number of formed PCC beams received.

9) AC MIX BULK SAMPLES: Record the number of AC hot-mix bulk samples received.

10) AC-TREATED BASE BULK SAMPLES: Record the number of AC-treated base bulk samples.

11) OTHER: Record the material type, type of sample and number of samples received for any other types of samples received.

12) SAMPLES TO BE SHIPPED TO OTHER LABORATORIES: This section is to be used to record the type, number of samples and the laboratory where the individual samples are to be shipped.

Report Distribution - This shall be "checked off" whenever the Sample Receipt Report is sent to the RE/RCOC.

Special Instructions - Any special instructions for laboratory handling and laboratory material testing shall be entered here.

Form L02 "Sample Inspection Report"

Attachment "A" to Form L01 is required to be completed on Form L02. Form L02 documents the as-received status of all samples recorded on the material samples inventory by the state/province agency (or their designee). Sample condition, as observed during inspection, must be recorded on this form. The following information shall be entered on this form:

Location Number - This is a three or four digit alphanumeric code for the sample location obtained

from field markings and Field Operations Information Form 1. This number designates the field location of the sample.

Sample Number - This is an alphanumeric four or five digit code which will have two letters on the left side and up to three Arabic numerals on the right side which identify the type of sample/specimen and the sampling location of the material sample.

The first digit on the left will have a letter that defines the "sample type." It can be one of the following nine letters: C (Core sample), K (Block sample), B (Bulk sample), M (Moisture sample), T (thin-walled tube sample), J (Splitspoon sample), P (chunk and/or broken pieces), F (molded beam), G (molded cylinder).

The second digit from the left end will have another letter which indicates the sample material. It can be one of the following eight letters: A (asphalt concrete), P (portland cement concrete), X (portland cement concrete 14-day test specimens), Y (28-day test specimens), Z (365-day test specimens), T (treated or bound base/subbase), G (granular or unbound base/subbase) and S (subgrade soil).

Sample numbers for each sample retrieved from the field and sent to the LMTC can be found on Field Operations Information Form 1.

Sample Size - The size of the material sample. For example, the following terms may be used for these particular samples:

Core - 4" (i.e. 4 inch diameter)
Moisture - jar
Bulk - bag
Block - 12" x 12"

Sample Type - Type of material sample. For example; core, block, piece, chunk, bulk, moisture, splitspoon, etc.

Sample Material - Type of material sampled. For example; AC, PCC, base, subbase, subgrade, etc.

Sample Condition - This is the sample condition as observed during inspection. Possible entries may be good, cracked, loose, bag torn, spilled, etc.

Remarks - The remarks should include such items as; discrepancies found after comparing the samples with Field Operations Information Form 1, a note of any cores of two materials required to be sawed, approximate weight of bulk samples and a comment if there is an insufficient quantity than that required to complete the SPS laboratory material handling and testing program.

General Remarks - Any other pertinent comments shall be added here.

Form L03 "Preliminary Laboratory Test Assignments"

Form L03 is used for the preliminary assignment of laboratory tests to a particular laboratory. There is one L03 Form for use with each SPS experiment respectively. Use the appropriate form for the appropriate SPS experiment. This form is Attachment "B" to the Sample Receipt Report (Form L01) and it should be submitted for approval to the RE/RCOC with Form L01 and Form L02 after the samples have been received and checked, and prior to the commencement of the laboratory material testing.

A check mark should be placed in the blank space before the test designation if this test is to be performed in the participating laboratory in which the samples were received.

Note: The RE and RCOC approval of the L03 form is only an indication that the samples are ready for testing.

Form L04 "Laboratory Test Assignment"

After preparing the sample receipt report for the samples from one pavement section/SPS project, the FHWA-LTPP Laboratory Supervisor Engineer shall establish pavement layering, make laboratory test assignments, and forward these test assignments to the RE and RCOC for review, concurrence and approval.

Pavement Layering. Initial pavement layering information is available on the Field Operations Forms completed during field material sampling and testing. These are to be provided to the LMTC by the state/province highway agency directly, or through the RE or the RCOC. One of the purposes of the field material sampling and field testing and the laboratory material testing program is to make an independent determination of pavement layering. Field Operations Form 1 submitted by the state/provincial highway agency gives pavement layering identification (field layer number) for all pavement sublayers as observed in the field and recorded on the field sampling and testing forms. However, in most cases the field crew may not be able to devote sufficient time and resources to make a detailed layer identification. In any event, the LMTC is required to identify all pavement layers and assign layer numbers using Form L04 using all of the information available. The laboratory shall coordinate this layering with the RE/RCOC to resolve any discrepancies. Form L04 shall be completed as per the following directions.

Column 1: Layer Number - Layer number is assigned on Column 1 of Form L04 starting with layer number 1. Layer number 1 is always assigned for the subgrade and the last layer number is always assigned to the pavement surface layer. Example of layer numbers for a five-layer pavement structure is:

Subgrade . . . . . .
1

Subbase 2
Base 3
AC Binder Course 4
AC Surface Course 5

Column 2: Layer Description - Layer description is provided on Column 2 of this form, using the following codes:

Overlay	01
Seal Coat	02
Original Surface Layer	03
AC Layer Below Surface (Binder Course)	04
Base Layer	05
Subbase Layer	06
Subgrade	07
Interlayer	08
Friction Course	09
Surface Treatment	10
Embankment (Fill)	11

Layer Description Code "11" shall only be used for SPS-1, SPS-2 and SPS-8 project (e.g. "new construction"). Apparent embankment materials used in the SPS-3, SPS-4, SPS-5, SPS-6, SPS-7 and SPS-9 experiments shall be coded using Layer Description Code 6 (Subbase).

Layer Description Code "8" (Interlayer) applies to Stress Absorbing Membrane Interlayers (SAMIs), all types of engineering fabrics and any other type of distinct layer that is used for providing a separation between two "structural" layers. An interlayer is generally a "non-structural" component of the pavement layering system.

The following table provides a list of valid material codes for each Layer Description Code:

Layer Description Code	Valid Material Codes
01	01-08, 13, 16-20
02	71, 72, 73
03	01-08, 17-20
04	01, 03, 13, 20
05	302-310, 319-350
06	302-310, 319-350
07	100-178, 200-294
08	71-80, 85
09	02, 20
10	11, 12, 20
11	100-178, 200-294

Column 3: Layer Type - Layer type code is assigned in Column 3 from the left on Form L04 using:

AC .. for asphalt concrete (bituminous concrete) layer,
PC .. for portland cement concrete layer,
TB .. for bound (treated) base,
TS .. for bound (treated) subbase,
GB .. for unbound (granular) base,
GS .. for unbound (granular) subbase, and
SS .. for subgrade (untreated),
EF .. for engineering fabrics.

The following table provides a list of valid Layer Type Codes for each Layer Description Code:

Layer Description Code	Layer Type Code
01	AC, PC
02	AC
03	AC, PC
04	AC
05	TB, GB

Layer Description Code	Layer Type Code
06	TS, GS
07	SS
08	AC, EF
09	AC
10	AC
11	GS

Column 4: Sample Location Number - Record the sample location number as obtained from field markings, Field Operations Forms, and as entered earlier on Form L02.

Column 5: LTPP Sample Number - Record the four or five digit LTPP Sample Number as obtained from field markings, Field Operations Forms, and as entered earlier on Form L02.

Column 6: LTPP Laboratory Test Number - The number 1 should be assigned to the samples retrieved from the approach end of the test section. The number 2 shall be assigned to samples retrieved from the leave end of the test section and the number 3 shall be assigned for samples retrieved from within the section boundaries.

Column 7: Laboratory Control Number - This number can be the control number assigned by the LMTC in accordance with their in-house practice.

Column 8: LTPP Test Designation - Record on the form as shown to the left of the laboratory test titles on Form L03.

Column 9: LTPP Protocol Number - Record on the form as shown on the right of the laboratory test titles on Form L03.

Column 10: Test Date Schedule - Record this date on the form to indicate the approximate date that the test will be performed.

Reporting to the RE, RCOC and the COTR. After completing the sample receipt and test assignment process as outlined in the preceding, the Sample Receipt and Test Assignment Report (Forms L01-L04) for each pavement section/SPS project should be prepared for transmittal to the RE, and RCOC. All sample receipt reports should be sent to the RE and RCOC as soon as they have been completed and checked. The LMTC must submit, as part of their monthly progress report, a list of the Sample Receipt Reports sent to the RE/RCOC and a list of the Sample Receipt Reports approved by the RE and RCOC during the reporting month.

The RE is responsible, working with the RCOC, for checking the L01-L04 forms to make sure that they are complete, that they have been completed accurately with the right number and type of samples, etc. After the RE and RCOC have approved the sample receipt and test assignment report, they should send the approved forms back to the LMTC. After receipt of the approved Sample Receipt Report, the laboratory is authorized to begin testing. At the present time, blanket approval has been given to both LMTCs to proceed with all testing excluding P06, P07 and P46. LTPP Protocol P06, "Creep Compliance of Asphalt Concrete," LTPP Protocol P07, "Resilient Modulus of Asphalt Concrete," and Protocol P46, "Resilient Modulus of Unbound Granular Base/Subbase Materials and Subgrade Soils," testing cannot begin until the COTR has authorized the initiation of this testing in each laboratory. However, incidental testing for Protocol P46 has been approved as part of the aforementioned blanket approval.

LABORATORY SAMPLE DISPOSAL AND STORAGE RECORD (FORM L06)

Form L06 will be used by the LMTC to provide the RE, RCOC and the COTR with a record of the status of all material samples after the entire laboratory material testing program for a SPS project is complete. The following information shall be included on this form.

Column 1: Layer Number - As explained for Form L04, column 1.

Column 2: Layer Description Code - As explained for Form L04, column 2.

Column 3: Layer Type - As explained for Form L04, Column 3.

Column 4: Laboratory Test Number - As explained for Form L04, column 7.

Column 5: Material Code - As determined by the examination and index tests performed in the laboratory and as per the codes presented in Appendix D of the "***LTPP Interim Guide for Laboratory Materials Handling and Testing***."

Column 6: LTPP Sample Number - As explained for Form L04, column 5.

Column 7: Status of Sample - This column will be used to indicate the status of the material sample. If the sample has been tested, a "yes" should be written on this line on Form L06. If the test sample has been disposed of (after approval of COTR) a "yes" shall be placed on this line of the form and if the sample has been stored for future use, this also shall be indicated in this column.

Some possible combinations include the following:

TESTED -	YES
TEST SAMPLE DISPOSED -	YES
STORED FOR FUTURE -	YES
TESTED -	NO

TEST SAMPLE DISPOSED -	NO
STORED FOR FUTURE -	YES
TESTED -	YES
TEST SAMPLE DISPOSED -	NO
STORED FOR FUTURE -	YES
TESTED -	NO
TEST SAMPLE DISPOSED -	YES
STORED FOR FUTURE -	NO

Column 8: Remarks - Add any other remarks (up to 25 characters in length) which are necessary to properly identify the disposition of the material sample (for example, sample lost due to flooding).

One Form L06 shall be completed for each test section included on an SPS project.

After completion, Form L06 shall be sent to the COTR, the RE and the RCOC. Form L06 is sent to the RE and the RCOC for their information. The samples cannot be disposed until approval has been received from the COTR.

Prepared by: Aramis Lopez, Jr.

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Approving Official
Paul Teng, Chief LTPP Division

ATTACHMENT A

FORMS L01, L02, L03, L04 AND L06