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16. **Abstract**

This report summarizes the findings of the first phase of LTRC research project 04-2P, which is sponsored by LADOTD. The project is assessing the current status and the state-of-the-practice of the LADOTD pavement management system (PMS). Results of the assessment would help LADOTD accomplish its overall objective in developing a cost-effective pavement preservation strategy to improve the pavement condition, as stated in the "Louisiana-Vision 2020". During the course of the study, various components of the PMS were evaluated. A detailed survey of all district engineers was conducted to establish the needs of each district. Based on the survey results and assessment of the current PMS practices, the research team collaborated with LADOTD's PMS engineers to make various conclusions and recommendations. The key efforts of the research team during the first phase of the study included the following:

- A review of the-state-of-the-practice of LADOTD's PMS. The review included, but was not limited to, the current highway classification system, the reference location systems, the distress data collection and storage practices, other data available in the department, deduct points, distress indices and remaining service life calculations, and project- and network-level reports.
- A survey of all districts engineers to address the needs of the districts. The survey addressed various issues including the types of reports and their accessibility, the utility of the PMS outputs, the existing location reference systems, the various pavement preservation actions, and the degrees to which the PMS users fully understand the benefits and the potential cost savings that can be precipitated by using the PMS data.

The investigators believe that the results of this study will enhance the PMS capabilities in managing pavements and facilitate better communication among various PMS data users and decision makers.

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Development of Uniform Sections for Pavement Management System Inventory and Application

Interim Report
LTRC Project No: 04-2P
State Project No: 736-99-1342

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ABSTRACT

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IMPLEMENTATION STATEMENT

During the course of the study, a comprehensive assessment and evaluation of the PMS was conducted by reviewing the existing PMS practices and procedures and surveying all the districts. At the end of the first phase of the study, various recommendations were made and reported. If the LADOTD accepts these recommendations, the investigators believe that some can be implemented immediately. Others may need the departmental meetings and consensus, or perhaps legislative approval. Some recommendations need further study to assess the impact of implementation. Nevertheless, the investigators believe that the results of the study can enhance the PMS capabilities in managing pavements efficiently and improve the communication among various end users.

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INTRODUCTION

The Louisiana Department of Transportation and Development (LADOTD) pavement distress data collection system has evolved from windshield surveys in the early 1970s to videotaping with Pavedex Inc. in 1992 to the ARAN (Automatic Road Analyzer) system in 1995. Currently, the pavement network is surveyed once every two years. LADOTD collects roughness (International Roughness Index, IRI), rut, cracking (longitudinal, transverse, random, and alligator), patching, and faulting data. All PMS data are collected based on two location reference systems that consist of control sections subdivided into 0.1 mile segments and latitude and longitude coordinates. The digital images and distress data (VISIDATA) have also been installed in each district, and the personnel have been trained for the use of data.

In October 2003, a review team comprised of LADOTD Federal Highway Administration (FHWA) employees was tasked with assessing and evaluating the effectiveness of the PMS. The review focused on the pavement selection process as perceived by the pavement management data users. The data users were identified as personnel from nine LADOTD district offices, headquarters, and the research section. The team concluded that the various functional sections of LADOTD did not effectively use PMS data as a whole due to the gap between the output of PMS and the department users' needs. Many reasons can account for this ineffective use, including, but not limited to, the complexity and interpretation of PMS outputs, the needs at the local district level versus the ones at the state level, and the need to update the pavement performance models of the system due to the experience accumulated over years.

In an effort to evaluate and improve the PMS, LADOTD, in conjunction with FHWA, initiated a two-year research study to evaluate the overall performance and effectiveness of LADOTD's PMS. In order to conduct a comprehensive review and assessment of operation and implementation of the current PMS, the study was divided into two phases. Phase I included the following: a) *review* and examine current PMS practices within the department, b) *conduct* departmental survey to identify the needs of PMS users, c) *identify* the available source of pavement data, and d) *recommend* a PMS roadway identification system. Phase II includes a review and update of both pavement performance and treatment selection models. This report

focuses on the Phase I study and on the results of the departmental survey to determine the needs of the districts.

The research team believes that the proposed research will enhance the PMS capabilities in managing pavements and facilitate better communication amongst various PMS data users and decision makers. The district engineers will have more confidence in using the data because the outputs and reports will be based on their needs.

OBJECTIVES

The main objective of this project is to find the most cost-effective way to incorporate PMS into LADOTD's regular operation and make the information in PMS usable for engineers within the department (especially for district-level personnel who schedule construction and maintenance activities). The objective of this study will be accomplished as follows:

1. Identify the needs of PMS users at LADOTD.
2. Establish a unified roadway identification system acceptable to all PMS users.
3. Evaluate and update the existing pavement performance, condition assessment, and treatment selection models.

This interim report deals with objectives 1 and 2.

SCOPE OF STUDY

In this study, the comprehensive review and assessment of operation and implementation of LADOTD's current PMS was conducted. The PMS users' needs at the district level and the degree to which the current system addresses such needs were assessed by surveying all districts and the PMS office, followed by telephone calls and personnel interviews. In addition, the compatibility of the location reference system used by PMS relative to those used by other sections within the LADOTD and the degrees of difficulties in using the system were identified. The various components of the PMS operations were also evaluated. These include, but were not limited to, the frequency of data collection, the data digitization, the data processing time, the types of reports that can be generated, the ease at which the data are accessible to the various users, the degree at which the extended pavement life due to pavement preservation action is being tracked, the number of pavement preservation treatments that are integrated into the system, and the degree to which the condition data assists the users in identifying the causes of distress.

METHODOLOGY

BACKGROUND

LADOTD's PMS uses dTIMS (Deighton Total Infrastructure Management System) software to analyze pavement condition data and to model the pavement rate of deterioration. The condition data are analyzed based on an index scale from 0 to 100 (100 being perfect pavement), and index values for roughness, rut, patching, alligator cracking, transverse cracking, longitudinal cracking, and random cracking are calculated. Although the data is collected continuously, it is reported by 0.1-mile segments.

All districts in the state of Louisiana have access to all the PMS data; however, most are reluctant to use the data for various reasons, as shown below.

1. Complexity of the system.
2. Untimely posting of the data.
3. The types of employed data aggregation systems (e.g., pavement types, composite index over a control section, pavement performance, etc.).
4. Lack of training and/or proper communications.
5. The types and complexity of the reports generated by PMS, which may offer either too much or too little information to address their needs.
6. Lack of clarity about the benefits of learning and using the system.

Pavement management is a business process that allows department of transportation personnel to make cost-effective decisions regarding the pavements under their jurisdiction. Two American Association of State Highway and Transportation Officials (AASHTO) documents provide a complete treatment of pavement management and PMS, including objectives, components, and benefits. The AASHTO *Guidelines for Pavement Management Systems* published in 1990 provides the basic information needed to develop a framework for PMS (1). The 2001 *Pavement Management Guide* discusses in detail the technologies and processes used for the selection, collection, reporting, management, and analysis of data used in pavement management at the state level (2).

Although the PMS used by LADOTD is based on effective software, it is not perfectly tailored to the users' needs. A well-customized PMS must provide its users with easy-to-use tools to assist them in making cost-effective decisions regarding pavement preservation (1). A successful PMS also provides a systematic process for collecting, managing, analyzing, and summarizing pavement information to support the selection and implementation of cost-effective pavement construction, rehabilitation, and maintenance programs (1-3). Furthermore, successful PMS provides the users with up-to-date information for identifying the most cost-effective strategies for selecting the proper space (project boundaries) and optimal time for pavement preservation.

Cost-effective pavement preservation is emphasized in current Louisiana state law (i.e., Act 1028) and federal law (i.e., The Transportation Equity Act for the 21st Century); it is also emphasized in the LADOTD Strategic Plan and in FHWA's National Strategic Plan (4). Furthermore, the importance of well maintained highway pavements is recognized in "Louisiana: Vision 2020," as noted below:

> "Poor highway pavements contribute to negative image of Louisiana as well as leading to increased vehicle repair cost, increased freight damage, and a general decrease in highway safety. A well-maintained highway system is critical to the state's economy including tourism and the transport of products to market."

"Louisiana: Vision 2020" contains a benchmark for improving highway pavements over a 20-year period. The LADOTD Task Force on Highway Project Identification and Prioritization was created in January 1999, and it produced a draft report in April 1999 and a final report in January 2000 (4). The Task Force recommended improvements in LADOTD's already-established process employed for identifying, prioritizing, and selecting cost-effective highway projects. The revised process relies on much of the same data and represents only a minor modification to the existing process. There are some significant differences, however. For example, the revised process largely decentralizes the decision-making process and relies on the team of experts to assist in setting priorities and selecting projects.

LITERATURE REVIEW

Numerous studies (1-15) have been conducted to establish PMS and to make it effective throughout the United States. All the studies agreed that the PMS should be customized to meet the individual agency's needs. Valuable information about the development, implementation, and use of PMS by towns, cities, and counties can be found in National Highway Institute (NHI) course 13426, Road Surface Management for Local Governments (8). The following section provides a brief background of PMS of some states.

PMS Background of Various States

Pavement management covers all phases of pavement planning, programming, analysis, design, construction, and research (9). Most agencies that implemented PMS are restricted to addressing pavement maintenance and rehabilitation (M&R) needs (2).

Nebraska- In 1973, Nebraska initiated a program for measuring the roughness of pavement for present serviceability index (PSI) on all state-maintained highways. The data was used with more detailed information for overlay thickness design for asphalt concrete over existing bituminous pavement. Data was collected every two years by the Materials and Research Division. Gradually, the program was improved, and in 1984 it was upgraded and implemented as an operational PMS (10).

South Dakota- In 1993, the South Dakota Department of Transportation (SDDOT) initiated the research project (16) "Enhancement of South Dakota's Pavement Management System." It was found that in order to better evaluate the condition of the pavement, a more detailed distress survey was needed. A distress survey manual was developed and adopted. At present, faulting, roughness, and rut depth are collected by Office of Data Inventory staff with the SDDOT type road profiler. All other distresses are currently collected by a visual distress survey performed by seasonal staff of the Office of Planning & Programs. All data on distresses are collected by sections, the majority of which have a length of one quarter of a mile. The year 1995 was the first year that the visual distress data had been collected on a statewide basis in South Dakota. A project has been initiated with plans to eventually collect pavement images with a specialized vehicle traveling at highway speed. The

visual pavement distress rating would then be performed in the office with these images. Some changes in the rating procedure may result by the change in data collection methods.

Mississippi- The Mississippi Department of Transportation (MDOT) initiated a pilot study in 1986 with the University of Mississippi to establish PMS for District 2 (17). After the completion of the study in 1989, the pilot program was launched to include all the state data for PMS. Over time, the system has been modified and software has been changed. The state uses Transportation Management Information System, a GIS-based data warehouse system that includes a PMS module. It is also connected to a bridge and traffic information system. The Pavement Analysis Package is another tool that the state uses to perform long-term PMS functions, such as life-cycle cost analysis, cost-benefit analysis, pavement performance prediction, and recommendation of appropriate treatments. Pavement condition and distress data have been collected by a contractor every 2 year since 1991. The video images are taken using five cameras installed on the van along with a GPS receiver for coordinate data. The data is collected for 100 percent of the state-maintained system. The images are digitized every 50 ft. In addition, the state also collects friction and deflection data. The Mississippi PMS data are mainly used on a network level as opposed to a project level. This means that the data is primarily intended to show the condition of the system as whole or a particular class of the road. Sometimes PMS is used for project level evaluation, but it is mainly a tool to plan projects and evaluate performance to spend and allocate funds.

Arizona- The Arizona Department of Transportation (ADOT) has been one of the pioneering states in the development and implementation of PMS (18). Since the early 1980s, ADOT has been using pavement management tools to manage, maintain, and preserve Arizona's highway network. Recently, ADOT has decided to expand the use of the PMS tools to also support the pavement maintenance operations. ADOT has selected Stantec's Highway Pavement Management Application (HPMA) software to replace its PMS, and retained Stantec's services for structuring, data loading, model development, and implementing the HPMA. HPMA is a single software application that provides full database management and analysis capabilities required by the two types of users (PMS and Maintenance). It provides a wide variety of analysis capabilities, including corrective maintenance, preventive maintenance, and rehabilitation analysis.

California- The California Department of Transportation (Caltrans) first implemented a pavement management system in 1977, when the concept of pavement management was relatively new and computers were not as powerful as they are today (19). Over the subsequent 30 years, there have been large improvements in computers and significant changes in the theory and practice of pavement management, both within the way pavements are maintained in the state of California, and within Caltrans itself. These changes have led to the slow evolution of the Caltrans PMS database. In particular, the database management software has been changed three times, with concurrent changes in the structure of the database. There have also been changes in the structure and usage of various fields within the database structure. These changes have primarily been made to improve the capability of the PMS for day-to-day management of the network, but have sometimes made performance modeling more difficult because of lack of compatibility of the data fields across the changes. A study was conducted by Pavement Research Center University of California, Berkeley, called, "Data Mining of the Caltrans Pavement Management System (PMS) Database." Some of the findings of the study were as follows (19):

- The data collected, as with all data, reflects the purpose for which they were collected, which was to aid in the project-level maintenance of the network. Because of this, it has been difficult to organize the data into a useful format for statistical analyses.
- Caltrans milepost system is not a fixed reference system and changes from year to year. This has made it almost impossible to correctly link the survey, traffic, and maintenance activity data on a year-by-year basis.
- Within this changing milepost system, the surveyed sections changed from year to year. This has necessitated a major restructuring of the database.
- The databases do not include any information concerning pavement structure, which is vital for the accurate statistical modeling of pavement performance.
- If any further work is to be carried out on these databases, then the major problem of incorrect milepost information needs to be overcome. To this end, the data need to be linked with GIS coverage of the state roads, and the milepost system needs to be linked with a fixed reference system, so that the year-to-year data can be correctly related. Doing so would allow traffic data to be linked to condition data, thus allowing traffic to be used as explanatory variable.

Montana- In 2006, the Montana Department of Transportation (MDT) completed a study to review and improve the ride (IRI) specification for the state (20). The report covers the activities that were performed to enhance the current MDT ride specification for flexible pavements. The project team reviewed the MDT ride specification for flexible pavements and compared it with current literature and state-of-practice. An extensive state-of-practice survey of other DOT's was conducted and the results were utilized to provide recommendations to MDT for improving its ride specification. The report provides detailed information on the MDT current ride specification review, literature review, the state-of-the-practice survey, and recommendations for improvements. The recommendations cover the proposed improvements to the current ride specification, tolerances, project classification levels, analysis tools and indices, and methods of acceptance. As part of the recommendations, a series of new documents (i.e., Profiler Operations Manual, QC/QA Plan) have been developed to enhance future profile data collection and analysis. Based on the findings of this project, the project team have revised the document entailed "Method of Sampling and Testing (MT-422)" and the document "MDT Ride Specification for Flexible Pavement." An implementation plan has been developed and presented in the report to provide MDT with a road map for implementing the findings of the project.

Virginia- The pavement management program in Virginia began with the establishment of a pavement inventory (21). That phase took place in the 1970s with the manual gathering of pavement records, including those of construction history and rehabilitation projects. Highway Traffic Records Information/Inventory System (HTRIS) was the first repository for pavement construction and rehabilitation records or pavement inventory. The system was developed and remains a mainframe computer application widely accessible throughout the Virginia Department of Transportation (VDOT). A second stage of pavement management activity in the state took place in the early 1980s and involved the development of a first generation pavement condition assessment methodology. Distress maintenance rating (DMR) is a rating scale of 0 to 100, with 100 being a pavement with no visual surface distress (2). The DMR index was widely used for priority programming of resurfacings and other rehabilitation activities. Unfortunately, the system had major disadvantages, the most critical of which was that it gave no consideration to pavement structural integrity such that the pavement with the worst visual condition rating received the highest priority on a "worst first" basis. Other disadvantages of the DMR approach were the danger in putting

people in harms way to collect the data and the inherent variability associated with such a subjective process. In the mid-1990s VDOT began to collect pavement distress data with videotaped images. To make use of data collected from those tapes, VDOT also made interim use of the pavement condition index (PCI) defined and used by the U.S. Army Corps of Engineers (4).

Data Integration

Data integration is very important as agencies move toward more global asset management approaches to comprehensively manage different types of transportation assets. However, the number of agencies that have actually completed or are close to completing a full integration of the systems is limited (9). Relating the data to the spatial system by using a GIS approach can help resolve various issues in data integration. NCHRP has sponsored a series of research projects to define the basic structure of a GIS-T. NCHRP Report 359: *Adaptation of Geographic Information Systems for Transportation* (11) provided the framework for the adaptation of GIS-T. This project recommended a "corporate" or enterprise-wide approach for information system planning and GIS development within a DOT, as well as a series of GIS enhancements relevant to its application for transportation management and operations. NCHRP Project 20-27, *Development of System and Application Architectures for Geographic Information Systems in Transportation* (3), defined generic information architecture for the implementation of GIS-T and proposed a robust location referencing system data model (12-13). NCHRP Report 460: *Guide-lines for the Implementation of Multimodal Transportation Location Referencing Systems*, refined this model to accommodate the necessary elements to store, operate, and share multimodal, multidimensional, spatiotemporal transportation data (14).

Location Reference Systems

All personnel of a highway agency should have access to data elements. The best way to incorporate all the data elements into an integrated database system and give access to all personnel is to use a location referencing system. There are several referencing systems that are used by highway agencies. Some of these are presented below:

- Milepost
- Uniform Construction Sections
- County/Parish Boundaries

- Reference Post

Each system has several advantages and disadvantages.

A wide variety of activities are dependent on the collection of highway-related data. These activities include but are not limited to traffic, design, maintenance, monitoring, rehabilitation, and others. Previously, the data was stored in paper files or in single purpose computer files with access to a few people. When the data was collected for a specific use, it rarely was used for other purposes. There are several reasons for not being able to share the data:

- Lack of uniform location referencing system.
- The narrow concept of data use and application.
- Inability to overcome barriers of equipment and software incompatibility.

As a result the data was duplicated. Tedious and complicated data retrieval affected the efficiency of the time used.

Several location reference systems have been mentioned previously. One system should be used by a state agency to be most efficient. Usually a state agency is so complex that several of the location reference systems are being used by different sections of a state agency. The next best thing is to merge all location reference systems into one uniform location reference system. This would allow all members of a state agency to retrieve data from other sections of the state agency. A uniform location reference system will allow the members of the highway agency to:

- Easily retrieve all or part of the data collected for a particular highway segment using the appropriate reference (code) of that segment.
- Determine relationships between different data files (e.g., traffic volume and width or number of lanes or traffic accident and roughness or friction).
- Obtain timely and usable output information based on the availability of all highway data.
- Reduce duplication and inconsistency in the data acquisition process.
- Easily expand the database to include the information that was not collected in the past.
- Maximize the use of the highway network data.

As stated above, there are several location referencing systems that can be used by a highway agency. Some of these systems are described here:

Mileposts- In this system, the reference points for each transportation route correspond to the milepost along that route, which may or may not be continuous along the entire length of the road. This system can produce almost uniform length segments along the highway, regardless of the highway conditions.

Uniform Construction Sections- In this system, each highway is divided into several segments that correspond to the beginning and end of uniform construction sections. This system produces variable length segments that are often independent of pavement conditions.

County Boundaries- Fewer number of reference points are typically used in this system relative to the others. Each reference point corresponds to the intersection of a county boundary with a highway route. Again, this system produces variable length segments that are independent of the pavement conditions.

Reference Posts- Reference post systems consist of reference points that are established along a highway route using certain criteria. For example, reference posts could be located at the beginning and end of a bridge, at an intersection or interchange, at a county boundary, orat the beginning and end of a pavement type or uniform pavement conditions. Thus, a reference posts system may produce uniform or variable length segments.

Each of the above listed referencing systems has several advantages and disadvantages. Two common disadvantages are:

- The entire database must be recoded when the boundaries change due to realignment of the highway, rehabilitation, or reconstruction. One method to avoid recoding the database is to establish a hierarchical order that requires an automated data management system. This will allow the newly coded boundaries to automatically replace the older ones. Further, data stored under the older boundaries are automatically transferred to the appropriate newer ones. Another method to avoid recoding the data could be similar to that used by Minnesota Department of Transportation (MDOT). MDOT uses reference post system consisting of milepost locations. The lengths of the segments, however, can be changed when realignment takes place.

- The location reference data cannot be used to graphically generate accurate maps of the network without an extensive electronic transformation of the data. Only graphical maps depicting the highway as a straight line can be generated for uniform sections.

The best tool to overcome these disadvantages is a geographical information system (GIS). A GIS is simply a computerized database management system for the capture, storage, retrieval, analysis, and display of objects and/or events that can be located geographically (22). The system is created, maintained, manipulated, and analyzed using specialized, graphic-based utility software. It is this combination of spatially related data and the processing tools that makes GIS distinct from other information systems (22-24). GIS is also known as a database integrator and geographical location reference system. GIS is so flexible that it can be used for all three functions: Database, Database integrator, and geographical location reference.

With respect to the PMS, the purpose of a GIS depends on the users. It was originally developed to:

- Maintain a massive database of vast networks of gas and oil pipelines, and electric lines.
- Connect the different data items related to the facilities of the utility companies using geographically located reference points.
- Provide rapid interactive response to system users.
- To access any part of the database that is connected with small or large geographical areas.
- Post any changes, addition, and/or modifications to the database.
- Provide compatibility with several hardware units for graphic displays using scaling and windowing, and alphanumeric character displays and printout.
- Allow future expansion or reduction of the network and database without having to change any of the data items.
- Allow multi-user access using different interactive terminals and/or work stations.
- Produce color- or pattern-code uniform segments of a network based upon certain uniform characteristics (such as capacity or conditions) of that segment that specified by the user.

GIS was designed to answer basically two major types of queries as follows (25-26):

- What are the spatial relationships inherent in the data?
- What are the data available at a specific geographic location?

Relative to PMS operation, the GIS capabilities include:

- Large data capacity that allows the inclusion of many reference points and many attributes. To conserve resources and ensure consistency among the various users, GIS allows data sharing between the data files in the database by using geographical reference locations.
- Complex visual and graphical data processing based on geographical reference locations as well as ground control-based functions and outputs (e.g., intersections, bridges, etc.).
- Overlay processing of the various data files to compute physical locations of interchanges, intersection or other common features between different roads.
- Data storage and retrieval routines that ensure uniformity and consistency of the database.
- Data scaling and display routines that allow the user to view the entire network on the computer screen or to zoom on a specific intersection.

It is important to note that GIS is not a computer aided drafting system (CAD). The combined use of GIS and CAD makes the best unified location reference system.

LADOTD PAVEMENT MANAGEMENT SYSTEM
THE STATE-OF-THE-PRACTICE

LOUISIANA HIGHWAY SYSTEMS

Louisiana's highway network is the 32nd largest in the nation; with the State highway system, it is the 11th largest. The network is comprised of over 60,000 miles and more than 13,000 bridges under the jurisdiction of federal, state, and local governments and entities. The 27.4 percent of highway network centerline mileage that is state-owned places Louisiana 10th nationally. On the other hand, 30 percent of total highway network lane mileage that is state-owned places Louisiana 11th in the nation. The network typically handles just under 41 billion miles traveled annually. While a larger percentage of total vehicle miles traveled are on rural roads and highways, the urban highway system is experiencing a greater percentage of vehicle miles traveled when compared to the highway mileage available. Of Louisiana's 4.47 million citizens, 2.76 million are licensed drivers. The State ranks 47th nationally in the number of licensed drivers per 1,000 persons, at 617. Drivers averaged 14,915 miles traveled for 2000, placing Louisiana 28th nationally (27). Figure 1 displays the major highways in Louisiana.

Functional Classification

Functional classification of transportation facilities is designed to describe the hierarchical arrangement and interaction between various roadways. Classification is based on each roadway's functional role in the overall network, including traffic movement and access. Louisiana's highway network is classified in the following categories (27):

1. Interstate
2. Other Freeway/Expressway
3. Other Principal Arterial
4. Minor Arterial
5. Collector
6. Local

Table 1 shows how the 60,000 miles of roadway are distributed among the different functional classes.

Figure 1
Louisiana major highway network

Table 1
Louisiana Highway Network Functional Classification by Jurisdiction

Classification	State	Parish	City	Total
Interstate	893	0	0	893
Other Freeway/Expressway	45	0	0	45
Other Principal Arterial	1,801	64	102	1,967
Minor Arterial	2,532	218	518	3,268
Collector	8,723	326	858	9,907
Local	2,706	32,703	9,423	44,832
Total	**16,700**	**33,311**	**10,901**	**60,912**

Source: DOTD, US DOT – FHWA, Office of Highway Policy Information, 2000 (27).

Highway System Categories

The LADOTD Task Force on Highway Project Identification and Prioritization (4) developed the concept of improved highway project selection process and recommended three categories of highways, a) the National Highway System (NHS), b) the State Highway System (SHS), and c) the Regional Highway System (RHS).

The NHS includes the Interstate highways, some urban and rural arterial highways, and a few urban and rural collector highways. The SHS complements the NHS and is comprised of those highways with the principal function of this inter-city, inter-regional, interstate, and international movement of people and goods. The RHS is comprised of those highways with the principal function of local movement of people and goods (4).

For convenience of budget analysis, the Pavement Management office has separated the Interstate Highways from the NHS system and calls for four categories as below.

1. Interstate Highway System (IHS)
2. National Highway System (NHS)
3. State Highway System (SHS)
4. Regional Highway System (RHS)

Table 2 shows the mileage breakdown of the highway system categories.

Table 2
Distribution of Highway System Categories (4)

Classification		Miles	Percentage
National Highway System (NHS):	i) Interstate	893	5.4
	ii) Others	1,550	9.3
State Highway System (SHS)		7,043	42.2
Regional Highway System (RHS)		7,184	43.1
Total		**16,670**	**100**

LADOTD EXISTING LOCATION REFERENCE SYSTEMS

LADOTD is currently using five location reference systems. The different systems are:

1. Control Section Log Mile (CSLM)
2. Route Mile Post (RMP)
3. Route Mile Point (RMPT)
4. Station numbers or Chainage (STA)
5. Global Positioning System (GPS)

The location reference systems are discussed below.

Control Sections Log-mile

The control section log mile (CSLM) is the most widely used system in LADOTD. The department has a numerical coding system for recording cost data and relating it to a segment of roadway. Each state highway is divided into smaller segments called “Controls” and each Control is divided further into smaller segments called “Section.” A Control is always identified with 3 digits and a Section is composed of 2 digits. The state project number usually consists of the Control-Section of the highway being worked on and a job number on that section. For example, for a State Project Number of 268-01-0012, 268 represents the Control Number for the project, 01 indicates the Section Number for the Control, and 0012 represents the twelfth project on the Control-Section. Using the beginning and ending log mile of a project can further narrow the location of work on a Control–Section. All project names begin with the CSLM that makes data retrieval an easy task. However, the CSLM system does not identify the direction of traffic. Most controls begin or end at junctions with routes, parish lines, or at a bridge. Table 3 provides various example of CSLM.

Table 3
Use of Control Section Log Mile

District No.	Route	Control Section	Begin Log-mile	Treatment Section Length	Pavement Type	Highway Category
03	LA 0093	221-01	0.46	0.34	Jointed Concrete	SHS
03	LA 0760-2	221-30	0.00	0.84	Asphalt	RHS
03	LA 0070	230-05	9.89	6.18	Asphalt	SHS
03	LA 0070	230-06	2.30	0.34	Composite	SHS
03	US 0090	424-02	3.02	0.35	Jointed Concrete	NHS
03	US 0090	424-04	0.00	9.78	Jointed Concrete	NHS
03	LA 1123	801-04	0.00	3.00	Asphalt	RHS
03	LA 1123	801-04	3.00	2.61	Asphalt	RHS

Route Mile Post

The route mile post (RMP) system is used by little over half of LADOTD district engineers. The RMP is arranged in route number sequence, and route is traced from its beginning in a west to east or south to north manner to its point of termination within the State. The RMP is not dependent on the different components of the roadway, and is permanent since the construction of the road or its first installation. This is the only location reference system that can be seen on the actual roadway using signs for mile posts as references. In general, the mile posts are installed every one mile length of the road. One great advantage of the RMP system is that it is easy to locate specific points on the road in the field, which helps in locating the traffic accidents and crash analysis. In addition, any changes in alignment of the road do not affect the RMP distance. The reference to any crash reported at a known location stays the same if the crash occurs at the same point during any other year. Moreover, when the realignment occurs, only that portion of road that is realigned is affected; the rest of the reference posts beyond the realignment remain unchanged. The disadvantage is that all the mile posts need to be maintained, and their location must be exact. For example, if the mile post is knocked down due to an accident, the post must be re-installed at the same exact location by measuring the distance from the last standing post. Another disadvantage is that secondary and small local routes may not have the sign post installed, thereby increasing the cost of installation of new mile posts.

Route Mile Point

The route mile point (RMPT) reference system is not widely used by the LADOTD district engineers. The RMPT uses the measured distance from a given or known point to the referenced location. The beginning point is the beginning of route. The measured distance typically is the accumulated mileage from the known point to the referenced location. The RMPT system is mainly used when any change in the alignment of the road occurs. Therefore, the accumulated distance used in RMPT represents the actual field distances of the points. Another advantage of using the RMPT system is that reference posts or signs do not have to be maintained in the field. The disadvantage is that the field person has to go back to the beginning of the route to start measuring distance in order to locate a reference. A field person must know where the route begins and the primary direction of the referencing system. Another disadvantage of the RMPT is the burden of maintaining a historical record of changes to the referencing system. If a roadway is realigned, all of the roadway beyond that point will suddenly have different mile points. The system is burdened with maintaining historical relationships so that two traffic accidents that occurred in same locations and reported differently in two different years are understood to be the same real-world locations.

Station Numbers or Chainage

The construction projects are referenced to station numbers (STA) or chainage. The main purpose of STA is to give the construction crew guidelines on the overall project length and intermediate points for construction and survey details. It is one of the linear location reference systems that is mainly used in the construction project and has beginning and end points. In general, during the survey of a given road, the STA increases when driving away from the start point and decreases when heading back along the same road towards the start point. The STA runs in one direction such as east to west or south to north, etc. Various construction details, such as built information and soil surveys are linked to STA. The disadvantage is that there is no standard policy to establish STA for the project. For example, on one project, the STA can start from 0+00 and on the other, the starting point can be 10+00. Similarly, the beginning of control section log mile of a project is not always going to be 0+00. In addition, the STA overlaps from project to project in different years. Another disadvantage is that for the curves, the STA is based on the tangent lengths. Since the curve length is shorter than the two tangents, the STA does not reflect the real-world distances.

Global Positioning System

Similar to RMPT, the global positioning system (GPS) has limited utility in the districts. Some use was found in the traffic section of the districts. However, it is mainly utilized by the Location and Survey section of LADOTD for inroad surveys and establishing the contour maps, among other uses. The section has been using ARC-View GIS based software to view various location reference systems in one map.

The GPS currently uses World Geodetic System 1984 (WGS 84) as its reference system. WGS 84 is a geodetic datum. This means that the map is not a flat sheet of paper but in the shape of an ellipsoid. This is a three-dimensional datum as compared to control section log mile and route mile post, which are only one dimension. Even though WGS 84 is a three-dimensional datum, LADOTD is concerned with the horizontal location, not the vertical. The Prime Meridian and the Equator are the reference planes used to define latitude and longitude. The geodetic latitude of a point is the angle from the equatorial plane to the vertical direction of a line normal to the reference ellipsoid. The geodetic longitude of a point is the angle between a reference plane and a plane passing through the point, both planes being perpendicular to the equatorial plane. The advantage of this location system is that users can easily locate specific points on the road in the field. Another advantage is if the roadway is extended at either end of the route, there are no mile posts that must be moved. The disadvantage to this location system is that specific equipment has to be installed on state vehicles in order to determine one's location on the road. Another disadvantage is that poor satellite reception can sometimes hinder determining a location on the road.

Efficiency, Usability, Compatibility, and Acceptability of Location Reference Systems

Ranking Based on Efficiency and Usability. Each of the location reference systems was ranked based on ease of data access and locating the pavement sections in the field in relation to efficiency and usability. The ranking system was based on numbers from 1 to 5, with 1 being the best and 5 being the worst. Finally, a summary of the ranking is presented below.

> ***CSLM System-*** In order to do research on a road section, the control section is needed to look up past data on a roadway in the mainframe. Although some land marks are used to

define the beginning or end of the control sections, there are no markings on the roadway to locate the control section. This makes it difficult to determine if a construction crew is in the correct location using only the CSLM system. Since building the road in the wrong place is more costly, and it is time consuming to locate the road section, the efficiency rating would be assigned as 3. However, all engineers are more familiar with the CSLM system and it is convenient and easy to do research for past data and other information, so the usability rating would be assigned as 2.

RMP System- Since the RMP is not a part of the project number, it becomes very difficult for engineers to conduct research and data inquiry of a road section using the mainframe database. The RMP are installed at known locations on the roads, which makes it easy to determine the correct location of a construction crew. This will make it is easier to locate a section of road; therefore, the efficiency rating would be a 2. Since it is more difficult to do research on the past history of a section of road, the usability rating would be a 3.

RMPT System- The RMPT is not a part of project number; therefore, it becomes very difficult for the engineers to conduct research and data inquiry of a road section using the mainframe database. The RMPT are installed at known locations on the roads which makes it easy to determine if a construction crew is in the correct location, the efficiency rating would be a 2. However, it is more difficult to do research on the past history and maintain the historic records of the section of road, so the usability rating would be a 4.

STA System- Since the STA is not a part of project number, it becomes very difficult for the engineers to conduct research and data inquiry of a road section using the mainframe database. The STA are installed at know locations on the roads which makes it easy to determine if a construction crew is in the correct location. Since, it is only used by design and construction engineers and is project depend, the efficiency rating would be a 3. It is more difficult to do research on the past history and maintain the historic records of the section of road, and most of the records are in hard files, the usability rating would be a 5.

GPS- With GPS the CSLM, RMP, and RMPT can be linked. There are maps with the

control section labeled for each roadway. A Cartesian coordinate system can be placed on these maps. The research can be done with a visual aid such as a map. With the proper equipment, field personnel can locate the project on the roadway. This makes it easy to determine if a construction crew is in the correct location using only GPS. Since the location reference system can properly ensure that the roadway is built in the correct location, and location of the road can be easily located for maintenance and other inquiry, the efficiency rating would be a 1. In addition, the other location reference systems can be linked with GPS and research on historical records can be done more easily with a visual aid such as a map. There are some costs of training and equipment issues are involved; therefore, the usability rating is 2.

NCHRP has sponsored a series of research projects to define the basic structure of a GIS-T, a transportation-related GIS system (11-14). The studies recommended a "corporate" or enterprise-wide approach for information system planning and GIS development within a DOT, as well as a series of GIS enhancements relevant to its application for transportation management. LADOTD should explore such available GIS systems to link existing location reference systems.

Compatibility of the ARAN Vehicle Location Reference System. One of the major concerns is the compatibility of the ARAN vehicle location reference system with LADOTD's location reference system. The ARAN vehicle is the source of the data that measures pavement condition data on a two-year cycle using cameras, sensors, and other truck-mounted equipment. The ARAN vehicle location reference system data is produced in GPS. Since GPS is one of the systems used by LADOTD, there are no significant compatibility issues.

Acceptability of a Location Reference System. To be acceptable, a location reference system, it must be easy to use with all the current systems. Linking CSLM, RMP, and RMPT to GPS will allow LADOTD to continue using the different systems without having to recreate a new system. This would create a smoother transition to a new system, if required.

Linkage of the Various Location Reference Systems

Degree of Difficulty of Linking the Location Reference Systems. A major concern is linking all systems used by LADOTD with GPS. The CSLM, RMP, and RMPT are linear based systems and would not be difficult to link. A linear based system can be placed on a two-dimensional system by assigning each point along the linear system with an ordered pair. This can be accomplished using computer aided drafting (CAD). CAD software is needed to generate a two-dimensional map. A Cartesian coordinate system is needed. Louisiana has two Cartesian coordinate systems; the type of Cartesian coordinate system Louisiana uses is Lambert Conical Conformal. The Lambert Conical Conformal is a conic projection that is used for rectangular zones with a larger east-west than north-south extent. Louisiana has two zones, which are the north zone and the south zone. The first one is called Louisiana North Zone: 1701, and the second is Louisiana South Zone: 1702. These two state plane coordinates are derived from North American Datum of 1983 (NAD83). NAD83 is a geodic model that maps North America. There is a conversion between NAD83 and World Geodetic System of 1984 (WGS84). Complete datum conversion is based on seven parameter transformations that include three translation parameters, three rotation parameters, and a scale parameter. WGS84 is the datum used by the GPS location reference system.

In order to link STA with GPS, much work would have to be done. All STA information is located on hard copies of each project's plans. This would require significant time to go back and acquire the data. The next step would be to merge the data with the different attributes of the location reference system. In addition, a standard departmental procedure and policy is required for establishing STA for each project. This will ensure consistency and ease of use of STA system.

During the PMS review process, it was found that LADOTD's information technology (IT) section has developed user friendly software that links the three systems (CSLM, RMP, and GPS) which can be seen in one visual map. The details of the software are discussed in the next section.

Cost of Linking Location Reference Systems. Since the IT section of the department has already established a user-friendly program to link various location reference systems, the cost of linkage will be a minimum. This includes the startup cost and the reoccurring costs. This

system will be available to all sections of LADOTD. Since the system works in GPS, there would be no compatibility issues with ARAN and the distress data collection. This system will be a great tool for communicating between the office personnel and the field personnel. Since the system converts CSLM to RMP, the field personnel can locate the beginning and ending of projects much easier. In addition, if field personnel are equipped with GPS on their vehicles, they can locate the beginning and ending of the different projects with ease. The beginning and ending location of projects can be shown on a "visual earth" map. This would allow the field personnel to use landmarks on the ground since the visual maps use aerial photography.

Linkage of CSL, RMP, and GPS Location Reference Systems. Since various sections of the department use different location reference systems, it becomes difficult to locate and link the data sets that are required for PMS. Sometimes, it is almost impossible to locate a section of the road that needs treatment. Therefore, it will be a great advantage to have a unified location reference system or a way to link all these different reference systems.

During the PMS review process, it was found that LADOTD's IT section has developed user friendly software that links the three systems (CSLM, RMP, and GPS) so they can be seen in one visual map. A stepwise example of how the software works is given below. In this example, the control section number is "080-02" with the log mile of 8.991. The LADOTD–Convert Latitude/Longitude to Route/Milepost software window is shown in figure 2 with various attributes of the control sections. The following procedure is followed.

- Enter the control section number in the field "Cont-Sec:" and the log mile in the field "Logmile:" as shown in figure 2.
- Select "I-,US,LA" under the "Route Formats:" on the bottom left side of the window.
- Select "Submit" next to the two fields that were just entered.

A screen will come up as shown in figure 3. The figure shows the calculated values of latitude, longitude, route, mile post, and the Universal Transverse Mercator (UTM) coordinates for the selected control section and log mile data. The link between the latitude, longitude, route, mile post, control sections and log mile are based on an access file labeled "latlong_2006_segs.mdb". This file has a list of all the control section and the beginning and end of each log mile. For each one of these points, there is a corresponding latitude, longitude, route and mile post for each control section

beginning and ending log mile listed in this database. The UTM is a two-dimensional reference system. UTM is very similar to the Lambert Conical Conforma, except it slices north and south instead of east and west. The slicing begins at the North Pole and end at the South Pole.

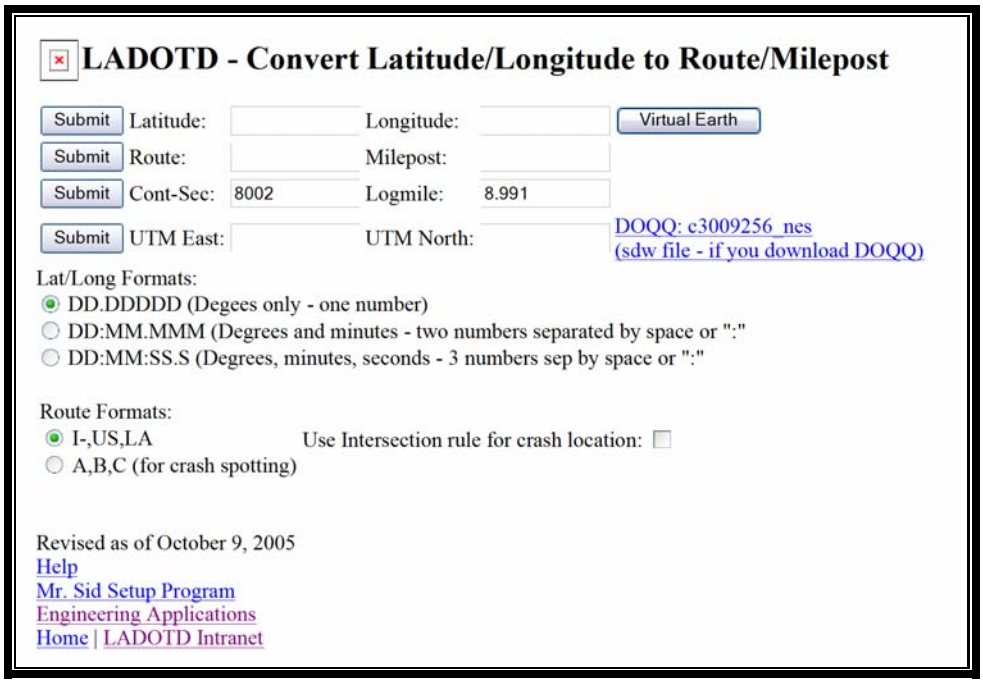

Figure 2
LADOTD – Convert Latitude/Longitude to Route/Milepost software

After the route and mile post are determined from the figure 3, a visual map can be made for field and office personnel. The office personnel can see how the surrounding area looks. For example, if detours are required for the project, this visual map can help to determine the temporary route. The following steps are adopted to see the visual map.

- Click on the "Virtual Earth" option as shown in top right corner of figure 3.
- A new window will open up as shown in figure 4.
- A red dot in the center of the map represents the control section and log mile listed in figure 3. The map has a scale on the lower right hand corner of the map. The map also has a tool box on the upper left hand corner. The window does not show the scale or the tool box (figure 4).
- On the tool box there are three buttons located at the bottom of the tool box. The three buttons are: 1) Road, 2) Aerial, and 3) Hybird.

The “Hybrid” button is automatically selected when the window first opens. This shows both the roads and aerial photos at the same time. When the button “Road” is selected, only the roads and each road name or number will appear (see figure 5).

When the button “Aerial” is selected, only the aerial photos will appear (figure 6). On the tool box there is a slider bar that is used to zoom in closer. Sliding the bar between the first two tick marks will zoom into the map as close as possible (figure 7). The scale will adjust automatically.

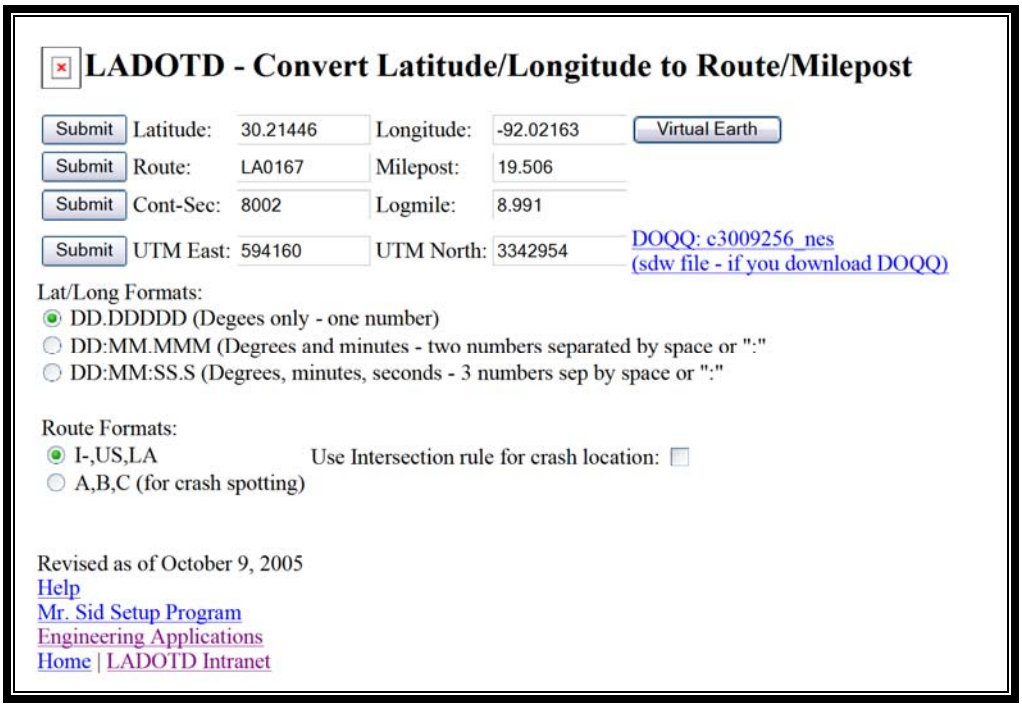

Figure 3
LADOTD – Convert Latitude/Longitude to Route/Milepost software

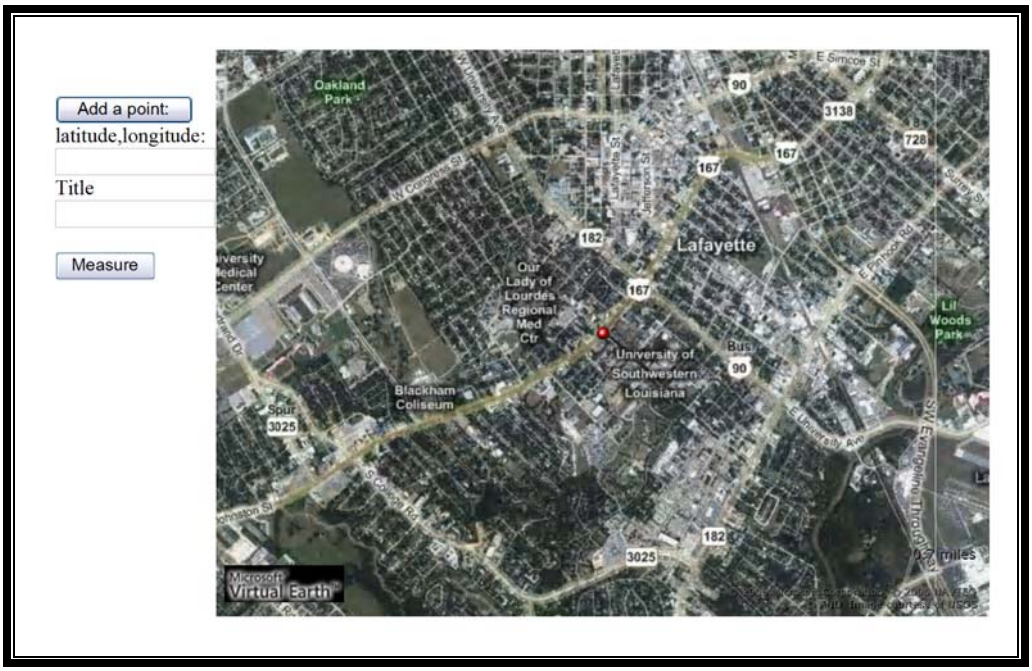

Figure 4
LADOTD – Virtual earth initial view

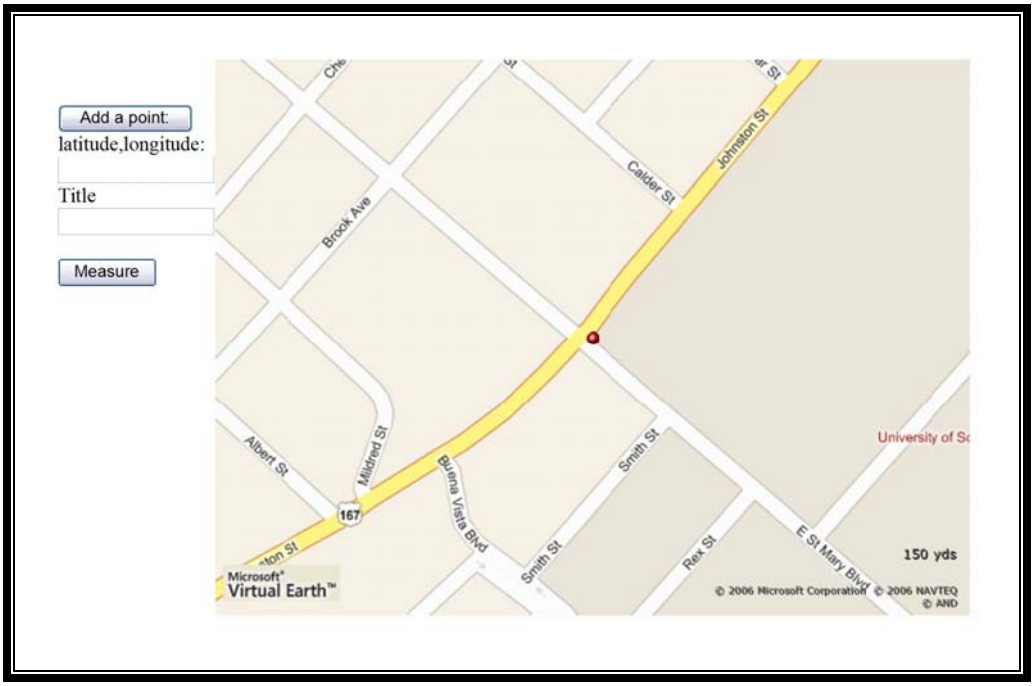

Figure 5
LADOTD – Virtual earth road view

Figure 6
LADOTD – Virtual earth aerial view

Figure 7
LADOTD – Virtual earth zoomed-in view

Limitations of the Computer Program- The following are some limitations of the computer program used for linking the reference location systems.

- The linkage for RMPT and STA can not be accomplished using the computer program.
- The linkage does not distinguish between the primary and secondary routes. Whenever two routes overlaps, the program reflects only the primary route.
- The program takes into account only one direction of the travel.

DISTRESS SURVEY, DATA COLLECTION, AND STORAGE

Distress Survey

As reported earlier, the LADOTD pavement distress data collection system has evolved from windshield surveys in the early 1970s to videotaping with Pavedex Inc. in 1992 to the ARAN (Automatic Road Analyzer) system in 1995. The data collected in 1992 was discarded because all of the highways in the state of Louisiana were not collected, and there were extreme difficulties in trying to integrate the partial data into the data collected in 1995. Currently, the pavement network is surveyed once every two years. The LADOTD collects roughness (International Roughness Index, IRI), rut, longitudinal cracking, transverse cracking, random cracking, alligator cracking, patching, and faulting data. All data are reported every 0.1 mile section based on a location reference system that consists of control sections. The ARAN vehicle also uses the GPS system to reference the data. The vehicle is zeroed at the beginning of log mile of a control section, usually the first marker. It should be noted that there are no exact points for it. Therefore, the error could occur because the road markers for control sections may not be accurately identified by the ARAN survey crew. The continuous digital images and distress data (VISIDATA) acquired by ARAN have also been installed in each district, and the personnel have been trained for the use of data.

ARAN vehicle collects pavement data in two directions. The **primary direction** or direction-1, in most cases, travels from south to north and from west to east. The opposite direction, also referred to as the **secondary direction** or direction-2, travels north to south and from east to west. It should be noted that the direction -2 has digital video collected but only has distress data on 4 or more lane divided highways. ARAN uses a profiler to collect the pavement distress data. A profiler has three components that are collected and combined (28):

- Reference to elevation
- Height relative to the reference
- Longitudinal distance

Presently, the department utilizes the quarter car model for profiling. The quarter car model, as shown in figure 8, is capable of profiling at high speed and compatible with monitoring roadway networks.

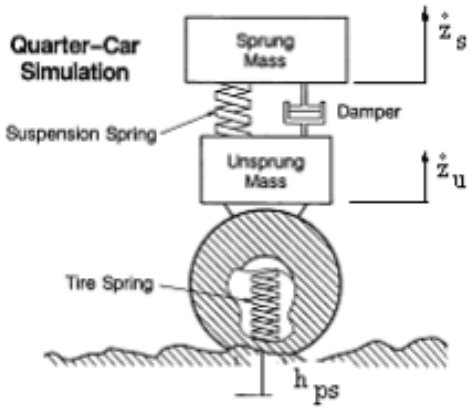

Figure 8
Schematic of the quarter car model

Inventory Data and Condition Data

Tables 4 through 6 compile LADOTD Pavement Management's inventory data, condition data, and the frequency in which the data collections occur. The location referencing system used to identify section locations is based on distances measured from a reference point rather than mileposts, the beginning of road, or GPS (Latitude/Longitude). LADOTD uses AASHTO Provisional Standards to measure IRI, rutting, faulting, and cracking. The PMS collects data for the following four types of pavements.

1. Flexible Pavement (Hot Mix Asphalt, HMA)
2. Composite Pavements
3. Continuously Reinforced Pavements (CRCP)
4. Jointed Plain and Reinforced Concrete Pavements (JPCP, JRCP)

For flexible pavements, the longitudinal and transverse cracking are added together and called as random cracking. The index calculated from such a system does not accurately represent the condition of the pavement. Since the causes of failure for both types of cracking are completely different from each other, the system may lead to the selection of an inadequate treatment that is not based on the causes of failure. The transverse cracks in flexible pavements are:

- Temperature related (may not occur since LA does not have thermal cracking)
- Caused by hardening of the asphalt binder
- Reflective cracking due to widening joints or shrinkage from cement stabilized bases

On the other hand, longitudinal cracks in flexible pavements could be caused by several factors:

- Inadequate construction of the joint between the two lanes, or the joint between an old but narrow pavement (10-feet wide) and an expansion ribbon.
- Particle segregation of the asphalt mix, which, in most cases, causes longitudinal crack at the middle of the lane (under the paver gear box).
- Lack of edge support or absence of adequate shoulders, which causes edge cracking (longitudinal cracks located at the pavement edge).
- Top-down cracking due to high tensile stress induced at the pavement surface by the tire-pavement interaction.
- Reflective cracking due to widening joints or shrinkage from cement stabilized bases

In addition, the practice of ARAN software has classified reflective cracking from cement stabilized bases as fatigue cracking.

Table 4
Inventory Data for Pavement Design & Materials

No.	Data Category	Does State Collect?		Data Sources	
		Yes	No	State PMS	Other
1	Pavement type (e.g., HMA, JPCP, JRCP, CRCP, composite (HMA/PCC)	X		X	Surface Type Log, NEEDS
2	Pavement width	X			Surface Type Log, NEEDS
3	Shoulder type (e.g., turf, granular, tied PCC non-tied PCC, HMA)	X			Surface Type Log, NEEDS
4	Shoulder width	X			Surface Type Log, NEEDS
5	Number of lanes in each direction	X			Surface Type Log, NEEDS
6	Layer thicknesses (i.e., all layers above the subgrade)	X			MATT FILE
7	Joint spacing (for jointed PCC pavements)	X			Surface Type Log, NEEDS
8	Transverse joint load transfer	X			MATT FILE
9	Subgrade type and material classification (i.e., AASHTO, UCS, or others)	X			MATT FILE
10	Layer material properties (e.g., strength, mix constituents, gradation, etc.)	X			MATT FILE
11	Drainage (e.g., presence of drainable or permeable layer, edge drains, etc.)	X			Surface Type Log, NEEDS
12	Other (specify)	NA			

Table 5
Condition Data Collected (Network Level)

Pavement Type	Distress/Condition Indices	Does State Collect?		Data Source	
		Yes	No	PMS	Other
Flexible	Rutting	X		X	
	Fatigue/alligator cracking	X		X	
	Longitudinal cracking in the wheel path	X*			
	Transverse cracking	X		X	
	IRI	X		X	
	PSR***	X			X
	Surface friction (FN or skid number)	X			X
	Other specify (Patching, Rutting)	X		X	
JPCP/JRCP	Transverse joint faulting	X		X	
	Transverse cracking	X		X	
	Longitudinal cracking	X		X	
	Transverse joint spalling	X**			
	IRI	X		X	
	PSR***	X			X
	Surface friction (FN or skid number)	X			X
	Other specify (Patching)	X		X	
CRCP	Punchouts	X		X	
	Longitudinal cracking	X		X	
	IRI	X		X	
	PSR***	X			X
	Surface friction (FN or skid number)	X			X
	Other specify (Patching)	X		X	
Composite (HMA/PCC)	Longitudinal cracking	X		X	
	Transverse cracking	X		X	
	IRI	X		X	
	PSR***	X			X
	Surface friction (FN or skid number)	X			X
	Other specify (Patching, Rutting)	X		X	

** LADOTD collects longitudinal cracking outside of the wheel path as "longitudinal cracking" and longitudinal cracking in the wheel path as "alligator cracking". ** LADOTD collects high severity joint spalling as "patching"*** PSR calculated from IRI.

Table 6
Frequency of Condition Data Collection for Each Section

Pavement Type	Distress/Condition Indices	Frequency			
		Yearly	Every 2 years	Every 3 years	Other
Flexible	Rutting		X		
	Fatigue/alligator cracking		X		
	Longitudinal cracking in the wheel path		X		
	Transverse cracking		X		
	IRI		X		
	PSR***	X			
	Surface friction (FN or skid number)				X*
	Other specify (Patching, Rutting)		X		
JPCP/JRCP	Transverse joint faulting		X		
	Transverse cracking		X		
	Longitudinal cracking		X		
	Transverse joint spalling		X		
	IRI		X		
	PSR***	X			
	Surface friction (FN or skid number)				X*
	Other specify (Patching)		X		
CRCP	Punchouts		X		
	Longitudinal cracking		X		
	IRI		X		
	PSR***	X			
	Surface friction (FN or skid number)				X*
	Other specify (Patching)				
Composite (HMA/PCC)	Longitudinal cracking		X		
	Transverse cracking		X		
	IRI		X		
	PSR***	X			
	Surface friction (FN or skid number)				X*
	Other specify (Patching, Rutting)		X		

Surface friction (Skid number) is updated every 5 years and yearly for sections where accident occur frequently.* PSR is calculated from IRI*

All of the inventory data is stored in the mainframe. The mainframe is organized by project number. The project number is composed of nine digits. The first five are the control section. The last four represent the number of projects done on that control section. The material type and thickness information of the base, sub-base, asphalt, or concrete surface is located in the Material Testing System (MATT) under Menu/Project/RoadwayXsec. All tests that are performed are located in MATT under Menu/Test Files. The surface type is listed in several places. The first is MATT Menu/Project/RoadwayXsec. The next one is Highway NEEDS Menu/SummaryLog. The third location is Traffic & Planning Highway Inventory/Surface Type Log/Detail. The final location is Maintenance Operations System/Inventory/List. The road geometry can be found in Highway NEEDS System Menu/SummaryLog and in MATT Menu/Project/RoadwayXsect. The Average Daily Traffic can be located from Traffic Volumes Menu/RoutineTrafficCounts and Highway NEEDS System Menu/SummaryLog.

Traffic and Load Data (Network Level)

Traffic data is collected to calculate annual ESALs, annual number of heavy trucks (FHWA Class 4 through 13), and traffic forecasts (e.g., growth rate) for all types of vehicles. Currently, the ESAL factor is calculated on a 3-year cycle with weight-in-motion data collected at 100 sites. It has been proposed that weigh-in-motion data may be increased to 300 sites collected on a 3-year cycle.

Historical Data

For most pavement sections, LADOTD's Pavement Management records and stores historical data such as construction date, construction type (e.g., original or reconstruction), rehabilitation date, rehabilitation type (e.g., thick overlays, grinding, etc), preventative maintenance date, and preventative maintenance type (e.g., thin overlay, seals, etc.). Such historical records can be found in the mainframe databases of LADOTD (MATT, TOPS and LETS, etc.).

LADOTD maintains various databases for all kind of pavements. During the review, the researchers noticed that it was not convenient to download all the related data for a given section of the road. This is because the data sets are not linked to each other and contain different reference location systems.

DATA ANALYSIS AND REPORTING

Distress Index

The LADOTD uses dTIMS (Deighton Total Infrastructure Management System) software to analyze the pavement condition data and to model the pavement rate of deterioration. The condition data are analyzed based on an index scale from 0 to 100 (100 being perfect pavement), and index values for roughness, rut, patching, alligator cracking, transverse cracking, longitudinal cracking, and random cracking are calculated. The index scale helps to determine the condition of a highway section as shown in table 7. Although the data are collected continuously, they are reported by 0.1 mile segments (528 ft.).

Table 7
Performance indices for condition classification of highways as of June 10, 2003

CONDITION	INTERSTATES	NHS	RHS & SHS
Very Good	100-96	100-95	100-95
Good	95-90	94-88	94-85
Fair	89-76	87-70	84-65
Poor	75-65	69-60	64-50
Very Poor	64-0	59-0	49-0

Deduct Points. The distress indices are calculated using the deduct points for each distress in a pavement. The deduct points used by LADOTD are based on the type of distress, extent of the distress and severity level. For most distresses, three severity levels are used: low, medium and high. For each type of distress, the cumulative deduct points for each 0.1 mile of pavement section is then subtracted from 100 to calculate the distress index, such as alligator cracking index, transverse cracking index, and so forth. Hence, for all types of distress, the distress index is based on a scale of 0 to 100, with 100 indicating no surface distress. Along the distress index scale, several threshold values are established by the LADOTD. Each threshold value triggers certain types of maintenance or rehabilitation actions that need to be taken, which are referred to triggers. Hence, the pavement rehabilitation actions that are recommended by LADOTD are based on the accuracy of the distress index, which is based on the assigned deduct points and on the predetermined threshold values (triggers).

The distress index is used to calculate the remaining service life (RSL) of the pavement sections. Finally, the RSL values and the deduct points are used to establish pavement rehabilitation strategies. The above scenario indicates that the accuracy of the RSL and the effectiveness of the pavement rehabilitation strategy is based upon the accuracy of the assigned deduct points for each type of distress, trigger, and its extent and severity level.

During the review, the researchers found that the PMS uses numerous triggers (index threshold values) to trigger various rehabilitation actions. For example, a combined trigger value of <65 (deduct value of >35) for alligator cracking is required for a structural overlay of 7 in. on Interstate flexible pavements. However, this index value is <50 (deduct value >50) for collector highways. The range of trigger values for major rehabilitation action is found to be between 65 and 50 (deduct value 35-50). It should be noted that it will be more efficient if PMS's adopt uniform threshold values for all pavement types and for all types of distress in flexible, composite, and rigid pavements. Uniformity of the threshold values for all pavement and distress types would enhance communication between the districts and would eliminate the need for establishing a dictionary for the threshold values. As reported by PMS personnel, the deduct point policy was established in 1992 or earlier. Since then it has been modified twice; however, no study has been conducted to evaluate and calibrate the deduct point policy based on cost and what has been learned from the past experience.

The summaries of deduct points for various pavements and distress types as established by LADOTD are reported in tables 8 through 15.

Table 8
LADOTD deduct points for Alligator cracking in Flexible Pavements

ALLIGATOR CRACKING DEDUCTS (FLEXIBLE)						
	EXTENT (SQ.FT.)					
SEVERITY	0-51	51-701	701-1301	1301-2401	2401-3168	3168-9999.99
LOW	0	1-16	16-21	21-25	25-28	28
MED	0	1-21	21-29	29-36	36-49	49
HIGH	0	1-29	29-43	43-50	43-61	61

Table 9
LADOTD deduct points for Patching in Flexible and Composite Pavements

PATCHING DEDUCTS (FLEXIBLE AND COMPOSITE)							
	EXTENT (SQ.FT.)						
SEVERITY	0-31	31-81	81-151	151-251	251-501	501-6336	6336-9999.99
LOW	0	1-2	2-21	21-23	23-27	27-30	30
MED	0	1-4	4-23	23-27	27-31	31-41	41
HIGH	0	1-11	11-27	27-30	30-47	47-65	65

Table 10
LADOTD deduct points for patching in JCP and CRC Pavements.

PATCHING DEDUCTS (JCP AND CRC)							
	EXTENT (SQ.FT.)						
SEVERITY	0-31	31-81	81-151	151-251	251-501	501-6336	6336-9999.99
LOW	0	1-2	2-6	6-12	12-15	15-20	20
MED	0	1-4	4-11	11-31	31-40	40-45	45
HIGH	0	1-11	11-20	20-35	35-47	47-65	65

Table 11
LADOTD deduct points for Random Cracking for Flexible Pavements

RANDOM CRACKING DEDUCTS (FLEXIBLE)						
	EXTENT (LIN FT.)					
SEVERITY	0-31	31-301	301-1601	1601-5001	5001-6001	6001-9999.99
LOW	0	1-3	3-16	16-18	18-20	20
MED	0	1-16	16-21	21-30	30	30
HIGH	0	1-26	26-28	28-42	42-48	48

Table 12
LADOTD deduct points for Random Cracking for Composite Pavements

RANDOM CRACKING DEDUCTS (COMPOSITE)						
	EXTENT (LIN FT.)					
SEVERITY	0-51	51-326	326-901	901-2001	2001-6001	6001-9999.99
LOW	0	1-3	3-5	5-16	16-33	33
MED	0	1-16	16-26	26-35	35-46	46
HIGH	0	1-32	32-40	40-55	55-70	70

Table 13
LADOTD deduct points for Transverse Cracking for JCP Pavements

TRANSVERSE CRACKING DEDUCTS (JCP)						
	EXTENT (LIN FT.)					
SEVERITY	0-13	13-49	49-241	241-469	469-2900	2900-9999
LOW	0	1-13	13-23	23-31	31-35	35
MED	0	1-16	16-41	41-49	49-61	61
HIGH	0	1-20	20-46	46-63	63-77	77

Table 14
LADOTD deduct points for Longitudinal Cracking for JCP and CRC Pavements

LONGITUDINAL CRACKING DEDUCTS (JCP AND CRC)						
	EXTENT (LIN FT.)					
SEVERITY	0-11	11-31	31-131	131-261	261-1000	1000-9999
LOW	0	1-13	13-23	23-31	31-35	35
MED	0	1-16	16-41	16-49	49-61	61
HIGH	0	1-20	20-46	46-63	63-70	70

Table 15
The LADOTD roughness index as a function of the average International Roughness Index (IRI) and Rut Index as a function of Average Rut depth

POINT NUMBER	ROUGHNESS		RUT	
	AVG_IRI	RUFF Index	R_AVG (inch)	RUT INDEX
1	0	100	0.000	100
2	50	100	0.125	100
3	100	90	0.250	90
4	150	80	0.500	70
5	200	70	0.750	50
6	250	60	1.000	30
7	300	50	1.250	10
8	350	40	1.375	0
9	400	30		
10	450	20		
11	500	10		

The following example illustrates the calculation of deduct points and distress index values for alligator cracking in flexible pavements.

Example: Low severity cracks = 215 ft^2

Medium severity cracks = 825 ft^2

High severity cracks = 755 ft^2

In order to use the data in table 8, linear interpolation is used to calculate the deduct points using the following equation.

Equation of a line: $y= m*x + b$

Where, y= deduct points, x= extent, m= slope=(y/x), and b= intercept

For any given two points (see table 8): (x_1, y_1):(51, 1) and (x_2, y_2):(701, 16) the values of "m" and "b" are calculated as follows:

m= (16-1)/(701-51) = 0.0231

b = y-m*x = 1-0.0231*51 = -0.1769

Therefore, the deduct points are calculated as:

Deduct points for low severity cracks:	$y_L = 0.0231*215 – 0.1769 =$	4.78
Deduct points for medium severity cracks:	$y_M = 0.0133*825 +11.653 =$	22.65
Deduct points for high severity cracks:	$y_H = 0.0233*755 + 12.643 =$	30.26
Total Deduct Points:	$y_T = yL + y_M + y_H =$	57.70

Hence, the distress index for alligator cracking for flexible pavement is given as:

Distress Index = 100- {Total Deduct Points} = 100- 57.7 = 42.30

Discussion on Deduct Points. During the review, some preliminary analyses were also conducted on the existing deduct points policy of the PMS. The deduct points for alligator cracking in flexible pavements (see table 8) were plotted as shown in figure 9. The figure shows the deduct points for low, medium, and high severity alligator cracking in flexible pavements. The examination of the figure and the data in table 8 reveals the following.

- The deduct point values for major rehabilitation action are different for Interstate (>35) and Arterials (>50), and correspond to 15% and 38%, respectively, area cracked in a section.

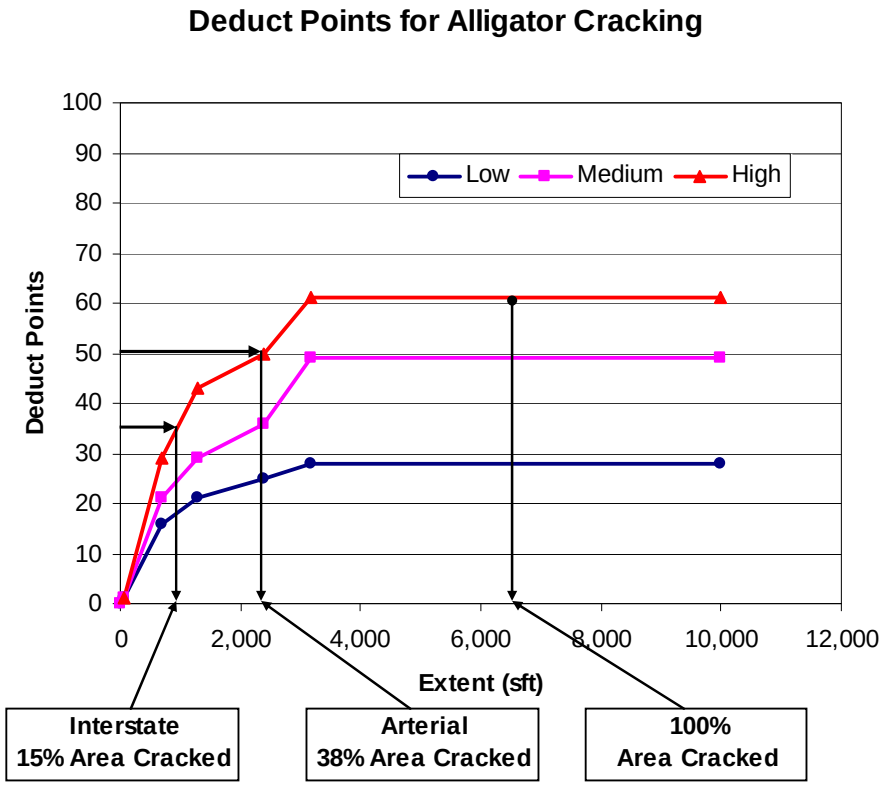

Figure 9
The deduct points for alligator cracking in flexible pavements

- The extent scale reported as area in ft^2 (9,999.99 ft^2) is significantly higher than the maximum area ($ft.^2$) of the survey section (12*528= 6,336 ft^2).
- The deduct curves are irregular and the deduct points stay the same after 50 percent of the area is cracked. This indicates that the condition of the road section is the same at 50% and 100% area cracked. It should be noted that the pavement is deteriorating over time, and the deduct points should reflect the condition of the road section at all times.
- It appears that the deduct point values for various severity levels are not balanced. For example, the deduct points for low severity cracking areas are relatively high. It should be noted that the low severity cracks are tight cracks and do not require fixing. They may not significantly affect the ride quality of the section. Based on the AASHTO definition, the area of low severity cracks can be calculated by multiplying the length of the crack by 1 ft. width. Therefore, if 4 cracks are present, the total area

becomes (4*1*528) = 2,112 ft.,^{2} which is approximately 34% of the area cracked and represents approximately 25 deduct points. This implies that the distress index is 75 and will trigger a minor rehabilitation of 3.5-in. overlay (based on PMS trigger values for rehabilitation actions) and will be questionable. This observation indicates that the deduct points for various distress severities requires appropriate balancing weight factors.

The implication of the above observations is that the distress indices may not reflect the real condition of the road section, thus affecting the selection of appropriate treatment action. Such inconsistency not only affect the performance of the road but creates a communication gap between the PMS and end users.

Figure 10 indicates the deduct points for transverse cracking in jointed concrete pavements (JCP). The figure shows the deduct points for low, medium, and high severity transverse cracking in JCP. The examination of the figure and the data in table 13 reveals the following.

- The extent scale as reported in linear feet (lin. ft.) is very high. The maximum value corresponds to unrealistic crack spacing of about 0.5 ft. for a 528 ft. section of a road.
- The deduct points values for major rehabilitation action are different for interstate (between 60 and 20) and arterial highways (60).
- The deduct points for low, medium, and high severity cracking needs to be balanced. For example, for arterial highways:
    - 1.4 high severity cracks per slab (based on an average length of slab of 20 ft.) will trigger major rehabilitation.
    - Similarly, 1.0 high severity and 0.15 medium severity cracks will trigger major rehabilitation action.
    - On the other hand, for the same threshold value (60), 1.4 high severity cracks (13 ft. center to center) are equivalent to 9.0 medium severity cracks per slab (2 ft. center to center).

The above scenarios imply that the weight factors for high and medium severity cracks are inadequate.

Note: The major rehabilitation on arterial highways is referred to as major rehabilitation (non-curb & gutter)-(minor rehab. plus up to 800 sq. yds. full depth patching plus 3.5 in. saw & seal overlay).

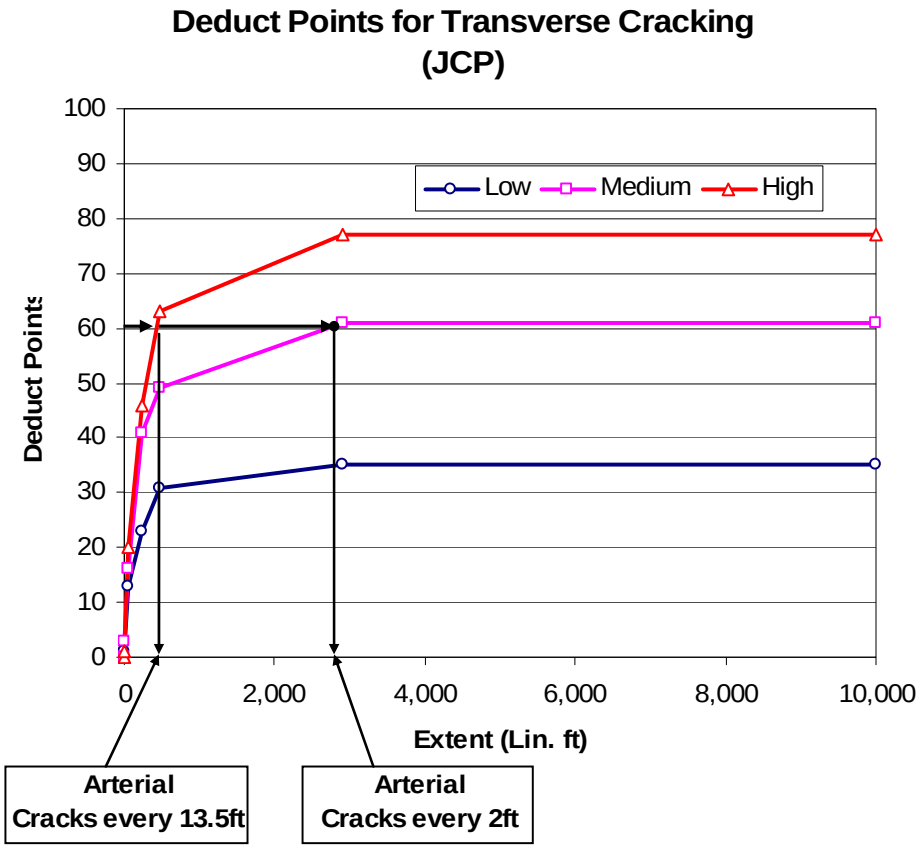

Figure 10
The deduct points for transverse cracking in jointed concrete pavements (JCP)

Similarly, some other observations are reported below:

- The deduct points for patching are the same for both flexible and composite pavements. It should be noted that the patching techniques and cost of repair for flexible pavements are much different from the composite pavements. Similarly, the causes and rate of deterioration vary significantly with the pavement type. Having the same deduct point values for patching in both flexible and composite pavements may be confusing and creates the communication gap between the PMS office and local districts, particularly the maintenance engineers.
- The PMS does not have tables or charts for deduct point values of transverse, longitudinal, and block cracking for flexible pavements.

- The rut depth and IRI are linearly related to the rut and roughness index, respectively. It should be noted that both distresses are a function of the speed of a vehicle. For a given road roughness, higher speeds result in higher driver discomfort. Similarly, during rain, standing water in the rut channel may cause hydroplaning. Hydroplaning is a function of the vehicle speed, the quality of the tire, and the depth of water standing in the rut channel. Hence, after considering such factors calculation of deduct point, the indices will no longer be linear.

As reported earlier, the deduct point policy was established in 1992 or earlier. Since then, there has been no study conducted to calibrate the deduct points. Since the accuracy of the index values is based on accurate deduct values, the above preliminary analysis indicates that the deduct point values for distresses need calibration, which will be based on cost data and all that the research community has learned over period of time.

Triggers, Resets, and Treatment Options

The review of the various triggers and treatments for pavements is still under way and is part of the second phase of the study. The preliminary information for this section is reported below.

The trigger is the index value that is used to determine what type of treatment is needed. The triggers are based on the pavement type. Based on the behavior and surface material, the PMS classifies the roads into four pavement types:

- Flexible Pavement
- Composite Pavement
- Jointed Concrete Pavement
- Continuously Reinforced Concrete Pavement

Each of the pavement types has a list of distresses that are relative to the pavement type. Each distress has a trigger value that corresponds to a specific treatment to repair the road. Each of the pavement types are again broken down into three traffic categories:

- Interstate
- Arterial
- Collector

The pavement is broken up into treatment type for each of the traffic categories. The treatment for various triggers as established by the LADOTD in May 2006 is summarized in tables 16 through 19.

Every time maintenance is done to a road, it resets the index scale for that rehabilitated section of road to a higher index, usually about 100. For each of the treatment types, there is a specific reset index value. The summaries of the treatment for various resets as established by the LADOTD in May 2006 are reported in tables 20 through 23. Similarly, the summaries of costs associated with treatments are reported in Tables 24 through 27.

The following example illustrates the use of the table 16 for flexible pavement treatment and triggers values:

Item 2 on the table “bfTRG_TO_ASP_INT” indicates “Thin Overlay on Interstate (Cold Plane 2", put 2" back; 0-100 sq.yds. Patching).” The PMS will Trigger a “Thin Overlay on Interstate” when Rut Index <80 or Roughness Index <90 and check that Alligator >=90 and Random Index >= 85 and patch Index >= 90 and Roughness Index >= 85.

Table 16 Flexible pavement triggers and treatments

No	TREATMENT	DESCRIPTION	ALLIGATOR	RANDOM	PATCH	RUT	ROUGHNESS
1	bfTRG_MS_ASP_INT	Microsurfacing on Interstate	>=98	>=98	>=98	>=80<90	>=85
2	bfTRG_TO_ASP_INT	Thin Overlay on Interstate (Cold Plane 2", put 2" back; 0-100 sq.yds. Patching)	>=90	>=85	>=90	<80	>=85 <90
3	bfTRG_MO_ASP_INT	Medium Overlay on Interstate (Cold Plane 2", put 3.5" back or just 3.5" overlay, 100-300 sq.yds Patching)	>=65 <90	<90	>=65 <90		<85
4	bfTRG_SO_ASP_INT	Structural Overlay on Interstate (7" Overlay; 700 sq.yds. Patching)	<65		<65		
5	bfTRG_MS_ASP_ART	Microsurfacing on Arterial	>=95	>=95	>=95	>=65 <80	>=80
6	bfTRG_TO_ASP_ART	Thin Overlay on Arterial (Cold Plane 2", put 2" back; 0-100 sq.yd. Patching)	>=90	>=80 <95	>=80	<65	>=70 <80
7	bfTRG_MO_ASP_ART	Medium Overlay on Arterial (Cold Plane 2", put 3.5" back or just 3.5" overlay, 100-300 sq.yds Patching)	>=50 <90	<80	>=60 <80		<70
8	bfTRG_SO_ASP_ART	Structural Overlay on Arterial (5.5" Overlay; 700 sq.yds. Patching)	<50		<60		
9	bfTRG_PST_ASP_COL	Polymer Surface Treatment on Collector	>= 85 <95	>=80 <95	>=85	>=65	>=80
10	bfTRG_MS_ASP_COL	Microsurfacing on Collector	>=95	>=95	>=95	>=65 <80	>=80
11	bfTRG_TO_ASP_COL	Thin Overlay on Collector (2" Overlay; 0-100 sq.yd. Patching)	N/A	N/A	N/A	N/A	N/A
12	bfTRG_MO_ASP_COL	Medium Overlay on Collector (Cold Plane 2", put 3.5" back or just 3.5" overlay, 100-500 sq.yds Patching)	>=60 <85	<80	>=65 <85	<65	>=60 <80
13	bfTRG_IPS	In Place Stabilization on Collector (In-Place Stabilization & 3" A.C.)	<60		<65		<60

Table 17
Composite pavement triggers and treatments

No	TREATMENT	DESCRIPTION	ALLIGATOR	RANDOM	PATCH	RUT	ROUGHNESS	NO_LANES
1	bfTRG_MS_COM_INT	Microsurfacing on Interstate	>=98	>=95	>=98	>=80<90	>=90	
2	bfTRG_TO_COM_INT	Thin Overlay on InterstateCold Plane 2", put 2" back; 0-100sq.yds. Patching	>=90	>=90	>=90	<80	>=85 <90	
3	bfTRG_MO_COM_INT	Medium Overlay on Interstate (Cold Plane 2", put 3.5" back & 1.5" on shoulders; 100-500 sq.yds Patching)	>=65 <90	>=65 <90	>=65 <90		<85	
4	bfTRG_SO_COM_INT	Structural Treatment on Interstate (CRCP Composites-Cold Plane 2", heavy patching (600 sq.yds), put 5.5" back &3.5" on shoulders) orJCP Composites-Cold Plane to slab, Rubblize, put 7" A.C., 3" A.C. on shoulders)	<65	<65	<65			
5	bfTRG_MS_COM_ART	Microsurfacing on Arterial	>=95	>=95	>=95	>=65 <80	>=80	
6	bfTRG_TO_COM_ART_CURB	Thin Overlay on Arterial (Curb & Gutter) (Cold Plane to slab, 300 sq.yds. Patching, Clean & Reseal Joints, 2" Saw & Seal Overlay)	>=65 <90	>=65 <90	>=65 <90	<65	<80	
7	bfTRG_TO_COM_ART_NC	Thin Overlay on Arterial (Non-Curb & Gutter) (Cold Plane 2", put 2" back, 100 sq.yds. Patching, 30 tons Joint Repair)	>=90	>=80 <95	>=80	<65	>=70 <80	
8	bfTRG_MO_COM_ART_NC	Medium Overlay on Arterial (Non-Curb & Gutter) Cold Plane to slab, put 3.5" Saw & Seal Back, 300 sq.yds. Concrete Patching , Clean & Reseal Joints or Cold Plane 2", 300 sq.yds. A.C. Patching, 30 tons Joint Repair, 3.5" Overlay)	>=50 <90	>=50 <80	>=60 <80		<70	
9	bfTRG_SO_COM_ART_CURB	Structural Overlay on Arterial (Curb & Gutter) (Cold Plane to slab, 1000 sq.yds. Patching, Clean & Reseal Joints, 2" Saw & Seal Overlay)	<65	<65	<65			
10	bfTRG_SO_COM_ART_NC	Structural Overlay on Arterial (Non-Curb & utter) Cold Plane 2", 600 sq.yds. A.C. Patching, 100 tons Joint Repair, 5.5" A.C. & 3.5" on Shoulders)	<50	<50	<60			<=3

Table 17
Composite pavement triggers and treatments (continued)

No	TREATMENT	DESCRIPTION	ALLIGATOR	RANDOM	PATCH	RUT	ROUGHNESS	NO_LANES
11	bfTRG_RUBL_COM_ART_NC	Rubblize and Overlay on Arterial (Non-Curb & Gutter) Cold Plane to Slab, Rubblize, 5.5" A.C. & 2" A.C. on Shoulders (4 or more lanes)	<50	<50	<60			>=4
12	bfTRG_MS_COM_COL	Microsurfacing on Collector	>=95	>=95	>=98	>=65 <80	>=80	
13	bfTRG_TO_COM_COL_CURB	Thin Overlay on Collector (Curb & Gutter) (Cold Plane to slab, 300 sq.yds. Concrete Patching, Clean & Reseal Joints, 2" Saw & Seal Overlay)	>=65 <90	>=65 <90	>=65 <90	<65	<80	
14	bfTRG_TO_COM_COL_NC	Thin Overlay on Collector (Non-Curb & Gutter) (Cold Plane 2", put 2" back, 100 sq.yds. Patching, 30 tons Joint Repair)	>=80	>=80 <95	>=80	<65	>=65 <80	
15	bfTRG_MO_COM_COL_NC	Medium Overlay on Collector (Non-Curb & Gutter) Cold Plane to slab, put 3.5" Saw & Seal Back, 300 sq.yds. Concrete Patching , Clean & Reseal Joints or Cold Plane 2", 300 sq.yds. A.C. Patching, 30 tons Joint Repair, 3.5" Overlay)	>=50 <90	>=50 <80	>=60 <80		<65	
16	bfTRG_SO_COM_COL_CURB	Structural Overlay on Collector (Curb & Gutter) (Cold Plane to slab, 1000 sq.yds. Concrete Patching, Clean & Reseal Joints, 2" Saw & Seal Overlay)	<65	<65	<65			
17	bfTRG_SO_COL_NC	Structural Overlay on Collector (Non-Curb & Gutter) Cold Plane 2", 600 sq.yds. A.C. Patching, 100 tons Joint Repair, 5.5" A.C. & 3.5" on Shoulders)	<50	<50	<60			<=3
18	bfTRG_RUBL_COM_COL_NC	Rubblize and Overlay on Collector (Non-Curb & Gutter) Cold Plane to Slab, Rubblize, 5.5" A.C. & 2" A.C. on Shoulders (4 or more lanes)	<50	<50	<60			>=4

Table 18
Jointed concrete pavement (JCP) triggers and treatments

No	TREATMENT	DESCRIPTION	TRANS	LONG	PATCH	FAULT-ING	ROUGH-NESS	NO_ LANES
1	bfTRG_SJC_JCP_INT	Seal Joints and Cracks on Interstate (Crack Sealing Plus Clean & Reseal Joints, Minor Patching)	>=80 <98	>=95 <98	>=90	<=0.2	>=85	
2	bfTRG_MNR_JCP_INT	Minor Rehab on Interstate (Crack Sealing plus Clean & Reseal Joints, Partial Depth Patching, Grinding, Cross-Stitching, Slab Jacking, Full Depth Patching (**Not Greater Than:** 400 sq.yds.))	>=80	>=80 <95	>=80 <90	<.5	>=70 <85	
3	bfTRG_MJR_JCP_INT_CURB	Major Rehab on Interstate(Curb & Gutter) (Minor Rehab. Plus up to 1000 sq.yds. Full Depth Patching)	>=40 <80	>=50 <80	>=50 <80	>=.5	>=60 <70	
4	bfTRG_MJR_JCP_INT_NO_CURB	Major Rehab on Interstate(Non-curb & Gutter) (Minor Rehab. Plus up to 1000 sq.yds. Full Depth Patching)	>=65 <80	>=65 <80	>=65 <80	>=.5	>=70	
5	bfTRG_RUBL_JCP_INT_NC	Rubblize and Overlay on Interstate (Non-curb & Gutter) (Rubblize + 7” Overlay)	<65	<65	<65		<70	
6	bfTRG_CREC_JCP_INT	Reconstruct on Interstate(Curb & Gutter)	<40	<50	<50		<60	
7	bfTRG_SJC_JCP_ART_CURB	Seal Joints and Cracks on Arterial (Curb & Gutter) (Crack Sealing Plus Clean & Reseal Joints, Minor Patching)	>=80 <98	>=95 <98	>=90	<=0.2	>=85	
8	bfTRG_SJC_JCP_ART_NC	Seal Joints and Cracks on Arterial (Non-curb & Gutter) (Crack Sealing Plus Clean & Reseal Joints, Minor Patching)	>=80 <98	>=95 <98	>=90	<=0.2	>=85	

Table 18
Jointed concrete pavement (JCP) triggers and treatments (continued)

No	TREATMENT	DESCRIPTION	TRANS	LONG	PATCH	FAULT-ING	ROUGH-NESS	NO_ LANES
9	bfTRG_MNR_JCP_ART_CURB	Minor Rehab on Arterial (Curb & Gutter) (Crack Sealing plus Clean & Reseal Joints, Partial Depth Patching, Grinding, Cross-Stitching, Slab Jacking, Full Depth Patching (**Not Greater Than:** 400 sq.yds.))	>=60 <80	>=60 <95	>=70 <90		>=60 <85	
10	bfTRG_MNR_JCP_ART_NC	Minor Rehab on Arterial (Non-curb & Gutter) (Crack Sealing plus Clean & Reseal Joints, Partial Depth Patching, Grinding, Cross-Stitching, Slab Jacking, Full Depth Patching (**Not Greater Than:** 400 sq.yds.))	>=60 <80	>=60 <95	>=70 <90		>=60 <85	
11	bfTRG_MJR_JCP_ART_CURB	Major Rehab on Arterial (Curb & Gutter) (Minor Rehab. plus up to 800 sq.yds. Full Depth Patching plus 2" Saw & Seal Overlay)	<60	<60	<70	>=.5	<60	
12	bfTRG_MJR_JCP_ART_NC_3LN	Major Rehab on Arterial (Non-curb & Gutter) (Minor Rehab. plus up to 800 sq.yds. Full Depth Patching plus 3.5" Saw & Seal Overlay)	<60	<60	<70	>=.5	<60	<=3
13	bfTRG_MJR_JCP_ART_NC_4LN	Major Rehab on Arterial (Non-curb & Gutter) (Minor Rehab. plus up to 800 sq.yds. Full Depth Patching plus 3.5" Saw & Seal Overlay)	>=50 <60	>=50 <60	>=60 <70	>=.5	<60	>=4
14	bfTRG_RUBL_JCP_ART_NC	Rubblize and Overlay on Arterial (Non-curb & Gutter) (Rubblize + 5” Overlay)	<50	<50	<60			>=4
15	bfTRG_SJC_JCP_COL_CURB	Seal Joints and Cracks on Collector (Curb & Gutter) (Crack Sealing Plus Clean & Reseal Joints, Minor Patching)	>=80 <98	>=95 <98	>=90	<=0.2	>=85	
16	bfTRG_SJC_JCP_COL_NC	Seal Joints and Cracks on Collector (Non-curb & Gutter) (Crack Sealing Plus Clean & Reseal Joints, Minor Patching)	>=80 <98	>=95 <98	>=90	<=0.2	>=85	

Table 18
Jointed concrete pavement (JCP) triggers and treatments (continued)

No	TREATMENT	DESCRIPTION	TRANS	LONG	PATCH	FAULT-ING	ROUGH-NESS	NO_ LANES
17	bfTRG_MNR_JCP_COL_CURB	Minor Rehab on Collector (Curb & Gutter) (Crack Sealing plus Clean & Reseal Joints, Partial Depth Patching, Grinding, Cross-Stitching, Slab Jacking, Full Depth Patching (Not Greater Than: 400 sq.yds.))	>=60 <80	>=60 <95	>=65 <90		>=60 <85	
18	bfTRG_MNR_JCP_COL_NC	Minor Rehab on Collector (Non-curb & Gutter) (Crack Sealing plus Clean & Reseal Joints, Partial Depth Patching, Grinding, Cross-Stitching, Slab Jacking, Full Depth Patching (**Not Greater Than:** 400 sq.yds.))	>=60 <80	>=60 <95	>=65 <90		>=60 <85	
19	bfTRG_MJR_JCP_COL_CURB	Major Rehab on Collector (Curb & Gutter) (Minor Rehab. Plus up to 800 sq.yds. Full Depth Patching plus 2" Saw & Seal Overlay)	<60	<60	<65	>=.5	<60	
20	bfTRG_MJR_JCP_COL_NC_3LN	Major Rehab on Collector (Non-curb & Gutter) (Minor Rehab. Plus up to 800 sq.yds. Full Depth Patching plus 3.5" Saw & Seal Overlay)	<60	<60	<65	>=.5	<60	<=3
21	bfTRG_MJR_JCP_COL_NC_4LN	Major Rehab on Collector (Non-curb & Gutter) (Minor Rehab. Plus up to 800 sq.yds. Full Depth Patching plus 3.5" Saw & Seal Overlay)	>=50 <60	>=50 <60	>=55 <65	>=.5	<60	>=4
22	bfTRG_RUBL_JCP_COL_NC	Rubblize and Overlay on Collector (Non-curb & Gutter) (Rubblize + 5” Overlay)	<50	<50	<55			>=4

Table 19
Continuously reinforced concrete (CRC) pavement triggers and treatments

No	TREATMENT	DESCRIPTION	LONG	PATCH	ROUGHNESS
1	bfTRG_MNR_CRCP_INT	Minor Rehab on Interstate (Not Greater Than: 200 sq.yds. of Full Depth Patching & 4" A.C. Overlay)	>=65 <85	>=70 <85	<76
2	bfTRG_MJR_CRCP_INT	Major Rehab on Interstate (Not Greater Than: 400 sq.yds. of Full Depth Patching & 8" A.C. Overlay or Bonded Concrete Overlay)	>=50 <65	>=50 <70	
3	bfTRG_CREC_CRCP_INT	Reconstruction or Unbonded Concrete Overlay on Interstate	<50	<50	
4	bfTRG_MNR_CRCP_OTHER	Minor Rehab on Other (Not Greater Than: 200 sq.yds. of Full Depth Patching & 4" A.C. Overlay)	>=65 <85	>=70 <85	<75
5	bfTRG_MJR_CRCP_OTHER	Major Rehab on Other (Not Greater Than: 400 sq.yds. of Full Depth Patching & 8" A.C. Overlay or Bonded Concrete Overlay)	>=50 <65	>=50 <70	
6	bfTRG_CREC_CRCP_OTHER	Reconstruction or Unbonded Concrete Overlay on Other	<50	<50	

Table 20
RESETS for flexible pavement

No	TREATMENT	DESCRIPTION	ALLIGATOR	RANDOM	PATCH	RUT	ROUGHNESS	AAGE
1	bfTRG_MS_ASP_INT	Microsurfacing on Interstate	A 100	A 100	A 100	A 100	A 100	N -1
2	bfTRG_TO_ASP_INT	Thin Overlay on Interstate (Cold Plane 2", put 2" back; 0-100 sq.yds. Patching)	A 100	A 100	A 100	A 100	A 100	A 0
3	bfTRG_MO_ASP_INT	Medium Overlay on Interstate (Cold Plane 2", put 3.5" back or just 3.5" overlay, 100-300 sq.yds Patching)	A 100	A 100	A 100	A 100	A 100	A 0
4	bfTRG_SO_ASP_INT	Structural Overlay on Interstate (7" Overlay; 700 sq.yds. Patching)	A 100	A 100	A 100	A 100	A 100	A 0
5	bfTRG_MS_ASP_ART	Microsurfacing on Arterial	A 100	A 100	A 100	A 100	A 100	N -1
6	bfTRG_TO_ASP_ART	Thin Overlay on Arterial (Cold Plane 2", put 2" back; 0-100 sq.yd. Patching)	A 100	A 100	A 100	A 100	A 100	A 0
7	bfTRG_MO_ASP_ART	Medium Overlay on Arterial (Cold Plane 2", put 3.5" back or just 3.5" overlay, 100-300 sq.yds Patching)	A 100	A 100	A 100	A 100	A 100	A 0
8	bfTRG_SO_ASP_ART	Structural Overlay on Arterial (5.5" Overlay; 700 sq.yds. Patching)	A 100	A 100	A 100	A 100	A 100	A 0
9	bfTRG_PST_ASP_COL	Polymer Surface Treatment on Collector *	N -1	N -1	N -1	R 5	R 10	N -1
10	bfTRG_MS_ASP_COL	Microsurfacing on Collector	A 100	A 100	A 100	A 100	A 100	N -1
11	bfTRG_TO_ASP_COL	Thin Overlay on Collector (2" Overlay; 0-100 sq.yd. Patching)	A 100	A 100	A 100	A 100	A 100	A 0
12	bfTRG_MO_ASP_COL	Medium Overlay on Collector (Cold Plane 2", put 3.5" back or just 3.5" overlay, 100-500 sq.yds Patching)	A 100	A 100	A 100	A 100	A 100	A 0
13	bfTRG_IPS	In Place Stabilization on Collector (In-Place Stabilization & 3" A.C.)	A 100	A 100	A 100	A 100	A 100	A 0

Table 21
RESETS for composite pavement

No	TREATMENT	DESCRIPTION	ALLIGATOR	RANDOM	PATCH	RUT	ROUGHNESS	AAGE	PAVETYPE
1	bfTRG_MS_COM_INT	Microsurfacing on Interstate	A 100	A 100	A 100	A 100	A 100	N -1	
2	bfTRG_TO_COM_INT	Thin Overlay on Interstate (Cold Plane 2", put 2" back; 0-100 sq.yds. Patching)	A 100	A 100	A 100	A 100	A 100	A 0	
3	bfTRG_MO_COM_INT	Medium Overlay on Interstate (Cold Plane 2", put 3.5" back & 1.5" on shoulders; 100-500 sq.yds Patching)	A 100	A 100	A 100	A 100	A 100	A 0	
4	bfTRG_SO_COM_INT	Structural Treatment on Interstate (CRCP Composites-Cold Plane 2", heavy patching (600 sq.yds), put 5.5" back &3.5" on shoulders) or (JCP Composites-Cold Plane to slab, Rubblize, put 7" A.C., 3" A.C. on shoulders)	A 100	A 100	A 100	A 100	A 100	A 0	(Rubblize & Overlay) ASP
5	bfTRG_MS_COM_ART	Microsurfacing on Arterial	A 100	A 100	A 100	A 100	A 100	N -1	
6	bfTRG_TO_COM_ART_CURB	Thin Overlay on Arterial (Curb & Gutter) (Cold Plane to slab, 300 sq.yds. Patching, Clean & Reseal Joints, 2" Saw & Seal Overlay)	A 100	A 100	A 100	A 100	A 100	A 0	
7	bfTRG_TO_COM_ART_NC	Thin Overlay on Arterial (Non-Curb & Gutter) (Cold Plane 2", put 2" back, 100 sq.yds. Patching, 30 tons Joint Repair)	A 100	A 100	A 100	A 100	A 100	A 0	
8	bfTRG_MO_COM_ART_NC	Medium Overlay on Arterial (Non-Curb & Gutter) Cold Plane to slab, put 3.5" Saw & Seal Back, 300 sq.yds. Concrete Patching , Clean & Reseal Joints or Cold Plane 2", 300 sq.yds. A.C. Patching, 30 tons Joint Repair, 3.5" Overlay)	A 100	A 100	A 100	A 100	A 100	A 0	
9	bfTRG_SO_COM_ART_CURB	Structural Overlay on Arterial (Curb & Gutter) (Cold Plane to slab, 1000 sq.yds. Patching, Clean & Reseal Joints, 2" Saw & Seal Overlay)	A 100	A 100	A 100	A 100	A 100	A 0	

Table 21
RESETS for composite pavement (continued)

No	TREATMENT	DESCRIPTION	ALLIGATOR	RANDOM	PATCH	RUT	ROUGHNESS	AAGE	PAVETYPE
10	bfTRG_SO_COM_ART_NC	Structural Overlay on Arterial (Non-Curb & Gutter) Cold Plane 2", 600 sq.yds. A.C. Patching, 100 tons Joint Repair, 5.5" A.C. & 3.5" on Shoulders)	A 100	A 100	A 100	A 100	A 100	A 0	
11	bfTRG_RUBL_COM_ART_NC	Rubblize and Overlay on Arterial (Non-Curb & Gutter) Cold Plane to Slab, Rubblize, 5.5" A.C. & 2" A.C. on Shoulders (4 or more lanes)	A 100	A 100	A 100	A 100	A 100	A 0	ASP
12	bfTRG_MS_COM_COL	Microsurfacing on Collector	A 100	A 100	A 100	A 100	A 100	N -1	
13	bfTRG_TO_COM_COL_CURB	Thin Overlay on Collector (Curb & Gutter) (Cold Plane to slab, 300 sq.yds. Concrete Patching, Clean & Reseal Joints, 2" Saw & Seal Overlay)	A 100	A 100	A 100	A 100	A 100	A 0	
14	bfTRG_TO_COM_COL_NC	Thin Overlay on Collector (Non-Curb & Gutter) (Cold Plane 2", put 2" back, 100 sq.yds. Patching, 30 tons Joint Repair)	A 100	A 100	A 100	A 100	A 100	A 0	
15	bfTRG_MO_COM_COL_NC	Medium Overlay on Collector (Non-Curb & Gutter) Cold Plane to slab, put 3.5" Saw & Seal Back, 300 sq.yds. Concrete Patching , Clean & Reseal Joints or Cold Plane 2", 300 sq.yds. A.C. Patching, 30 tons Joint Repair, 3.5" Overlay)	A 100	A 100	A 100	A 100	A 100	A 0	
16	bfTRG_SO_COM_COL_CURB	Structural Overlay on Collector (Curb & Gutter) (Cold Plane to slab, 1000 sq.yds. Concrete Patching, Clean & Reseal Joints, 2" Saw & Seal Overlay)	A 100	A 100	A 100	A 100	A 100	A 0	
17	bfTRG_SO_COL_NC	Structural Overlay on Collector (Non-Curb & Gutter) Cold Plane 2", 600 sq.yds. A.C. Patching, 100 tons Joint Repair, 5.5" A.C. & 3.5" on Shoulders)	A 100	A 100	A 100	A 100	A 100	A 0	
18	bfTRG_RUBL_COM_COL_NC	Rubblize and Overlay on Collector (Non-Curb & Gutter) Cold Plane to Slab, Rubblize, 5.5" A.C. & 2" A.C. on Shoulders (4 or more lanes)	A 100	A 100	A 100	A 100	A 100	A 0	ASP

Table 22
RESETS for jointed concrete pavement

No	TREATMENT	DESCRIPTION	TRANS	LONG	PATCH	FAULTING	ROUGHNESS	AAGE	PAVE TYPE
1	bfTRG_SJC_JCP_INT	Seal Joints and Cracks on Interstate (Crack Sealing Plus Clean & Reseal Joints, Minor Patching)	A 100	A 100	A 100	N –1	N –1	N -1	
2	bfTRG_MNR_JCP_INT	Minor Rehab on Interstate (Crack Sealing plus Clean & Reseal Joints, Partial Depth Patching, Grinding, Cross-Stitching, Slab Jacking, Full Depth Patching (**Not Greater Than:** 400 sq.yds.))	A 100	A 100	A 100	<=0.2	A 92	N -1	
3	bfTRG_MJR_JCP_INT_CURB	Major Rehab on Interstate(Curb & Gutter) (Minor Rehab. Plus up to 1000 sq.yds. Full Depth Patching)	A 100	A 100	A 100	<=0.2	A 92	A 0	
4	bfTRG_MJR_JCP_INT_NO_CURB	Major Rehab on Interstate(Non-curb & Gutter) (Minor Rehab. Plus up to 1000 sq.yds. Full Depth Patching)	A 100	A 100	A 100	<=0.2	A 92	A 0	
5	bfTRG_RUBL_JCP_INT_NC	Rubblize and Overlay on Interstate (Non-curb & Gutter) (Rubblize + 7” Overlay)	A 100	A 100	A 100	<=0.2	A 100	A 0	ASP
6	bfTRG_CREC_JCP_INT	Reconstruct on Interstate	A 100	A 100	A 100	<=0.2	A 100	A 0	
7	bfTRG_SJC_JCP_ART_CURB	Seal Joints and Cracks on Arterial (Curb & Gutter) (Crack Sealing Plus Clean & Reseal Joints, Minor Patching)	A 100	A 100	A 100	N –1	N –1	N -1	
8	bfTRG_SJC_JCP_ART_NC	Seal Joints and Cracks on Arterial (Non-curb & Gutter) (Crack Sealing Plus Clean & Reseal Joints, Minor Patching)	A 100	A 100	A 100	N –1	N –1	N -1	

Table 22
RESETS for jointed concrete pavement (continued)

No	TREATMENT	DESCRIPTION	TRANS	LONG	PATCH	FAULTING	ROUGHNESS	AAGE	PAVETYPE
9	bfTRG_MNR_JCP_ART_CURB	Minor Rehab on Arterial l (Curb & Gutter) (Crack Sealing plus Clean & Reseal Joints, Partial Depth Patching, Grinding, Cross-Stitching, Slab Jacking, Full Depth Patching (**Not Greater Than:** 400 sq.yds.))	A 100	A 100	A 100	<=0.2	A 92	N -1	
10	bfTRG_MNR_JCP_ART_NC	Minor Rehab on Arterial (Non-curb & Gutter) (Crack Sealing plus Clean & Reseal Joints, Partial Depth Patching, Grinding, Cross-Stitching, Slab Jacking, Full Depth Patching (**Not Greater Than:** 400 sq.yds.))	A 100	A 100	A 100	<=0.2	A 92	N -1	
11	bfTRG_MJR_JCP_ART_CURB	Major Rehab on Arterial (Curb & Gutter) (Minor Rehab. plus up to 800 sq.yds. Full Depth Patching plus 2" Saw & Seal Overlay)	A 100	A 100	A 100	<=0.2	A 92	A 0	COM
12	bfTRG_MJR_JCP_ART_NC_3LN	Major Rehab on Arterial (Non-curb & Gutter) (Minor Rehab. plus up to 800 sq.yds. Full Depth Patching plus 3.5" Saw & Seal Overlay)	A 100	A 100	A 100	<=0.2	A 92	A 0	COM
13	bfTRG_MJR_JCP_ART_NC_4LN	Major Rehab on Arterial (Non-curb & Gutter) (Minor Rehab. plus up to 800 sq.yds. Full Depth Patching plus 3.5" Saw & Seal Overlay)	A 100	A 100	A 100	<=0.2	A 92	A 0	COM
14	bfTRG_RUBL_JCP_ART_NC	Rubblize and Overlay on Arterial (Non-curb & Gutter) (Rubblize + 5” Overlay)	A 100	A 100	A 100	<=0.2	A 100	A 0	ASP
15	bfTRG_SJC_JCP_COL_CURB	Seal Joints and Cracks on Collector (Curb & Gutter) (Crack Sealing Plus Clean & Reseal Joints, Minor Patching)	A 100	A 100	A 100	N –1	N –1	N -1	

Table 22
RESETS for jointed concrete pavement (continued)

No	TREATMENT	DESCRIPTION	TRANS	LONG	PATCH	FAULTING	ROUGHNESS	AAGE	PAVETYPE
16	bfTRG_SJC_JCP_COL_NC	Seal Joints and Cracks on Collector (Non-curb & Gutter) (Crack Sealing Plus Clean & Reseal Joints, Minor Patching)	A 100	A 100	A 100	N –1	N –1	N -1	
17	bfTRG_MNR_JCP_COL_CURB	Minor Rehab on Collector (Curb & Gutter) (Crack Sealing plus Clean & Reseal Joints, Partial Depth Patching, Grinding, Cross-Stitching, Slab Jacking, Full Depth Patching (**Not Greater Than:** 400 sq.yds.))	A 100	A 100	A 100	<=0.2	A 92	N -1	
18	bfTRG_MNR_JCP_COL_NC	Minor Rehab on Collector (Non-curb & Gutter) (Crack Sealing plus Clean & Reseal Joints, Partial Depth Patching, Grinding, Cross-Stitching, Slab Jacking, Full Depth Patching (**Not Greater Than:** 400 sq.yds.))	A 100	A 100	A 100	<=0.2	A 92	N -1	
19	bfTRG_MJR_JCP_COL_CURB	Major Rehab on Collector (Curb & Gutter) (Minor Rehab. Plus up to 800 sq.yds. Full Depth Patching plus 2" Saw & Seal Overlay)	A 100	A 100	A 100	<=0.2	A 92	A 0	COM
20	bfTRG_MJR_JCP_COL_NC_3LN	Major Rehab on Collector (Non-curb & Gutter) (Minor Rehab. Plus up to 800 sq.yds. Full Depth Patching plus 3.5" Saw & Seal Overlay)	A 100	A 100	A 100	<=0.2	A 92	A 0	COM
21	bfTRG_MJR_JCP_COL_NC_4LN	Major Rehab on Collector (Non-curb & Gutter) (Minor Rehab. Plus up to 800 sq.yds. Full Depth Patching plus 3.5" Saw & Seal Overlay)	A 100	A 100	A 100	<=0.2	A 92	A 0	COM
22	bfTRG_RUBL_JCP_COL_NC	Rubblize and Overlay on Collector (Non-curb & Gutter) (Rubblize + 5” Overlay)	A 100	A 100	A 100	<=0.2	A 100	A 0	ASP

Table 23
RESETS for continuously reinforced concrete pavement

No	TREATMENT	DESCRIPTION	LONG	TRCK	PATCH	ROUGHNESS	PAVETYPE
1	bfTRG_MNR_CRCP_INT	Minor Rehab on Interstate (Not Greater Than: 200 sq.yds. of Full Depth Patching & 4" A.C. Overlay)	A 100	A 100	A 100	A 92	COM
2	bfTRG_MJR_CRCP_INT	Major Rehab on Interstate (Not Greater Than: 400 sq.yds. of Full Depth Patching & 8" A.C. Overlay or Bonded Concrete Overlay)	A 100	A 100	A 100	A 92	COM
3	bfTRG_CREC_CRCP_INT	Reconstruction or Unbonded Concrete Overlay on Interstate	A 100	A 100	A 100	A 100	
4	bfTRG_MNR_CRCP_OTHER	Minor Rehab on Other (Not Greater Than: 200 sq.yds. of Full Depth Patching & 4" A.C. Overlay)	A 100	A 100	A 100	A 92	COM
5	bfTRG_MJR_CRCP_OTHER	Major Rehab on Other (Not Greater Than: 400 sq.yds. of Full Depth Patching & 8" A.C. Overlay or Bonded Concrete Overlay)	A 100	A 100	A 100	A 92	COM
6	bfTRG_CREC_CRCP_OTHER	Reconstruction or Unbonded Concrete Overlay on Other	A 100	A 100	A 100	A 100	

Table 24
Costs for flexible pavement treatments

No	TREATMENT	DESCRIPTION	COST PER MILE FOR 2 LANES	COST PER MILE FOR EXTRA LANES
1	bfTRG_MS_ASP_INT	Microsurfacing on Interstate	* 52,000	26,000
2	bfTRG_TO_ASP_INT	Thin Overlay on Interstate (Cold Plane 2", put 2" back; 0-100 sq.yds. Patching)	* 200,000	* 100,000
3	bfTRG_MO_ASP_INT	Medium Overlay on Interstate (Cold Plane 2", put 3.5" back or just 3.5" overlay, 100-300 sq.yds Patching)	* 300,000	* 150,000
4	bfTRG_SO_ASP_INT	Structural Overlay on Interstate (7" Overlay; 700 sq.yds. Patching)	535,000	* 225,000
5	bfTRG_MS_ASP_ART	Microsurfacing on Arterial	50,000	26,000
6	bfTRG_TO_ASP_ART	Thin Overlay on Arterial (Cold Plane 2", put 2" back; 0-100 sq.yd. Patching)	132,000	64,000
7	bfTRG_MO_ASP_ART	Medium Overlay on Arterial (Cold Plane 2", put 3.5" back or just 3.5" overlay, 100-300 sq.yds Patching)	245,000	99,000
8	bfTRG_SO_ASP_ART	Structural Overlay on Arterial (5.5" Overlay; 700 sq.yds. Patching)	434,000	135,000
9	bfTRG_PST_ASP_COL	Polymer Surface Treatment on Collector	37,000	16,000
10	bfTRG_MS_ASP_COL	Microsurfacing on Collector	50,000	23,000
11	bfTRG_TO_ASP_COL	Thin Overlay on Collector (2" Overlay; 0-100 sq.yd. Patching)	98,000	43,000
12	bfTRG_MO_ASP_COL	Medium Overlay on Collector (Cold Plane 2", put 3.5" back or just 3.5" overlay, 100-500 sq.yds Patching)	177,000	77,000
13	bfTRG_IPS	In Place Stabilization on Collector (In-Place Stabilization & 3" A.C.)	246,000	103,000

* Cost used from Pavement Preservation Program Manager as of November 2003.
** Proportioned from Interstate cost
Note: Microsurfacing and Seal Joints and Cracks not currently used for Interstate pavement preservation per Program Manager

Table 25
Costs for composite pavement treatments

No	TREATMENT	DESCRIPTION	COST PER MILE FOR 2 LANES	COST PER MILE FOR EXTRA LANES
1	bfTRG_MS_COM_INT	Microsurfacing on Interstate	* 52,000	26,000
2	bfTRG_TO_COM_INT	Thin Overlay on Interstate (Cold Plane 2", put 2" back; 0-100 sq.yds. Patching)	* 200,000	* 100,000
3	bfTRG_MO_COM_INT	Medium Overlay on Interstate (Cold Plane 2", put 3.5" back & 1.5" on shoulders; 100-500 sq.yds Patching)	* 300,000	* 150,000
4	bfTRG_SO_COM_INT	Structural Treatment on Interstate (CRCP Composites-Cold Plane 2", heavy patching (600 sq.yds), put 5.5" back &3.5" on shoulders) Or (JCP Composites-Cold Plane to slab, Rubblize, put 7" A.C., 3" A.C. on shoulders)	** 950,000	**475,000
5	bfTRG_MS_COM_ART	Microsurfacing on Arterial	(Curb) 66,000 (Non-curb) 66,000	(Curb) 41,000 (Non-curb) 41,000
6	bfTRG_TO_COM_ART_CURB	Thin Overlay on Arterial (Curb & Gutter) (Cold Plane to slab, 300 sq.yds. Patching, Clean & Reseal Joints, 2" Saw & Seal Overlay)	192,000	104,000
7	bfTRG_TO_COM_ART_NC	Thin Overlay on Arterial (Non-Curb & Gutter) (Cold Plane 2", put 2" back, 100 sq.yds. Patching, 30 tons Joint Repair)	135,000	68,000
8	bfTRG_MO_COM_ART_NC	Medium Overlay on Arterial (Non-Curb & Gutter) Cold Plane to slab, put 3.5" Saw & Seal Back, 300 sq.yds. Concrete Patching , Clean & Reseal Joints or Cold Plane 2", 300 sq.yds. A.C. Patching, 30 tons Joint Repair, 3.5" Overlay)	298,000	137,000
9	bfTRG_SO_COM_ART_CURB	Structural Overlay on Arterial (Curb & Gutter) (Cold Plane to slab, 1000 sq.yds. Patching, Clean & Reseal Joints, 2" Saw & Seal Overlay)	323,000	169,000

Table 25
Costs for composite pavement treatments (continued)

No	TREATMENT	DESCRIPTION	COST PER MILE FOR 2 LANES	COST PER MILE FOR EXTRA LANES
10	bfTRG_SO_COM_ART_NC	Structural Overlay on Arterial (Non-Curb & Gutter) Cold Plane 2", 600 sq.yds. A.C. Patching, 100 tons Joint Repair, 5.5" A.C. & 3.5" on Shoulders)	412,000	165,000
11	bfTRG_RUBL_COM_ART_NC	Rubblize and Overlay on Arterial (Non-Curb & Gutter). Cold Plane to Slab, Rubblize, 5.5" A.C. & 2" A.C. on Shoulders (4 or more lanes)	**800,000	**400,000
12	bfTRG_MS_COM_COL	Microsurfacing on Collector	(Curb) 62,000 (Non-curb) 62,000	(Curb) 38,000 (Non-curb) 38,000
13	bfTRG_TO_COM_COL_CURB	Thin Overlay on Collector (Curb & Gutter) (Cold Plane to slab, 300 sq.yds. Concrete Patching, Clean & Reseal Joints, 2" Saw & Seal Overlay)	179,000	97,000
14	bfTRG_TO_COM_COL_NC	Thin Overlay on Collector (Non-Curb & Gutter) (Cold Plane 2", put 2" back, 100 sq.yds. Patching, 30 tons Joint Repair)	135,000	63,000
15	bfTRG_MO_COM_COL_NC	Medium Overlay on Collector (Non-Curb & Gutter) Cold Plane to slab, put 3.5" Saw & Seal Back, 300 sq.yds. Concrete Patching , Clean & Reseal Joints or Cold Plane 2", 300 sq.yds. A.C. Patching, 30 tons Joint Repair, 3.5" Overlay)	294,000	128,000
16	bfTRG_SO_COM_COL_CURB	Structural Overlay on Collector (Curb & Gutter) (Cold Plane to slab, 1000 sq.yds. Concrete Patching, Clean & Reseal Joints, 2" Saw & Seal Overlay)	308,000	157,000
17	bfTRG_SO_COL_NC	Structural Overlay on Collector (Non-Curb & Gutter). Cold Plane 2", 600 sq.yds. A.C. Patching, 100 tons Joint Repair, 5.5" A.C. & 3.5" on Shoulders)	449,000	163,000
18	bfTRG_RUBL_COM_COL_NC	Rubblize and Overlay on Collector (Non-Curb & Gutter). Cold Plane to Slab, Rubblize, 5.5" A.C. & 2" A.C. on Shoulders (4 or more lanes)	**800,000	**400,000

Table 26
Costs for jointed concrete pavement treatments

No	TREATMENT	DESCRIPTION	COST PER MILE FOR 2 LANES	COST PER MILE FOR EXTRA LANES
1	bfTRG_SJC_JCP_INT	Seal Joints and Cracks on Interstate (Crack Sealing Plus Clean & Reseal Joints, Minor Patching)	* 50,000	* 25,000
2	bfTRG_MNR_JCP_INT	Minor Rehab on Interstate (Crack Sealing plus Clean & Reseal Joints, Partial Depth Patching, Grinding, Cross-Stitching, Slab Jacking, Full Depth Patching (**Not Greater Than:** 400 sq.yds.))	* 320,000	* 160,000
3	bfTRG_MJR_JCP_INT_CURB	Major Rehab on Interstate(Curb & Gutter) (Minor Rehab. Plus up to 1000 sq.yds. Full Depth Patching)	500,000	212,500
4	bfTRG_MJR_JCP_INT_NO_CURB	Major Rehab on Interstate(Non-curb & Gutter) (Minor Rehab. Plus up to 1000 sq.yds. Full Depth Patching)	500,000	212,500
5	bfTRG_RUBL_JCP_INT_NC	Rubblize and Overlay on Interstate (Non-curb & Gutter) (Rubblize + 7" Overlay)	* 950,000	* 475,000
6	bfTRG_CREC_JCP_INT	Reconstruct on Interstate	* (Curb) 4,000,000 * (Non-curb) 2,000,000	* (Curb) 1,000,000 * (Non-curb) 1,000,000
7	bfTRG_SJC_JCP_ART_CURB	Seal Joints and Cracks on Arterial (Curb & Gutter) (Crack Sealing Plus Clean & Reseal Joints, Minor Patching)	30,000	15,000
8	bfTRG_SJC_JCP_ART_NC	Seal Joints and Cracks on Arterial (Non-curb & Gutter) (Crack Sealing Plus Clean & Reseal Joints, Minor Patching)	30,000	15,000

Table 26
Costs for jointed concrete pavement treatments (continued)

No	TREATMENT	DESCRIPTION	COST PER MILE FOR 2 LANES	COST PER MILE FOR EXTRA LANES
9	bfTRG_MNR_JCP_ART_CURB	Minor Rehab on Arterial (Curb & Gutter) (Crack Sealing plus Clean & Reseal Joints, Partial Depth Patching, Grinding, Cross-Stitching, Slab Jacking, Full Depth Patching (**Not Greater Than:** 400 sq.yds.))	135,000	83,000
10	bfTRG_MNR_JCP_ART_NC	Minor Rehab on Arterial (Non-curb & Gutter) (Crack Sealing plus Clean & Reseal Joints, Partial Depth Patching, Grinding, Cross-Stitching, Slab Jacking, Full Depth Patching (**Not Greater Than:** 400 sq.yds.))	135,000	83,000
11	bfTRG_MJR_JCP_ART_CURB	Major Rehab on Arterial (Curb & Gutter) (Minor Rehab. plus up to 800 sq.yds. Full Depth Patching plus 2" Saw & Seal Overlay)	411,000	196,000
12	bfTRG_MJR_JCP_ART_NC_3LN	Major Rehab on Arterial (Non-curb & Gutter) (Minor Rehab. plus up to 800 sq.yds. Full Depth Patching plus 3.5" Saw & Seal Overlay)	411,000	196,000
13	bfTRG_MJR_JCP_ART_NC_4LN	Major Rehab on Arterial (Non-curb & Gutter) (Minor Rehab. plus up to 800 sq.yds. Full Depth Patching plus 3.5" Saw & Seal Overlay)	411,000	196,000
14	bfTRG_RUBL_JCP_ART_NC	Rubblize and Overlay on Arterial (Non-curb & Gutter) (Rubblize + 5” Overlay)	**800,000	**400,000
15	bfTRG_SJC_JCP_COL_CURB	Seal Joints and Cracks on Collector (Curb & Gutter) (Crack Sealing Plus Clean & Reseal Joints, Minor Patching)	30,000	14,000

Table 26
Costs for jointed concrete pavement treatments (continued)

No	TREATMENT	DESCRIPTION	COST PER MILE FOR 2 LANES	COST PER MILE FOR EXTRA LANES
16	bfTRG_SJC_JCP_COL_NC	Seal Joints and Cracks on Collector (Non-curb & Gutter) (Crack Sealing Plus Clean & Reseal Joints, Minor Patching)	30,000	14,000
17	bfTRG_MNR_JCP_COL_CURB	Minor Rehab on Collector (Curb & Gutter) (Crack Sealing plus Clean & Reseal Joints, Partial Depth Patching, Grinding, Cross-Stitching, Slab Jacking, Full Depth Patching (**Not Greater Than:** 400 sq.yds.))	135,000	63,000
18	bfTRG_MNR_JCP_COL_NC	Minor Rehab on Collector (Non-curb & Gutter) (Crack Sealing plus Clean & Reseal Joints, Partial Depth Patching, Grinding, Cross-Stitching, Slab Jacking, Full Depth Patching (**Not Greater Than:** 400 sq.yds.))	135,000	63,000
19	bfTRG_MJR_JCP_COL_CURB	Major Rehab on Collector (Curb & Gutter) (Minor Rehab. Plus up to 800 sq.yds. Full Depth Patching plus 2" Saw & Seal Overlay)	411,000	196,000
20	bfTRG_MJR_JCP_COL_NC_3LN	Major Rehab on Collector (Non-curb & Gutter) (Minor Rehab. Plus up to 800 sq.yds. Full Depth Patching plus 3.5" Saw & Seal Overlay)	411,000	196,000
21	bfTRG_MJR_JCP_COL_NC_4LN	Major Rehab on Collector (Non-curb & Gutter) (Minor Rehab. plus up to 800 sq.yds. Full Depth Patching plus 3.5" Saw & Seal Overlay)	411,000	196,000
22	bfTRG_RUBL_JCP_COL_NC	Rubblize and Overlay on Collector (Non-curb & Gutter) (Rubblize + 5” Overlay)	**800,000	**400,000

Table 27
Costs for continuously reinforced concrete pavement

No	TREATMENT	DESCRIPTION	COST PER MILE FOR 2 LANES	COST PER MILE FOR EXTRA LANES
1	bfTRG_MNR_CRCP_INT	Minor Rehab on Interstate (Not Greater Than: 200 sq.yds. of Full Depth Patching & 4" A.C. Overlay)	348,000	140,000
2	bfTRG_MJR_CRCP_INT	Major Rehab on Interstate (Not Greater Than: 400 sq.yds. of Full Depth Patching & 8" A.C. Overlay or Bonded Concrete Overlay)	* 1,000,000	* 500,000
3	bfTRG_CREC_CRCP_INT	Reconstruction or Unbonded Concrete Overlay on Interstate	* (Curb) 4,000,000 * (Non-curb) 2,000,000	* (Curb) 1,000,000 * (Non-curb) 1,000,000
4	bfTRG_MNR_CRCP_OTHER	Minor Rehab on Other (Not Greater Than: 200 sq.yds. of Full Depth Patching & 4" A.C. Overlay)	348,000	140,000
5	bfTRG_MJR_CRCP_OTHER	Major Rehab on Other (Not Greater Than: 400 sq.yds. of Full Depth Patching & 8" A.C. Overlay or Bonded Concrete Overlay)	* 1,000,000	* 500,000
6	bfTRG_CREC_CRCP_OTHER	Reconstruction or Unbonded Concrete Overlay on Other	* (Curb) 4,000,000 * (Non-curb) 2,000,000	* (Curb) 1,000,000 * (Non-curb) 1,000,000

Network Level Reports

A network level report is sent out to all districts. District 03 will be used as an example. There are four files sent to each district. The different files are:

1. Microsoft Excel File
2. Microsoft Access File
3. Two Acrobat Reader Files

The Microsoft excel file "DISTRICT 03 MAY 2006.xls" is an Excel file with five sheets labeled:

1. Resets
2. Current Condition Resets
3. Priority List
4. Poor and Very Poor
5. Lower Fair

Resets Sheet. In the sheet labeled "Resets," there is a list of projects that have been reset to about an index of 100 percent since the last time data was collected. In this sheet, there are eight columns of data. The first column listed is "CONTROL" which represents the control section number. The second column listed is "DIR," which represents the direction of the data collection. The number 1 represents data collection with the control, and number 2 represents data collection against the control. The third column is "FROM," which represents the beginning log mile of the control section. The next column is "LENGTH," representing the length of the project. The fifth column is "PROJECT#," which indicates the project number assigned. The sixth column is "PROJECT NAME" indicating the name of the project. The seventh column is "TYPE IMPROVEMENT," indicating the type of improvement being done on this project. The final column is "LET DATE," showing the date that the project was let. An example of district three can be seen in table 28.

Current Condition Reset Sheet. The sheet labeled "Current Condition Reset" is a list of all the roads in district. There are 29 columns in this sheet. Various information including the district number, route number, and control section numbers are listed. Moreover, the direction of the data collection, the beginning log mile of the road that corresponds to the index, and the length of the road that requires treatment are reported. Corresponding to each control section log mile,

are details about the pavement type (PAVETYPE), the type of treatment that is required (TREATMENT) for the road, and the road classification (SHS) along with the various type of distresses and distress index.

The table also lists the measured roughness of the section of road in the form of average international roughness index (AVG_IRI), the index score for the roughness of the road (RUFF), the measured rutting index for this section of road (RUT), average rut depth (R_AVG), and indices related to alligator cracking (ALCR), longitudinal cracking (LONG), transversal cracking (TRAN), random cracking (RNDM), and patching (PTCH), along with the composite index and (PREFINDEX) and remaining service life of the section of road (RSL). In the last column, "RESET" is reported to mark if the road has been reset to about an index of 100 percent. An example of district three can be seen in table 29.

Priority List Sheet. In the sheet labeled "Priority List" is a list of all the road sections that are in vital need of repair. There are eight columns in this sheet. The first column is "ROUTE" which is the route number. The second column is "CONTROL" which represents the control section number. The third column is "DIRECTION" representing the direction of the data collection. The number 1 indicates data collection with the control and number 2 represents data collection against the control. The next column is "BEG_LOG" which represents the beginning log mile of the road that corresponds to the index. The fifth column is "SECTION LENGTH" which is the length of the road that requires treatment. The sixth column is "TREATMENT YEAR" which is the year when the treatment should be applied. The seventh column is "RECOMMENDED TREATMENT" that indicates the type of treatment need to repair the road. The final column is "TREATMENT COST" which reflects the cost of applying the recommended treatment to the length of road. An example of District 03 can be seen in Table 30.

Poor and Very Poor Sheet. The sheet labeled "Poor and Very Poor" is a list of the roads that are poor and very poor. The column layout is exactly the same as sheet "Current Condition Reset Sheet."

Lower Fair Sheet. The sheet labeled "Lower Fair" is a list of the roads that are in the lower portion of the fair category. The column layout is exactly the same as the "Current Condition Reset Sheet."

The Microsoft access file "DISTRICT 03 MAY 2006.mdb" is a program that can be used to generate different lists based on different criteria. This file uses the data in the Microsoft Excel file to generate the list.

Acrobat Reader Files. Of the two "Acrobat Reader" files the first one is titled "SUMMARY_2005_DISTRICT_03 _TREATMENT_TYPE.pdf". This file shows a map of the districts roads and the corresponding treatment that is recommended. The treatments types are color coded as (figure 11):

- Reconstruction — Grey
- Structural Overlay — Brown
- Inplace Stabilization — Red
- Rubberized & Overlay — Pink
- Major Rehabilitation — Dark Green
- Medium Overlay — Light Green
- Minor Rehabilitation — Dark Blue
- Polymer Surface Treatment — Light Blue
- Thin Overlay — Baby Blue
- Microsurfacing — Yellow
- Seal Joints & Cracks — Orange

The map shows the control section for each road with colored dots representing the one tenth of a mile for the treatment. A north arrow and scale is shown at the bottom of the map.

The second Acrobat reader file is labeled "SUMMARY_2005_DISTRICT_03 _TREATMENT_YEAR.pdf". This file shows a map of the districts roads and the treatment year that is recommended. The treatment years are each color coded as (figure 12):

- 2006 Green
- 2007 Blue
- 2008 Purple
- 2009 Yellow
- 2010 Red

The map shows the control section for each road with colored dots representing the one tenth of a mile for the treatment year. A north arrow and scale is shown at the bottom of the map.

Project Level Reports

The project level report is sent out to each district upon request of the district. District three will be used as an example. A file labeled "SUMMARY_2005_DISTRICT_03_ROUGHNESS _INDEXV2.pdf" is a map of roughness in District 03 for 2005. The map is color coded to an accuracy of one tenth of a mile. There five condition categories of roughness are reported as follows (figure 13):

- Very Poor Red
- Poor Yellow
- Fair Purple
- Good Blue
- Very Good Green
- No Rating Black

The map shows the control sections with colored dots representing the one-tenth of a mile of the roughness. A north arrow and scale is shown at the bottom of the map. In addition to this map, a map of each parish within District 03 is produced for the project level. The file is labeled as "SUMMARY_2005_DISTRICT_03_ROUGHNESS_LAFAYETTE.pdf." It represents a map of roughness in Lafayette Parish for 2005. The map is color coded just like the map of district.

Table 28
RESETS Sheet for District 03

CONTROL	DIR	FROM	LENGTH	PROJECT#	PROJECT NAME	TYPE IMPROVEMENT	LET DATE
012-11	1	10.86	7.38	0035	EAST JUNCTION ROUTE LA 95 - JUNCTION ROUTE LA 35	RUBBLIZE AND OVERLAY	07/2005
012-11	2	10.86	7.38	0035	EAST JUNCTION ROUTE LA 95 - JUNCTION ROUTE LA 35	RUBBLIZE AND OVERLAY	07/2005
012-13	1	7.86	4.91	0097	BAYOU COURTABLEAU - JCT U.S. 71	IN-PLACE STABILIZATION	02/2002
012-13	2	7.86	4.91	0097	BAYOU COURTABLEAU - JCT U.S. 71	IN-PLACE STABILIZATION	02/2002
055-07	1	0.62	5.55	0072	JUNCTION ROUTE LA 675 - JUNCTION ROUTE US 90	THIN OVERLAY	02/2005
055-07	1	6.17	2.78	0072	JUNCTION ROUTE LA 675 - JUNCTION ROUTE US 90	THIN OVERLAY	02/2005
055-07	1	10.80	0.97	0073	END OF CONCRETE SECTION - LA 182	THIN OVERLAY	01/2006
055-07	2	0.62	5.55	0072	JUNCTION ROUTE LA 675 - JUNCTION ROUTE US 90	THIN OVERLAY	02/2005
055-07	2	6.17	2.78	0072	JUNCTION ROUTE LA 675 - JUNCTION ROUTE US 90	THIN OVERLAY	02/2005
056-07	1	0.00	7.45	0016	LEONVILLE NORTHWEST CITY LIMITS - JUNCTION LA 742	IN-PLACE STABILIZATION	02/2006
057-03	1	0.93	0.59	0049	NORTHERN AVENUE- JCT LA 1111 (CM)	THIN OVERLAY	03/2006
057-03	1	2.05	0.38	0045	JCT. LA 100 - SOUTH JCT. LA 365	MEDIUM OVERLAY	12/2001
057-03	2	0.93	0.59	0049	NORTHERN AVENUE- JCT LA 1111(CM)	THIN OVERLAY	03/2006

Table 29
CURENT CONDITION RESET Sheet for District 03, May 2006

Element ID	DISTRICT	ROUTE	CONTROL	DIRECTION	BEG_LOG	LENGTH	PAVE-TYPE	TREAT-MENT	SHS	RUFF	AVG_IRI	RUT	R_AVG	ALCR	LONG	TRAN	RNDM	PTCH	FSECTION	PERFINDEX	RSL	RESET
005-04-1-00.00	03	US0090	003-09	1	0	0.4	BRIDGE		SHS	N/A %	-1	N/A %	-1	N/A %	N/A %	N/A %	N/A %	N/A %	003-09-1-00.00	N/A %	-1	
005-05-1-07.70	03	US0090	003-10	1	0.85	0.19	COM-POSITE	MEDIUM OVER-LAY	RHS	68 %	198	65 %	0.55	98 %	N/A %	N/A %	96 %	85 %	003-10-1-00.85	71 %	5	
005-05-1-07.86	03	US0090	003-10	1	1.04	5.58	COM-POSITE	MEDIUM OVER-LAY	SHS	68 %	200	69 %	0.5	95 %	N/A %	N/A %	90 %	98 %	003-10-1-01.04	73 %	10	
005-05-2-07.02	03	US0090	003-10	1	6.62	1.03	COM-POSITE	THIN OVER-LAY	RHS	75 %	162	59 %	0.62	92 %	N/A %	N/A %	80 %	99 %	003-10-1-06.62	69 %	8	
007-02-2-01.78	03	US0190	012-11	2	10.86	7.38	COM-POSITE		SHS	100 %	240	100 %	0.63	100 %	N/A %	N/A %	100 %	100 %	012-11-2-10.86	100 %	1	RE-SET
007-02-2-02.09	03	US0190	012-11	2	18.24	0.24	JOINTED CONCRETE	MINOR REHABILITAT-ION	SHS	69 %	195	N/A %	-1	N/A %	95 %	92 %	N/A %	99 %	012-11-2-18.24	79 %	9	
007-02-2-02.79	03	US0190	012-11	2	18.48	0.19	JOINTED CONCRETE	MINOR REHABILITAT-ION	SHS	76 %	160	N/A %	-1	N/A %	99 %	99 %	N/A %	99 %	012-11-2-18.48	85 %	14	
007-02-2-03.60	03	US0190	012-12	1	0	0.77	COM-POSITE	MEDIUM OVER-LAY	SHS	70 %	189	78 %	0.38	78 %	N/A %	N/A %	91 %	99 %	012-12-1-00.00	74 %	6	
046-02-1-02.47	03	US0190	012-13	2	7.86	4.91	COM-POSITE		NHS	99 %	103	98 %	0.25	99 %	N/A %	N/A %	98 %	99 %	012-13-2-07.86	98 %	15	RE-SET
046-02-2-00.00	03	US0190	012-13	2	12.77	3.48	ASPHALT		NHS	98 %	47	92 %	0.21	99 %	N/A %	N/A %	98 %	99 %	012-13-2-12.77	95 %	23	
046-02-2-00.32	03	LA0742	012-30	1	0	4.99	ASPHALT	POLY-MER SUR-FACE	RHS	86 %	109	92 %	0.21	87 %	N/A %	N/A %	86 %	95 %	012-30-1-00.00	86 %	22	

Table 30
PRIORITY LIST Sheet for District 03, May 2006

ROUTE	CONTROL	DIRECTION	BEGIN LOG MILE	SECTION LENGTH	TREATMENT YEAR	RECOMMENDED TREATMENT	TREATMENT COST
US0090	003-10	1	0.85	0.19	2007	MEDIUM OVERLAY	$46,550
US0090	003-10	1	7.65	0.27	2007	MEDIUM OVERLAY	$66,150
LA0182	004-01	1	2.06	0.76	2007	THIN OVERLAY	$197,600
LA0182	004-02	1	3.93	0.92	2007	MEDIUM OVERLAY	$162,840
LA0182	004-04	1	3.73	0.40	2007	MINOR REHABILITATION	$54,000
LA0182	004-04	1	5.02	0.71	2007	MEDIUM OVERLAY	$173,950
LA0182	004-04	1	5.73	0.11	2007	MEDIUM OVERLAY	$26,950
LA0182	004-04	1	5.84	0.09	2007	MEDIUM OVERLAY	$ 22,050
LA0182	004-04	2	3.73	0.40	2007	MEDIUM OVERLAY	$ 98,000
LA0182	004-04	2	5.02	0.71	2007	MEDIUM OVERLAY	$173,950
LA0182	004-04	2	5.73	0.11	2007	MEDIUM OVERLAY	$26,950
LA0182	004-04	2	5.84	0.09	2007	MEDIUM OVERLAY	$22,050
LA0182	004-05	1	1.98	0.44	2007	MINOR REHABILITATION	$59,400
LA0182	004-06	1	9.76	1.79	2007	POLYMER SURFACE	$66,230
LA0182	004-06	1	12.73	0.39	2007	MEDIUM OVERLAY	$95,550
LA0182	004-07	1	0.76	0.24	2007	MEDIUM OVERLAY	$58,800
LA0182	004-08	1	4.25	0.75	2007	IN-PLACE STABILIZATION	$184,500

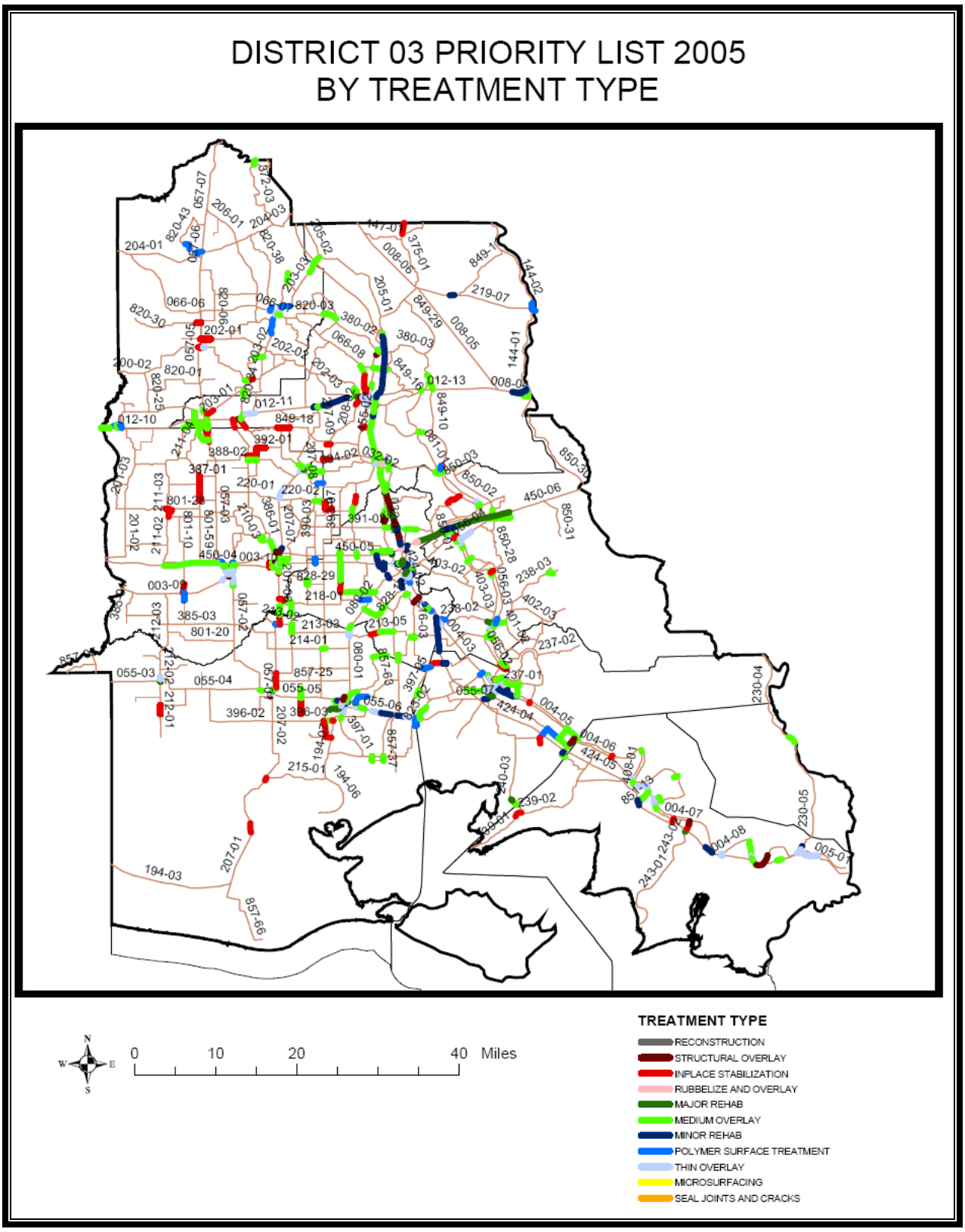

Figure 11
Map of the priority list by treatment type

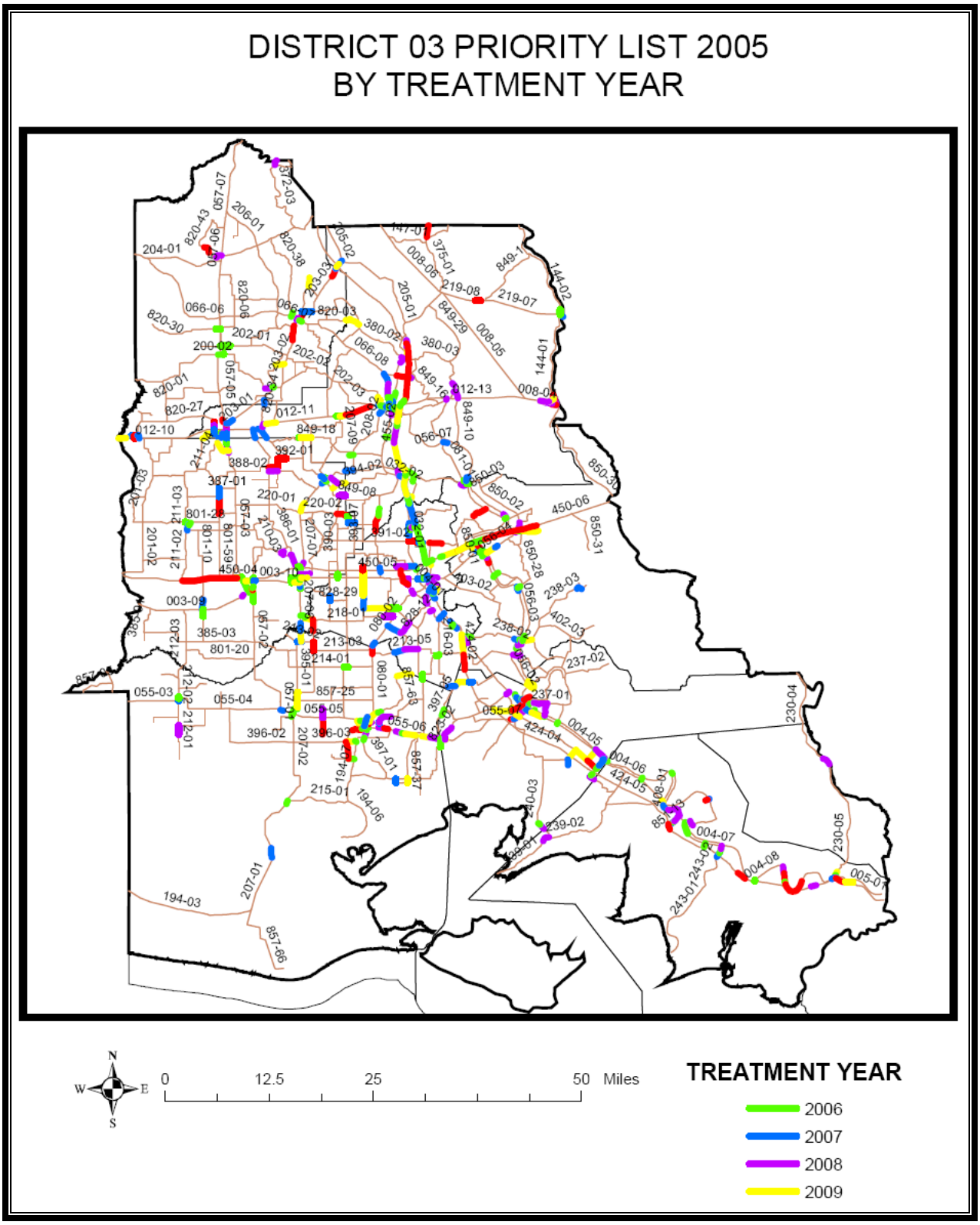

Figure 12
Map of the priority list by treatment year

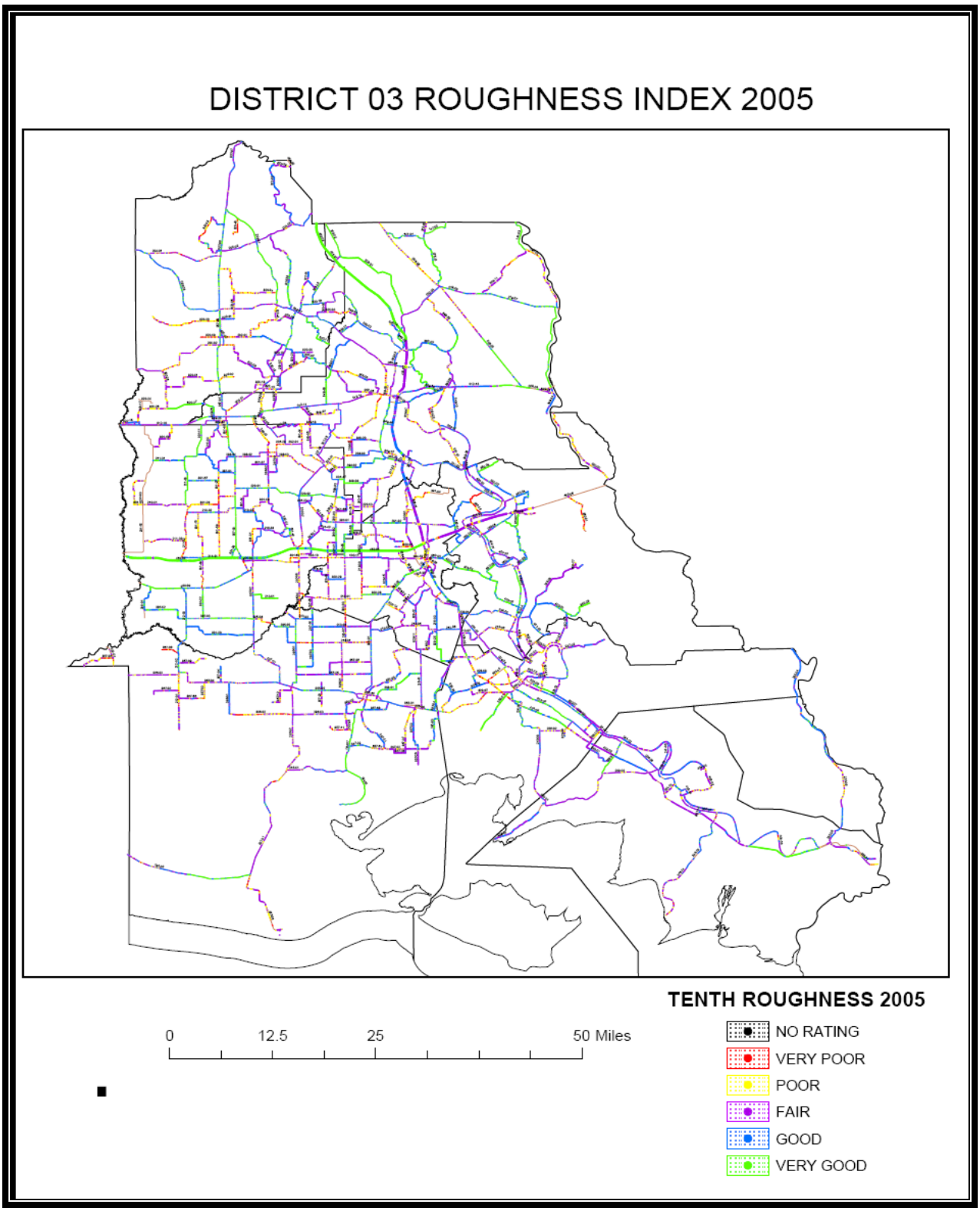

Figure 13
Map of the District 03 roughness index

RESULTS OF DISTRICT SURVEY

The research team, in collaboration with LTRC researchers and engineers, and the PMS office conducted a survey of the PMS group and engineers in the nine districts who are potential users of the PMS outputs. The survey questionnaire consisted of 23 questions with multiple sub-questions (see table 31). The main objective of the survey was to identify the needs of districts, including, but not limited to, the following:

- The types of output and reports accessible and available to the various users.
- The types of information and reports needed or desired by the users in order to make cost-effective decisions.
- The degrees to which the current PMS outputs are analyzed and utilized.
- The adequacy and the accuracy of the information currently available.
- The various issues and concerns regarding the PMS data and output.
- The degrees to which the potential PMS users fully understand the benefits and the potential cost savings that can be precipitated by using the PMS data.
- The existing location reference system.
- The degrees with which the current PMS tracks the performance of pavement preservation actions.
- The degrees to which the current PMS data differentiate between pavement projects that have received different preservation actions.

Louisiana has nine districts (see figure 14) and in each district, four groups of positions were targeted for survey. These include the maintenance engineers, construction engineers, traffic engineers, design and water research & development engineers. In general, each group consists of district and assistant district engineers. The results and analyses of the survey are based on the following:

- Total of 63 survey questionnaires were sent and 30 survey responses were received.
- It was assumed that the district and assistant district engineers returned one response for the survey questionnaire.
- The results are tabulated and reported as numbers and percent response based on the returned questionnaires.

- In general, all engineering groups within a district responded to the questionnaire. Therefore, it is reasonable to assume that the survey results are representative of LADOTD districts.

The following sections provide the summary of survey results of the LADOTD districts.

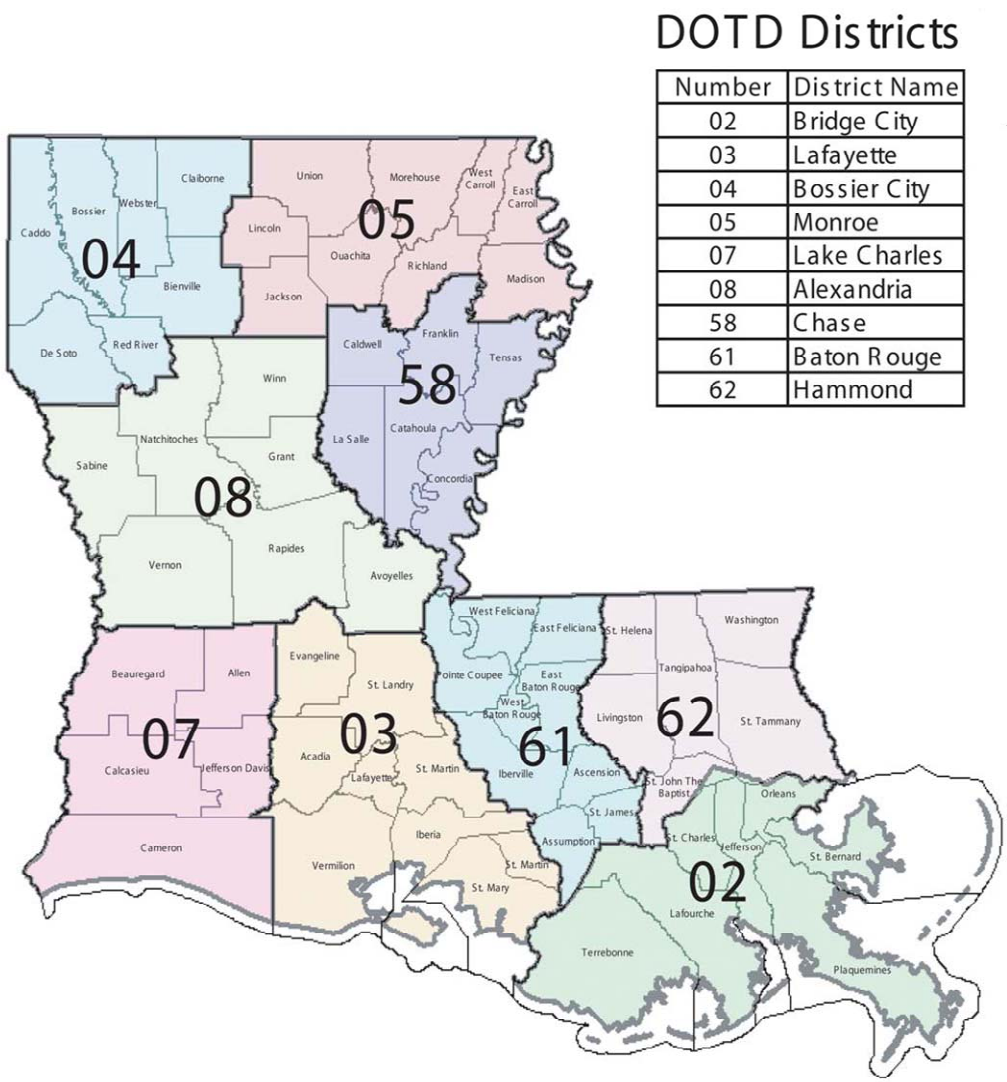

Figure 14
Map of Louisiana showing all the nine districts of LADOTD (courtesy of LADOTD)

Table 31
Survey questionnaire for LADOTD PMS survey for LTRC project No: 04-2P

Survey 2006-2007
Louisiana Transportation Research Center, LTRC Research Project No: 04-2P

Conducted by: University of Louisiana at Lafayette (UL Lafayette)
Contact Person: Mohammad Jamal Khattak, Ph.D., P.E., Department of Civil Engineering, Madison Hall, Lafayette, LA 70504-2291. Phone No: (337) 482-5356, email: mxk0940@louisiana.edu

Name: First_____ Middle _____ Last _____

Title: _____

District Number: _____

Please Respond to Each Question by Circling Yes or No or the Appropriate Response		
1. Do you have access to the Pavement Management System (PMS) Data (VISIDATA, VISIWEB, Surveyor Tool, Distresses, Indices, etc.)? If no, go to question number 3	Yes	No
2. How many people in your district have access to the PMS data? a. 1 to 5 b. 6 to 10 c. More than 10		
3. Do you use the PMS data? If no, go to question 5	Yes	No
4. You use the PMS data to:		
a. Obtain the present distress conditions of pavement projects	Yes	No
b. View the overall		
• Condition distress index	Yes	No
• Composite distress index	Yes	No
• IRI index	Yes	No
• Individual distress indices	Yes	No
• Remaining service life	Yes	No
c. Identify the type of treatment required (preventive, maintenance, rehabilitation, reconstruction, etc.)	Yes	No
d. Track the performance of applied treatments	Yes	No
e. Assess safety related issues	Yes	No
f. Obtain roadway sign locations	Yes	No
g. Obtain inventory data	Yes	No
h. Assess the pavement condition and select projects	Yes	No
i. Prioritize between projects	Yes	No
j. Other (please specify) _____		

5. What type of reports would you like to receive from the PMS office? a. Project-level report b. Network-level report c. Others, please explain _____		
6. How often would you like to receive reports from the PMS office? a. Once a year b. Twice a year c. Others _____		
7. Do you receive visual aids such as maps presenting suggested highway treatments, treatment years, and roughness from the PMS office? If no, go to question number 10	Yes	No
8. Do you use the visual aids or maps to assist in decision making (e.g. project and treatment selection, others)?	Yes	No
9. How do you rate the quality of the visual aids or maps in accommodating your needs? a. Excellent b. V. Good c. Good d. Fair e. Poor		
10. How long does it take the PMS office to respond to your request? a. One-day b. One-week c. One-month d. Too long		
11. Is the information in the reports adequate for your work? a. Just right b. Too little c. Too much		
12. In what format would you like to see the PMS Data? a. Pie Charts b. Bar Charts c. Strip Charts d. Tables e. Visual Maps f. Others _____		
13. What percentages of the annual pavement projects selected by the district are the same as those recommended by the PMS office? a. 0 % b. 25% c. 50% d. 75% e. 100%		
14. Does the district report the following activities to the PMS office (e.g. Mainframe data entry, TOPS, LETS, etc.)?		
a. Reconstruction	Yes	No
b. Rehabilitation	Yes	No
c. Preservation	Yes	No
d. Routine maintenance	Yes	No
15. Does your district maintain records of maintenance and construction activities?		
a. Hard Files	Yes	No
b. Digital files stored in Computers	Yes	No
16. Are there any concerns and issues regarding the following PMS information?		
a. Accuracy of data	Yes	No
b. Value of the indices	Yes	No
c. Recommended treatments	Yes	No
d. Remaining service life	Yes	No
e. Others _____		
Do you have any concerns about the reference location systems?	Yes	No
17. What reference location system are you using?		
a. Control Section Log mile	Yes	No
b. Route Point mile	Yes	No

c. Route Milepost d. GPS e. Other _____	Yes Yes	No No
18. Would you like to have Unified Reference Location System?	Yes	No
20. Please state any recommendations that you may have regarding the PMS operation. _____ _____ _____		
21. Based on the 2003 –04 FHWA and LADOTD surveys, several recommendations were made and forwarded to the PMS office. Do you know that the following items have been implemented?		
a. The Pavement Management Manual was completed and distributed in May 2006.		
b. The highways are surveyed in both directions. The images are collected in both directions and the distresses are rated in one direction on undivided highways and in both directions on divided highways.	Yes Yes	No No
c. PMS Training sessions were conducted for each district.		
d. The trigger values, resets, index deduct tables, and data dictionary of terms were supplied to each district when James Lee and Leslie Mix went to each District for the training purposes.	Yes Yes	No No
e. A users manual is available on PMS and District Servers under PMS VISIDATA FILES. Documents are VisiQuickRef_New.pdf, Surveyor.pdf and Visidata.pdf.	Yes	No
f. The Distress Rating Documentation/ Definitions (LADOTD Distress protocols) are available upon request.	Yes	No
g. The PMS web application includes the capability to click on a map of Control Sections that will bring up VISIWEB for that Control Section	Yes	No
h. Surveyor application can be used to measure distances to obstacles, signs, lane widths, shoulder widths, etc.	Yes	No
i. The PMS data of the 2007 survey will have the following capabilities:		
• Fore slopes and cross slopes data.		
• Bridge clearance and ramps	Yes	No
• Object heights and distances using the surveyor tools	Yes	No
• High definition quality sharp images	Yes	No
• Degree of curvatures based on AASHTO classification	Yes	No
• Electronic data in smaller intervals than a tenth of a mile.	Yes	No
• Upon request from the districts the PMS office is collecting data for over-sized loads in both directions (i.e., rice, sugar cane, timber, lignite, etc.)?	Yes Yes	No No
22. How often would you like to receive the training on the PMS data (VISIDATA, VISIWEB, Surveyor Tool, Distress Indices, etc.)? a. Once a year b. Twice a year c. Others _____		
23. Do you like to receive a copy of the tabulated response of this survey?	Yes	No
Thank You For Your Time		

SUMMARY OF ALL DISTRICTS

The summary of the survey results for all the districts is reported in table 32 and discussed as follows:

- Approximately 97% of the district engineers have access to the PMS Data. Of those who have access to the data, around 86% of them actually use it. Moreover, 89% of the engineers stated that more than 10 people in the district have access to the PMS data.
- About 72% of the engineers who use the PMS data view only the IRI index. In addition, half of them use it for viewing composite and individual distress indices, and few cared about the remaining service life of pavements sections.
- Of the respondents, 74% indicate that they use the data for assessing the pavement condition, selecting projects, and prioritizing projects.
- The survey results showed that around 70% and 71% would like to receive project-level reports and network-level reports from the PMS office, respectively. In addition, 64% would like to receive these reports once a year, as opposed to 20% who would prefer them twice a year.
- It was found that 71% of the engineers do not receive visual aids, such as maps, that present suggested highway treatments, treatment years, and roughness from the PMS office. Of the remaining 29% that receive the visual aids, the majority (71%) use the visual aids and rate them between very good and fair. About 67% stated that the information presented in PMS reports was just right for their work.
- Visual maps (43%) and tables (23%) were stated as the preferred format of the PMS data by all the engineers who responded to the question.
- Of the engineers who responded to the question, 63% stated that they do not report the reconstruction, rehabilitation, preservation, and routine maintenance activities to the PMS office.
- Only 50% answered the question related to the percentages of the annual pavement projects selected by the district that were the same as those recommended by the PMS office. About 27% stated that 25% of the time, the projects are the same as those recommended by PMS. However, 53% indicated the projects agreed 50% of the times.
- Less than half of the district engineers have concerns or issues regarding the following PMS information: accuracy of the data (40%), value of the indices (33%), recommended

treatments (42%), and remaining service life (40%).

- About 63% of engineers do not have concerns about the existing reference location system, and 76% of them stated that they would like to have a unified location reference system.
- The survey results showed that the primary reference location used in the districts is the control section log mile (100%). In addition, 59% of the districts also use route milepost. most of the districts stated that route point mile and GPS are not utilized.
- The majority of the district engineers are not aware of the implementation status of some of the previous FHWA recommendations. The capabilities of the new distress data collection system and the PMS database are also not known.
- Around 85% of district engineers stated that they would like to receive training on the PMS data (VISIDATA, VISIWEB, Surveyor, Distress Indices, etc.) once a year.

Table 32 Summary of Return of 30 Survey questionnaires that were mailed to all Districts

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
1	Do you have access to the Pavement Management System (PMS) Data (VISIDATA, VISIWEB, Surveyor Tool, Distresses, Indices,etc.)?	**30**	**100**	29	97	1	3	
2	How many people in your district have access to the PMS data?	**27**	**90**					
	a. 1 to 5			2	7			
	b. 6 to 10			1	4			
	c. More than 10			24	89			
3	Do you use the PMS data? If no, go to question 5	**29**	**97**	25	86	4	14	
4	You use the PMS data to:							
	a. Obtain the present distress conditions of pavement projects	**25**	**83**	19	76	6	24	
	b. View the overall							
	1. Condition distress index	**22**	**73**	11	50	11	50	
	2. Composite distress index	**22**	**73**	10	45	12	55	
	3. IRI index	**25**	**83**	18	72	7	28	
	4. Individual distress indices	**22**	**73**	11	50	10	45	
	5. Remaining service life	**20**	**67**	5	25	15	75	
	c. Identify the type of treatment required (preventive, maintenance, rehabilitation, reconstruction, etc.)	**25**	**83**	16	64	9	36	
	d. Track the performance of applied treatments	**23**	**77**	7	30	16	70	
	e. Assess safety related issues	**24**	**80**	15	63	9	38	
	f. Obtain roadway sign locations	**25**	**83**	14	56	10	40	
	g. Obtain inventory data	**24**	**80**	9	38	14	58	
	h. Assess the pavement condition and select projects	**25**	**83**	18	72	7	28	
	i. Prioritize between projects	**25**	**83**	19	76	6	24	
	j. Other (please specify)							

Table 32 Summary of Return of 30 Survey questionnaires that were mailed to all Districts (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
5	What type of reports would you like to receive from the PMS office?							
	a. Project-level report	**20**	**67**	14	70	6	30	
	b. Network-level report	**16**	**53**	10	63	4	25	
	c. Others, please explain	**5**	**17**					
6	How often would you like to receive reports from the PMS office?	**25**	**83**					
	a. Once a year			16	64			
	b. Twice a year			5	20			
	c. Others			4	16			
7	Do you receive visual aids such as maps presenting suggested highway treatments, treatment years, and roughness from the PMS office? If no, go to question number 10	**28**	**93**	8	29	20	71	
8	Do you use the visual aids or maps to assist in decision making (e.g. project and treatment selection, others)?	**14**	**47**	10	71	4	29	
9	How do you rate the quality of the visual aids or maps in accommodating your needs?	**13**	**43**					
	a. Excellent			0	0			
	b. V. Good			5	38			
	c. Good			5	38			
	d. Fair			3	23			
	e. Poor			0	0			
10	How long does it take the PMS office to respond to your request?	**13**	**43**					
	a. One-day			4	31			
	b. One-week			5	38			
	c. One-month			2	15			
	d. Too long			2	15			
11	Is the information in the reports adequate for your work?	**18**	**60**					
	a. Just Right			12	67			
	b. Too Little			3	17			
	c. Too much			3	17			

Table 32 Summary of Return of 30 Survey questionnaires that were mailed to all Districts (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
12	In what format would you like to see the PMS Data?	30	100					
	a. Pie Chart			0	0			
	b. Bar Chart			3	10			
	c. Strip Charts			3	10			
	d. Tables			7	23			
	e. Visual maps			13	43			
	f. Others:			5	17			
13	What percentages of the annual pavement projects selected by the district are the same as those recommended by the PMS office?	15	50					
	a. 0%			1	7			
	b. 25%			4	27			
	c. 50%			8	53			
	d. 75%			1	7			
	e. 100%			1	7			
14	Does the district report the following activities to the PMS office (e.g. Mainframe data entry, TOPS, LETS, etc.)?							
	a. Reconstruction	19	63	7	37	12	63	
	b. Rehabilitation	19	63	7	37	12	63	
	c. Preservation	20	67	8	40	12	60	
	d. Routine maintenance	20	67	7	35	13	65	
15	Does your district maintain records of maintenance and construction activities?							
	a. Hard Files	27	90	26	96	1	4	
	b. Digital files stored in Computers	25	83	22	88	3	12	
16	Are there any concerns and issues regarding the following PMS information?							
	a. Accuracy of data	25	83	10	40	15	60	
	b. Value of the indices	24	80	8	33	16	67	
	c. Recommended treatments	24	80	10	42	14	58	
	d. Remaining service life	25	83	10	40	15	60	

Table 32 Summary of Return of 30 Survey questionnaires that were mailed to all Districts (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
17	Do you have any concerns about the reference location systems?	27	90	10	37	17	63	
18	What reference location system are you using?							
	a. Control Section Log mile	29	97	29	100	0	0	
	b. Route Point mile	21	70	7	33	14	67	
	c. Route Milepost	22	73	13	59	9	41	
	d. GPS	21	70	4	19	17	81	
	e. Other							
19	Would you like to have Unified Reference Location System?	21	70	16	76	5	24	
20	Please state any recommendations that you may have regarding the PMS operation	6	20					
21	Based on the 2003 –04 FHWA and LADOTD surveys, several recommendations were made and forwarded to the PMS office. Do you know that the following items have been implemented?							
	a. The Pavement Management Manual was completed and distributed in May 2006.	25	83	17	68	8	32	
	b. The highways are surveyed in both directions. The images are collected in both directions and the distresses are rated in one direction on undivided highways and in both directions on divided highways.	26	87	26	100	0	0	
	c. PMS Training sessions were conducted for each district.	25	83	20	80	5	20	
	d. The trigger values, resets, index deduct tables, and data dictionary of terms were supplied to each district when James Lee and Leslie Mix went to each District for the training purposes.	24	80	17	71	7	29	
	e. A users manual is available on PMS and District Servers under PMS VISIDATA FILES. Documents are VisiQuickRef_New.pdf, Surveyor.pdf and Visidata.pdf.	23	77	16	70	7	30	
	f. The Distress Rating Documentation/ Definitions (LADOTD Distress protocols) are available upon request.	25	83	9	36	16	64	
	g. The PMS web application includes the capability to click on a map of Control Sections that will bring up VISIWEB for that Control Section	25	83	14	56	11	44	

Table 32 Summary of Return of 30 Survey questionnaires that were mailed to all Districts (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
	h. Surveyor application can be used to measure distances to obstacles, signs, lane widths, shoulder widths, etc.	**24**	**80**	12	50	12	50	
	i. The PMS data of the 2007 survey will have the following capabilities:	**0**		0		0		
	1. Fore slopes and cross slopes data.	**24**	**80**	5	21	19	79	
	2. Bridge clearance and ramps	**24**	**80**	5	21	19	79	
	3. Object heights and distances using the surveyor tools	**24**	**80**	7	29	17	71	
	4. High definition quality sharp images	**24**	**80**	7	29	17	71	
	5. Degree of curvatures based on AASHTO classification	**25**	**83**	4	16	21	84	
	6. Electronic data in smaller intervals than a tenth of a mile.	**24**	**80**	5	21	19	79	
	j. Upon request from the districts the PMS office is collecting data for over-sized loads in both directions (i.e., rice, sugar cane, timber, lignite, etc.)?	**24**	**80**	5	21	19	79	
22	How often would you like to receive the training on the PMS data (VISIDATA, VISIWEB, Surveyor Tool, Distress Indices, etc.)?	**26**	**87**					
	a. Once a Year			22	85			
	b. Twice a year			1	4			
	c. Others			3	12			
23	Do you like to receive a copy of the tabulated response of this survey?	**28**	**93**	16	57	12	43	

SUMMARIES BY POSITIONS

Maintenance Engineers

The Maintenance Engineers survey results are tabulated in Appendix A and discussed below:

- All of the engineers have access to the PMS data. Of those who have access to the data, 78% of them actually use it. In addition, 89% of the engineers stated that more than 10 people in the district have access to the PMS data.
- Of those surveyed, 78% would like to receive project-level reports, and 33% would prefer network-level reports from the PMS office. In addition, 56% would like to receive these reports once a year, as opposed to 33% wanting them twice a year.
- Approximately 68% of the engineers stated that they do not receive visual aids, such as maps, presenting suggested highway treatments, treatment years, and roughness from the PMS office. Of the remaining 38% that receive the visual aids, 60% of them do use it. 100% of the engineers rate these visual aids between very good and fair, and 50% of the engineers stated that the information given for their work was just right.
- Visual maps (44%) and tables (33%) were both stated as the preferred format of the PMS data in all the engineers.
- All engineers stated in the survey that between 25% and 50% of the time, the annual pavement projects selected by the district are the same as those recommended by the PMS office.
- Most of the engineers do not have concerns or issues regarding the following PMS information: accuracy of the data (67%), value of the indices (67%), recommended treatments (67%), and remaining service life (67%).
- It was found that 88% do not have concerns about the existing reference location system.
- The survey result showed that the primary reference location used by engineers is the control section log mile (100%). Furthermore, 67% of the engineers use route milepost. most of the engineers stated that route point mile (56%) and GPS (100%) is not used.
- It was found that 86% of the engineers stated that they would like to have a unified location reference system.
- About 88% of the engineers stated that they would like to receive the training on the PMS data (VISIDATA, VISIWEB, Surveyor, Distress Indices, etc.) once a year.

Construction Engineers

The Construction Engineers survey results are listed in Appendix A and discussed in this section. It should be noted that only four engineers responded to the survey questionnaire; nevertheless, the results are reported as percent response.

- All the construction engineers have access to the Pavement Management System (PMS) data. Of those who have access to PMS data, 75% of them actually use it. In addition, all the engineers stated that more than 10 people in the district have access to the PMS data.
- Of the people who use the PMS data, about 67% would like to receive project-level reports from the PMS office; 50% would like network-level reports. Moreover, 33% would like to receive these reports once a year, and the other 33% want them twice a year.
- It was found that all engineers do receive visual aids, such, as maps presenting suggested highway treatments, treatment years, and roughness from the PMS office. However, only 25% use the visual aids, and they rated them as very good. Around 50% of the engineers stated that the information presented in the reports sent by PMS was just right for their work.
- Strip charts (50%) and visual aids (25%) were both stated as the preferred format of the PMS data by the engineers.
- Most of the engineers do not have concerns or issues regarding the accuracy of the data, value of the indices, recommended treatments, and remaining service life.
- Although all the engineers have no concerns about the existing reference location system, but they would like to have a unified location reference system.
- The survey indicated that the primary reference location system used by the engineers is the control section log mile. Around 50% of the engineers also use route milepost and route point mile. GPS was used by only 25% of the engineers.
- Survey results showed that all the engineers would like to receive training on the PMS data (VISIDATA, VISIWEB, Surveyor, Distress Indices, etc.) once a year.

Traffic Engineers

The Traffic Engineers survey results are reported in Appendix A and discussed as follows:

- The results indicated that 80% of the engineers have access to the PMS data. Of those who have access to the data, 80% actually use it. In addition, all of the engineers stated that more than 10 people in the district have access to the PMS data.
- Of the people surveyed, 100% would like to receive project-level reports from the PMS office; 75% would prefer network-level reports. In addition, 75% would like to receive these reports once a year.
- Approximately 80% of the engineers stated that they do not receive visual aids, such as maps, presenting suggested highway treatments, treatment years, and roughness from the PMS office. Of the remaining 20% that receive the visual aids, 100% do use it. They also rate these visual aids between very good and good. 100% of the engineers stated that the information given for their work was just right.
- Visual maps (50%) and tables (50%) were both stated as the preferred format of the PMS data in all the engineers.
- Most of the engineers do not have concerns or issues regarding the following PMS information: accuracy of the data (67%) and recommended treatments (67%). The engineers do have concerns or issues regarding value of the indices (67%) and remaining service life (67%).
- It was found that 80% of engineers do have concerns about the existing reference location system.
- The survey indicated that the primary reference location used by the position is control section log mile (100%). The engineers also use route milepost (50%) and route point mile (60%). Most of the engineers (60%) stated that GPS is not used.
- Approximately 75% of the engineers stated that they would like to have a unified location reference system.
- Around 80% of the engineers stated that they would like to receive training on the PMS data (VISIDATA, VISIWEB, Surveyor, Distress Indices, etc.) once a year.

Design Engineers

The Design Engineers survey results are reported in Appendix A and are discussed as follows:

- The results indicated that 89% of the engineers have access to the Pavement Management System (PMS) Data. Of those who use PMS, 88% of them actually use the data. In addition, 86% of the engineers stated that more than 10 people in the district have access to the PMS data.
- Of the people surveyed, 67% would like to receive project-level reports from the PMS office; 83% would prefer network-level reports. In addition, 86% would like to receive these reports once a year.
- Approximately 63% of the engineers stated that they do not receive visual aids, such as maps, presenting suggested highway treatments, treatment years, and roughness from the PMS office. Of the remaining 38% that do receive the visual aids, 60% of them use it. 100% of the engineers rate these visual aids between very good and fair, and 83% of the engineers stated that the information given for their work was just right.
- Visual maps (50%) and tables (50%) were both stated as the preferred format of the PMS data in all the engineers.
- All the design engineers agreed that between 25% and 75% of the time, their annual pavement projects selected by the district are the same as those recommended by the PMS office.
- Most of the engineers do not have concerns or issues regarding the following PMS information: accuracy of the data (50%) and recommended treatments (63%). The engineers do have concerns or issues regarding value of the indices (63%) and remaining service life (50%)
- It was found that 50% of engineers do have concerns about existing reference location system.
- The survey indicated that the primary reference location used in by engineers is the control section log mile (100%). Most of the engineers stated that route milepost (100%), route point mile (67%), and GPS (83%) are not used.
- The results indicated that 63% of the engineers would like to have a unified location reference system.
- Most (75%) of the engineers stated that they would like to receive the training on the PMS data (VISIDATA, VISIWEB, Surveyor, Distress Indices, etc.) once a year.

SUMMARIES BY DISTRICTS

The survey results for each district are listed in Appendix B and discussed in the following sections. It should be noted that from two to five engineers returned the survey questionnaire from each district. Follow-up telephone inquiries were also conducted with the engineers who did not respond to the survey. The researchers found that some did not return the questionnaire because either they do not use the database or the district and assistant district engineer returned combined (one) response to survey. Nevertheless, the results are reported as percentage of the returned a questionnaire for each district as follows.

District 02

The District 02 survey results are reported below:

- Even though all of the engineers have access to the PMS data, only 75% of them actually use it. In addition, respondents stated that more than 10 people in the district have access to the PMS data.
- Of the engineers surveyed, it was found that 75% would like to receive project-level reports, and the rest would like to receive network-level reports from the PMS office. In addition, about 50% would like to receive these reports once a year, as opposed to 25% wanting them twice a year. Some (25%) would like to receive a report upon request.
- The survey results showed that 75% of the engineers do not receive visual aids.
- All of the engineers stated that the information in the reports was just right for their work.
- Tables (67%) were stated as the preferred format of the PMS data in this district; 33% stated that they had no preference.
- The engineers that responded (75%) to the survey reported that 50% of the projects that are selected by the district are the same as those recommended by the PMS office.
- The survey stated that only 33% of the people had concerns and issues with the accuracy of the data, value of the indices, recommended treatments, and remaining service life.
- 50% have concerns about the reference location system.
- Almost all engineers use the control section log mile, and 75% also utilize the route point mile. GPS is used by 50% of the engineers, followed by the route milepost (33%).
- Of the engineers who responded, only 33% of them stated that they wanted a unified reference location system.
- Approximately 75% of the engineers were not aware of the new capabilities of PMS

survey by ARAN. Moreover, on average, 50% did not know the implementation status of previous FHWA recommendations.

- Of the engineers surveyed, all of them would like to have training once a year.

Other comments given by the district:

- A unified reference location system would be helpful since everyone (surveyors, state troopers) uses different systems.

District 03

The following are the survey results of District 03:

- All the engineers that were surveyed not only have access to the PMS data, but they actually use it. In addition, 67% stated that 1-5 engineers in the district have access to the PMS data.
- About 67% of the engineers who use the PMS data view only the IRI index. In addition, half of them use it for viewing individual distress indices, and few cared about the composite index and remaining service life of pavements sections.
- On average, 75% indicate that they do not use the data for tracking the performance of treatments, safety, road sign inventory, and pavement inventory data.
- Of the engineers surveyed, 33% would like to receive project-level reports and 67% would like to receive network-level reports, from the PMS office. In addition, they would like to receive these reports once a year.
- The survey results showed that 67% of the engineers do not receive visual aids, and the rest stated that the quality of the maps was between very good and good.
- Half of the engineers stated that the information in the reports was just right for their work, and other half reported that it was too little.
- Visual maps (50%) were stated as the preferred format of the PMS data in this district, and the rest were split between the bar charts and tables as the preferred format.
- The engineers who responded to the survey reported that 50% of the projects that are selected by the district are the same as those recommended by the PMS office.
- The survey stated that there were no concerns and issues with the accuracy of the data, value of the indices, recommended treatments, and remaining service life.

- In regards to the reference location system, 67% responded and stated that they have no concerns about the system.
- The results showed that all of the positions use the control section log mile and GPS. The route milepost is used by 67% followed by the route point mile (33%) of the district position. GPS was not used as a location reference system.
- Of the engineers who responded only half of them stated that they would like to have a unified reference location system.
- All the engineers would like to have training once a year.

Other comments given by the district:

- PMS data is used to do right-of-way request; we verify the locations with VISIWEB.
- It is recommended that data be obtained every year. Additionally, a unified location reference system is needed.

District 04

The survey results of District 04 are shown below:

- The engineers that were surveyed have access to the PMS data, and they actually use it. In addition, it was stated that more than 10 engineers in the district have access to the PMS data.
- The majority of the engineers who use the PMS data view the individual, IRI, and composite indices of the pavements.
- On average, 75% indicate that they use the data for tracking the performance of treatments, safety, road signs inventory, and pavement inventory data, and to access the condition of road to prioritize the projects.
- It was found that none of the engineers would like to receive project-level reports and network-level reports from the PMS office. They would instead like to receive simplified reports specific to each level. In addition, all of them would like to receive these reports once a year. A comment was made about receiving the report upon request. Another suggestion was made to color-code maps showing tenths of a mile for rutting and IRI.
- Of the engineers who were surveyed, all reported that they received visual aids, and 75% of them actually use it. Of the engineers surveyed, 75% stated that the quality of the

maps was between very good and good. Only 25% stated that the quality of the maps was fair.

- About 50% of the engineers stated that the information in the reports was just right for their work and the other 50% reported that it was too much.
- Visual maps (25%) were stated as the preferred format of the PMS data in this district; 12.5% stated that bar charts are the preferred format; 12.5% stated that tables are the preferred format; and 12.5% stated that strip charts are the preferred format. On comment was made that the chart types should be presented as necessary, depending on the data.
- Of the engineers that responded to the survey, around 67% said that one-quarter of the projects that are selected by the district are the same as those recommended by the PMS office.
- The survey stated that all of the engineers have concerns about the recommended treatments and remaining service life. On the other hand, around 67% showed concerns about the accuracy of the data and value of the indices.
- All the engineers use the control section log mile and 50% also use the route milepost and GPS. In addition, all of them agreed that a unified reference location system is required. A comment was made that what is a reference location system.
- All of the engineers would like to have PMS training once a year.

Other comments given by the district:

- Unable to obtain the present distress conditions of pavement projects.
- The information for the type of treatment required (preventive, maintenance, rehabilitation, reconstruction, etc.) is reviewed.
- Unable to track the performance of applied treatments.
- It would be good for the district to be able to generate maps from the data.
- Finding the right person in the PMS office is difficult.
- Let the districts pull the necessary info to generate tables, maps etc. Let the district know how to request information. Too much detail in reports is being currently generated. For example, each 0.1 mile section has definite recommendation of rehab. Projects need to cover more than 0.1 of mile section.
- IRI & rutting numbers are of primary importance.

- Can video detection classify and count opposing lane truck traffic?
- Add simpler present query tabs to sort miles of benchmark IRI and rutting. Cross-reference PMS rutting & IRI with ground penetrating radar measurements of surfacing. Regularly distribute color-coded rutting & IRI measurements on a 24" x 24" map. You will find method variances in determining a degree of curvature for a roadway that never had vertical or horizontal control.

District 05

The District 05 survey results are reported below:

- The engineers that were surveyed indicated that they have access to the PMS data, and all of them actually use it. In addition, it was stated that more than 10 engineers in the district have access to the PMS data.
- All of the engineers who use the PMS data view only the IRI index. In addition, half of them use it for viewing condition distress indices, and none cared about the composite index and remaining service life of pavements sections.
- On average, all of the engineers indicate that they do not use the data for tracking the performance of treatments, safety, road sign inventory, and pavement inventory data.
- Of the engineers surveyed, all would like to receive network-level reports from the PMS office once a year. In addition, 50% would also like to receive project-level reports.
- The survey showed that none of the engineers received visual aids.
- It was stated in the survey that the information in the reports was just right for their work.
- Visual maps (100%), followed by tables (50%), were stated as the preferred format of the PMS data in this district.
- The engineers that responded to the survey indicated that 50% of the projects that are selected by the district are the same as those recommended by the PMS office.
- The survey stated that there were no concerns and issues with the accuracy of the data, value of the indices, and remaining service life. However, 50% had some concerns and issues with recommended treatments.
- Although none of the engineers have any concerns about the existing reference location system, 50% agreed to have unified location reference system.
- The survey results revealed that all the engineers use the control section log mile. On the

other hand, the route milepost, route point mile, and GPS are not used by the district engineers.

- The engineers stated that they would like to have training on PMS data once a year.

District 07

The following are the survey results of District 07:

- The engineers that were surveyed indicated that they have access to the PMS data, and all of them actually use it. In addition, it was stated that more than 10 engineers in the district have access to the PMS data.
- All of the engineers who use the PMS data view only the IRI index. In addition, the majority of them do not use it for viewing the composite index and remaining service life of pavement sections.
- The majority of the engineers indicate that they do not use the data for safety, road sign inventory, and pavement inventory data. On the other hand, the majority use it only for tracking the treatment performance, pavement condition for project selection, and prioritization.
- Of the engineers surveyed, all would like to receive project-level reports, and none were interested in receiving network-level reports. Moreover, they would like to receive these reports once a year. A suggestion of district-level reports grouped by control section and sorted by ADT, surface type, IRI, etc was made. In addition, 100% would like to receive these reports twice a year.
- The survey showed that none of the engineers receive visual aids.
- It was stated in the survey that the information in the reports was just right for their work.
- Visual maps (100%) were stated as the preferred format of the PMS data in this district.
- The survey stated that there were no concerns and issues with the accuracy of the data, value of the indices, recommended treatments, and remaining service life.
- In regards to the existing reference location system, no one has concerns about the system. However, they wanted to have a unified location reference system.
- The results of the survey revealed that all engineers in the districts utilize the control section log mile and route milepost systems. The route point Mile and GPS are not used by the district.
- Of the engineers surveyed, all would like to have training on PMS data once a year.

District 08

The District 08 survey results are reported below:

- Even though 100% of the engineers have access to the PMS data, only 60% of them actually use it. In addition, it was stated that more than 10 engineers in the district have access to the PMS data.
- About 67% of the engineers who use the PMS data do not view the IRI index, individual distress indices, composite index and remaining service life of pavements sections.
- 100% indicate that they do not use the data for tracking the performance of treatments. The majority stated that they use it for safety and pavement condition assessment.
- Of the engineers surveyed, 67% would like to receive project-level reports, and 50% would like to receive network-level reports from the PMS office. In addition, 67% would like to receive these reports twice a year, as opposed to 33% wanting them once a year.
- All the engineers who responded to the questions stated that they do not receive visual aids, such as maps, presenting suggested highway treatments, treatment years, and roughness from the PMS office.
- Strip charts (50%) and tables (50%) were both stated as the preferred format of the PMS data by the engineers.
- Respondents stated that 50 to100% of their annual pavement projects selected by the district are the same as those recommended by the PMS office.
- Most of the engineers (75%) do not have any concerns or issues regarding the value of the indices, recommended treatments, and remaining service life. However, 40% have concerns about the accuracy of the data.
- About 40% do have concerns about existing reference location system, and 100% agreed to have a unified location reference system.
- The survey result revealed that the primary reference location used in this district is the control section log mile. However, 67% of the engineers also use route point mile and route milepost. The GPS is not used by them.
- About 80% of the district stated that they would like to receive training on the PMS data (VISIDATA, VISIWEB, Surveyor, Distress Indices, etc.) once a year. On the other hand, 20% indicated that they would like it every few years.

District 58

The following are the District 58 survey results:

- Even though all of the engineers have access to the data, only 50% of them actually use it. In addition, it was stated that more than 10 engineers in the district have access to the PMS data.
- About 100% of the engineers who use the PMS data view only the IRI index. In addition, 50% of them use it for viewing individual distress indices and remaining service life.
- 50% indicate that they do not use the data for tracking the performance of treatments, safety, road sign inventory and pavement inventory, data.
- Approximately 50% would like to receive both project-level reports and network-level reports from the PMS office. In addition, all would like to receive the reports once a year.
- All stated that they do receive and use visual aids, such as maps, presenting suggested highway treatments, treatment years, and roughness from the PMS office. In addition, they rate these visual aids between fair and very good.
- Visual maps (67%) and tables (33%) were both stated as the preferred format of the PMS data in this district.
- It was reported in the survey that about 25% of the annual pavement projects selected by the district are the same as those recommended by the PMS office.
- All of the engineers do have concerns or issues regarding the following PMS information: accuracy of the data and recommended treatments. About 50% of the engineers have concerns about value of the indices and remaining service life.
- Although 50% do have concerns about existing reference location system, all would like to have a unified reference location system.
- It was found that the primary reference location used in this district is the control section log mile (100%). Around 50% of the engineers also use route milepost. In addition, the engineer stated that the route point mile and GPS are not used.
- The survey results showed that 50% of the engineers would like to receive training on the PMS data once a year and the rest would like it every three years.

District 61

The District 61 survey results are reported below:

- All the engineers who responded to the questionnaire stated that they have access to the PMS data and they actually use it. In addition, the majority reported that more than 10 engineers in the district have access to the PMS data.
- 70% of the engineers who use the PMS data do not view the IRI, distress and composite indices, and remaining service life.
- About 75% indicate that they use the data for safety, road sign inventory and pavement inventory data, pavement condition, and prioritizing the projects. On the other hand, 75% do not use it for tracking the performance of treatments.
- Of the engineers surveyed, 67% would like to receive both project-level reports and network-level reports from the PMS office. In addition, the majority would like to receive these reports once a year.
- Most of the engineers (75%) stated that they do not receive visual aids such as maps presenting suggested highway treatments, treatment years, and roughness from the PMS office. the 25% of the district that does receive the visual aids agreed that the visual aids are good.
- All of the engineers indicated that the information given in the reports was either too much or too little.
- Visual maps (50%) were stated as the preferred format of the PMS data in this district followed by bar charts (25%) and tables (25%).
- It was stated in the survey that 25% to 75% of the annual pavement projects selected by the district are the same as those recommended by the PMS office.
- Most of the district does have concerns or issues regarding these following PMS information: accuracy of the data (67%), recommended treatments (67%), and remaining service life (75%). Few have concerns about value of the indices.
- The results showed that 50% do have concerns about the existing reference location system.
- It was found that the primary reference location used in this district is the control section log mile (100%); 50% of the district uses route point mile and route milepost in addition; 100% of the district stated that GPS is not used.

- The survey indicated that 100% of the engineers would like to have a unified reference location system.
- About 75% of the engineers stated that they would like to receive training on the PMS data (VISIDATA, VISIWEB, Surveyor, Distress Indices, etc.) once a year and the rest agreed to have it twice a year.

Other comments given by the district:

- More frequent updates to data twice per year. Ability to acquire data for the new performance based budgeting, flexibility in changing the data that can be acquired.

District 62

The District 62 survey results are reported below:

- Approximately 67% of the engineers have access to the PMS data, and all of them actually use it. One person in the district stated that he does not use the surveyor tool. In addition, more than 10 engineers in the district have access to the data.
- Of the engineers surveyed, 50% would like to receive both project-level reports and network-level reports from the PMS office. About 50% would like to receive these reports once a year and 50% would like to receive the reports as needed. Other reports that were mentioned include the sign/signal type locations.
- All who were surveyed reported that they do not receive visual aids, such as maps, presenting suggested highway treatments, treatment years, and roughness from the PMS office.
- Visual maps (50%) were reported as the preferred format of the PMS data in this district, and 50% agreed to keep the same format.
- It was stated in the survey that about 50% of the annual pavement projects selected by the district are the same as those recommended by the PMS office.
- All engineers that respond to the survey stated that they have concerns or issues regarding the accuracy of the data and value of the indices as reported by the PMS. On the other hand, they do not have concerns about recommended treatments and remaining service life.
- The engineers do have concerns about the existing reference location system, and they

would like to have a unified reference location system.

- The survey results showed that the primary reference location used in this district is the control section log mile (100%). About 50% of the engineers also use the route milepost, route point mile, and GPS.
- Around 50% of the district stated that they would like to receive training on the PMS data (VISIDATA, VISIWEB, Surveyor, Distress Indices, etc.) once a year, and 50% stated they would like it every two years.

Other comments given by the district:

- Integrated location map to help determine engineers of cameras on state highway system.
- Regular discrepancies are encountered regarding the accuracy of log mile distances for various routes. Something is in error regarding our log mile system or the programming for the ARAN. Would like distances to match need study/log mile books. In the future training should be geared more toward querying the system to develop reports.

CONCLUSIONS AND RECOMMENDATIONS

Based on the review of the PMS practices and the survey conducted within all the districts, various conclusions and recommendations are made. These are presented below in a table format.

CONCLUSIONS	RECOMMENDATIONS
1) The LADOTD has an active and dynamic PMS. The pavement distress data is collected continuously (no sampling) for every 0.1 mile segment and good data on pavement distresses are available from 1995 to 2007.	Stay the course.
2) All districts have access to the PMS data and the majority use the data.	Stay the course.
3) Although most districts view the overall International Roughness Index (IRI), the use of the data as reported by the district engineers varies substantially from one district to another.	Obtain inputs from the district engineers and take the proper steps to increase the use of the PMS data. For example, review the values of the distress indices and the remaining service life and determine whether or not they reflect the conditions of the pavements.
4) No consensus was found amongst the district engineers regarding the type of reports that they like to receive from the PMS office.	Develop new forms of reports that streamline the content to the audience. For example, network-level reports should be prepared for the managers and the legislators whereas project-level reports should target district engineers and technicians (include detailed engineering data).
5) The PMS data is also associated with GPS-coordinates (ARAN vehicle). In addition, the pavement inventory and historical data has electronic records (NEEDS, MATTS, TOPS, etc.)	Stay the course.

CONCLUSIONS	RECOMMENDATIONS
6) Although most districts have electronic records of their maintenance and rehabilitation activities, the data are not accessible to, nor are stored in, the PMS databank. This may be because: o The data are not accessible to the PMS unit. o The data forms are not compatible with the PMS data software. o The PMS data bank is not designed to store such data. The main disadvantage of this is that the PMS engineers cannot track the performance and the cost of the various pavement preservation actions.	A meeting between the PMS unit and the various district engineers should be held to discuss this issue. The meeting agenda may include: o The types of data that are needed for a comprehensive and cost-effective pavement management. These include: fix type, cost, reference locations, and materials. o The format and accuracy of the data. o Data quality control. o The cost to unify all data forms versus the available resources.
7) Various location reference systems are being used; the majority of the district engineers would like to convert to a unified location reference system although they have no concern about the current systems.	Address this issue at the Department and/or legislative levels. Link existing location reference systems to GPS. This would allow LADOTD to continue using the existing systems. The linkage can be accomplished by utilizing the already existing software developed by the department's computer section. However, the software has some limitations; currently, it links only CSLM and RMP with GPS. It should be further improved to link the remaining location reference systems. In addition, it can identify the primary route only.
8) There is no standard procedure for establishing STA for projects.	Set up standard policy and procedures in the departments for establishing STA for future projects.

CONCLUSIONS	RECOMMENDATIONS
9) The majority of the district engineers are not aware of the implementation status of the previous FHWA recommendations. The capabilities of the new distress data collection system and the PMS database are also not known. This suggests a lack of communication between the PMS unit and the districts.	The PMS office should design and conduct training sessions and hold meetings with the district personnel to train and update the PMS users regarding the recent developments and capabilities of the PMS. This would enhance communication between the PMS and the districts.
10) The deduct point policy has been modified twice since its establishment. However, no study has been conducted to calibrate the deduct points.	The current scheme of deduct points should be calibrated and modified based on what we have learned and cost data.
11) The distress index is based on a scale from 0 to 100, with 100 representing a perfect pavement.	Stay the course.
12) Distress data for various distress types are collected. Some of the distress types, such as random cracking, can be confusing and include various types of cracks having different causes, hence different pavement preservation actions.	All cracking types in the PMS should be reviewed and evaluated for their definition and identification. Eliminate the term "Random Cracking" from the list of distresses for flexible pavements. Expand the distress types for flexible pavements to include alligator cracking, transverse cracking, block cracking, full- and partial-depth patches, roughness, rut depth, and two categories of longitudinal cracks, inside the wheel paths and elsewhere.

CONCLUSIONS	RECOMMENDATIONS
14) The LADOTD uses different threshold values (trigger values for preservation actions) for different pavement types and distresses.	Adopt uniform trigger (threshold values) for all pavement types and for all types of distress in flexible, composite, and rigid pavements. Uniformity of the threshold values for all pavement and distress types would enhance communication between the districts and would eliminate the need for establishing a dictionary for the threshold values.
15) Regarding LADOTD efforts to implement the MEPDG, the following observations were made: o PMS data is fair/good for initial calibration of performance models (level 2). o PMS data is not stored as required by MEPDG at the desired level, and in some cases is stored at the minimum level.	Calibrate the MEPDG pavement performance models for level 2 design using PMS data. Consider establishing a satellite PMS/Design database only for new sections added as recommended by FHWA.

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APPENDIX A

Table A-1 Summary of Return of 9 Survey questionnaires that were mailed to all Maintenance Engineers

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
1	Do you have access to the Pavement Management System (PMS) Data (VISIDATA, VISIWEB, Surveyor Tool, Distresses, Indices,etc.)?	**9**	**100**	9	100	0	0	
2	How many engineers in your district have access to the PMS data?	**9**	**100**					
	a. 1 to 5			0	0			
	b. 6 to 10			1	11			
	c. More than 10			8	89			
3	Do you use the PMS data? If no, go to question 5	**9**	**100**	7	78	2	22	
4	You use the PMS data to:							
	a. Obtain the present distress conditions of pavement projects	**7**	**78**	6	86	1	14	
	b. View the overall							
	1. Condition distress index	**5**	**56**	4	80	1	20	
	2. Composite distress index	**5**	**56**	3	60	2	40	
	3. IRI index	**7**	**78**	6	86	1	14	
	4. Individual distress indices	**5**	**56**	3	60	2	40	
	5. Remaining service life	**4**	**44**	0	0	4	100	
	c. Identify the type of treatment required (preventive, maintenance, rehabilitation, reconstruction, etc.)	**7**	**78**	5	71	2	29	
	d. Track the performance of applied treatments	**5**	**56**	3	60	2	40	
	e. Assess safety related issues	**6**	**67**	3	50	3	50	
	f. Obtain roadway sign locations	**7**	**78**	3	43	4	57	
	g. Obtain inventory data	**6**	**67**	1	17	5	83	
	h. Assess the pavement condition and select projects	**7**	**78**	6	86	1	14	
	i. Prioritize between projects	**7**	**78**	7	100	0	0	
	j. Other (please specify)							

Table A-1 Summary of Return of 9 Survey questionnaires that were mailed to all Maintenance Engineers (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
5	What type of reports would you like to receive from the PMS office?							
	a. Project-level report	**7**	**78**	7	100	0	0	
	b. Network-level report	**3**	**33**	3	100	0	0	
	c. Others, please explain							
6	How often would you like to receive reports from the PMS office?	**9**	**100**					
	a. Once a year			5	56			
	b. Twice a year			3	33			
	c. Others			1	11			
7	Do you receive visual aids such as maps presenting suggested highway treatments, treatment years, and roughness from the PMS office? If no, go to question number 10	**8**	**89**	3	38	5	63	
8	Do you use the visual aids or maps to assist in decision making (e.g. project and treatment selection, others)?	**5**	**56**	3	60	2	40	
9	How do you rate the quality of the visual aids or maps in accommodating your needs?	**4**	**44**					
	a. Excellent			0	0			
	b. V. Good			1	25			
	c. Good			1	25			
	d. Fair			2	50			
	e. Poor			0	0			
10	How long does it take the PMS office to respond to your request?	**5**	**56**					
	a. One-day			2	40			
	b. One-week			2	40			
	c. One-month			0	0			
	d. Too long			1	20			Never Asked
11	Is the information in the reports adequate for your work?	**8**	**89**					
	a. Just Right			4	50			
	b. Too Little			3	38			
	c. Too much			1	13			

Table 3 Summary of Return of 9 Survey questionnaires that were mailed to all Maintenance Engineers (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
12	In what format would you like to see the PMS Data?	9	100					
	a. Pie Chart			0	0			
	b. Bar Chart			0	0			
	c. Strip Charts			0	0			
	d. Tables			3	33			
	e. Visual maps			4	44			
	f. Others:			2	22			No preference
13	What percentages of the annual pavement projects selected by the district are the same as those recommended by the PMS office?	5	56					
	a. 0%			0	0			
	b. 25%			2	40			
	c. 50%			3	60			
	d. 75%			0	0			
	e. 100%			0	0			
14	Does the district report the following activities to the PMS office (e.g. Mainframe data entry, TOPS, LETS, etc.)?							
	a. Reconstruction	6	67	3	50	3	50	
	b. Rehabilitation	6	67	3	50	3	50	
	c. Preservation	7	78	3	43	4	57	
	d. Routine maintenance	7	78	3	43	4	57	
15	Does your district maintain records of maintenance and construction activities?							
	a. Hard Files	9	100	9	100	0	0	
	b. Digital files stored in Computers	7	78	6	86	1	14	
16	Are there any concerns and issues regarding the following PMS information?							
	a. Accuracy of data	9	100	3	33	6	67	
	b. Value of the indices	9	100	3	33	6	67	
	c. Recommended treatments	9	100	3	33	6	67	
	d. Remaining service life	9	100	3	33	6	67	

Table A-1 Summary of Return of 9 Survey questionnaires that were mailed to all Maintenance Engineers (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
17	Do you have any concerns about the reference location systems?	8	89	1	13	7	88	
18	What reference location system are you using?							
	a. Control Section Log mile	9	100	9	100	0	0	
	b. Route Point mile	9	100	4	44	5	56	
	c. Route Milepost	9	100	6	67	3	33	
	d. GPS	8	89	0	0	8	100	
	e. Other _____							
19	Would you like to have Unified Reference Location System?	7	78	6	86	1	14	
20	Please state any recommendations that you may have regarding the PMS operation							
21	Based on the 2003 –04 FHWA and LADOTD surveys, several recommendations were made and forwarded to the PMS office. Do you know that the following items have been implemented?							
	a. The Pavement Management Manual was completed and distributed in May 2006.	8	89	7	88	1	13	
	b. The highways are surveyed in both directions. The images are collected in both directions and the distresses are rated in one direction on undivided highways and in both directions on divided highways.	9	100	9	100	0	0	
	c. PMS Training sessions were conducted for each district.	8	89	8	100	0	0	
	d. The trigger values, resets, index deduct tables, and data dictionary of terms were supplied to each district when James Lee and Leslie Mix went to each District for the training purposes.	8	89	7	88	1	13	
	e. A users manual is available on PMS and District Servers under PMS VISIDATA FILES. Documents are VisiQuickRef_New.pdf, Surveyor.pdf and Visidata.pdf.	8	89	7	88	1	13	
	f. The Distress Rating Documentation/ Definitions (LADOTD Distress protocols) are available upon request.	9	100	5	56	4	44	
	g. The PMS web application includes the capability to click on a map of Control Sections that will bring up VISIWEB for that Control Section	9	100	8	89	1	11	

Table A-1 Summary of Return of 9 Survey questionnaires that were mailed to all Maintenance Engineers (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
	h. Surveyor application can be used to measure distances to obstacles, signs, lane widths, shoulder widths, etc.	**8**	**89**	3	38	5	63	
	i. The PMS data of the 2007 survey will have the following capabilities:							
	1. Fore slopes and cross slopes data.	**8**	**89**	3	38	5	63	
	2. Bridge clearance and ramps	**8**	**89**	3	38	5	63	
	3. Object heights and distances using the surveyor tools	**8**	**89**	3	38	5	63	
	4. High definition quality sharp images	**8**	**89**	5	63	3	38	
	5. Degree of curvatures based on AASHTO classification	**8**	**89**	3	38	5	63	
	6. Electronic data in smaller intervals than a tenth of a mile.	**8**	**89**	5	63	3	38	
	j. Upon request from the districts the PMS office is collecting data for over-sized loads in both directions (i.e., rice, sugar cane, timber, lignite, etc.)?	**8**	**89**	2	25	6	75	
22	How often would you like to receive the training on the PMS data (VISIDATA, VISIWEB, Surveyor Tool, Distress Indices, etc.)?	**8**	**89**					
	a. Once a Year			7	88			
	b. Twice a year			1	13			
	c. Others			0	0			
23	Do you like to receive a copy of the tabulated response of this survey?	**9**	**100**	7	78	2	22	

Table A-2 Summary of Return of 4 Survey questionnaires that were mailed to all Construction Engineers.

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
1	Do you have access to the Pavement Management System (PMS) Data (VISIDATA, VISIWEB, Surveyor Tool, Distresses, Indices,etc.)?	**4**	**100**	4	100	0	0	
2	How many engineers in your district have access to the PMS data?	**4**	**100**					
	a. 1 to 5			0	0			
	b. 6 to 10			0	0			
	c. More than 10			4	100			
3	Do you use the PMS data? If no, go to question 5	**4**	**100**	3	75	1	25	
4	You use the PMS data to:							
	a. Obtain the present distress conditions of pavement projects	**3**	**75**	3	100	0	0	
	b. View the overall							
	1. Condition distress index	**2**	**50**	0	0	2	100	
	2. Composite distress index	**3**	**75**	1	33	2	67	
	3. IRI index	**3**	**75**	2	67	1	33	
	4. Individual distress indices	**3**	**75**	1	33	2	67	
	5. Remaining service life	**2**	**50**	0	0	2	100	
	c. Identify the type of treatment required (preventive, maintenance, rehabilitation, reconstruction, etc.)	**3**	**75**	3	100	0	0	
	d. Track the performance of applied treatments	**3**	**75**	1	33	2	67	
	e. Assess safety related issues	**3**	**75**	2	67	1	33	
	f. Obtain roadway sign locations	**3**	**75**	1	33	1	33	
	g. Obtain inventory data	**3**	**75**	0	0	2	67	
	h. Assess the pavement condition and select projects	**3**	**75**	3	100	0	0	
	i. Prioritize between projects	**3**	**75**	2	67	1	33	
	j. Other (please specify)							

Table A-2 Summary of Return of 4 Survey questionnaires that were mailed to all Construction Engineers (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
5	What type of reports would you like to receive from the PMS office?							
	a. Project-level report	**3**	**75**	2	67	1	33	
	b. Network-level report	**2**	**50**	1	50	1	50	
	c. Others, please explain							
6	How often would you like to receive reports from the PMS office?	**3**	**75**					
	a. Once a year			1	33			
	b. Twice a year			1	33			
	c. Others			1	33			
7	Do you receive visual aids such as maps presenting suggested highway treatments, treatment years, and roughness from the PMS office? If no, go to question number 10	**4**	**100**	1	25	3	75	
8	Do you use the visual aids or maps to assist in decision making (e.g. project and treatment selection, others)?	**1**	**25**	1	100	0	0	
9	How do you rate the quality of the visual aids or maps in accommodating your needs?	**1**	**25**					
	a. Excellent			0	0			
	b. V. Good			1	100			
	c. Good			0	0			
	d. Fair			0	0			
	e. Poor			0	0			
10	How long does it take the PMS office to respond to your request?	**1**	**25**					
	a. One-day			0	0			
	b. One-week			0	0			
	c. One-month			1	100			
	d. Too long			0	0			
11	Is the information in the reports adequate for your work?	**2**	**50**					
	a. Just Right			2	100			
	b. Too Little			0	0			
	c. Too much			0	0			

Table A-2 Summary of Return of 4 Survey questionnaires that were mailed to all Construction Engineers (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
12	In what format would you like to see the PMS Data?	4	100					
	a. Pie Chart			0	0			
	b. Bar Chart			0	0			
	c. Strip Charts			2	50			
	d. Tables			0	0			
	e. Visual maps			1	25			
	f. Others:			1	25			
13	What percentages of the annual pavement projects selected by the district are the same as those recommended by the PMS office?	0	0					
	a. 0%			0	0			
	b. 25%			0	0			
	c. 50%			0	0			
	d. 75%			0	0			
	e. 100%			0	0			
14	Does the district report the following activities to the PMS office (e.g. Mainframe data entry, TOPS, LETS, etc.)?							
	a. Reconstruction	2	50	1	50	1	50	
	b. Rehabilitation	2	50	1	50	1	50	
	c. Preservation	2	50	1	50	1	50	
	d. Routine maintenance	2	50	1	50	1	50	
15	Does your district maintain records of maintenance and construction activities?							
	a. Hard Files	4	100	4	100	0	0	
	b. Digital files stored in Computers	4	100	4	100	0	0	
16	Are there any concerns and issues regarding the following PMS information?							
	a. Accuracy of data	3	75	0	0	3	100	
	b. Value of the indices	3	75	0	0	3	100	
	c. Recommended treatments	3	75	0	0	3	100	
	d. Remaining service life	3	75	0	0	3	100	

Table A-2 Summary of Return of 4 Survey questionnaires that were mailed to all Construction Engineers (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
17	Do you have any concerns about the reference location systems?	3	75	0	0	3	100	
18	What reference location system are you using?							
	a. Control Section Log mile	4	100	4	100	0	0	
	b. Route Point mile	2	50	1	50	1	50	
	c. Route Milepost	2	50	1	50	1	50	
	d. GPS	1	25	0	0	1	100	
	e. Other _____							
19	Would you like to have Unified Reference Location System?	3	75	3	100	0	0	
20	Please state any recommendations that you may have regarding the PMS operation							
21	Based on the 2003 –04 FHWA and LADOTD surveys, several recommendations were made and forwarded to the PMS office. Do you know that the following items have been implemented?							
	a. The Pavement Management Manual was completed and distributed in May 2006.	3	75	2	67	1	33	
	b. The highways are surveyed in both directions. The images are collected in both directions and the distresses are rated in one direction on undivided highways and in both directions on divided highways.	3	75	3	100	0	0	
	c. PMS Training sessions were conducted for each district.	3	75	2	67	1	33	
	d. The trigger values, resets, index deduct tables, and data dictionary of terms were supplied to each district when James Lee and Leslie Mix went to each District for the training purposes.	3	75	1	33	2	67	
	e. A users manual is available on PMS and District Servers under PMS VISIDATA FILES. Documents are VisiQuickRef_New.pdf, Surveyor.pdf and Visidata.pdf.	3	75	2	67	1	33	
	f. The Distress Rating Documentation/ Definitions (LADOTD Distress protocols) are available upon request.	3	75	1	33	2	67	
	g. The PMS web application includes the capability to click on a map of Control Sections that will bring up VISIWEB for that Control Section	3	75	1	33	2	67	

Table A-2 Summary of Return of 4 Survey questionnaires that were mailed to all Construction Engineers (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
	h. Surveyor application can be used to measure distances to obstacles, signs, lane widths, shoulder widths, etc.	**3**	**75**	2	67	1	33	
	i. The PMS data of the 2007 survey will have the following capabilities:							
	1. Fore slopes and cross slopes data.	**3**	**75**	0	0	3	100	
	2. Bridge clearance and ramps	**3**	**75**	0	0	3	100	
	3. Object heights and distances using the surveyor tools	**3**	**75**	0	0	3	100	
	4. High definition quality sharp images	**3**	**75**	0	0	3	100	
	5. Degree of curvatures based on AASHTO classification	**3**	**75**	0	0	3	100	
	6. Electronic data in smaller intervals than a tenth of a mile.	**3**	**75**	0	0	3	100	
	j. Upon request from the districts the PMS office is collecting data for over-sized loads in both directions (i.e., rice, sugar cane, timber, lignite, etc.)?	**3**	**75**	1	33	2	67	
22	How often would you like to receive the training on the PMS data (VISIDATA, VISIWEB, Surveyor Tool, Distress Indices, etc.)?	**3**	**75**					
	a. Once a Year			3	100			
	b. Twice a year			0	0			
	c. Others			0	0			
23	Do you like to receive a copy of the tabulated response of this survey?	**3**	**75**	2	67	1	33	

Table A-3 Summary of Return of 5 Survey questionnaires that were mailed to all Traffic Engineers

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
1	Do you have access to the Pavement Management System (PMS) Data (VISIDATA, VISIWEB, Surveyor Tool, Distresses, Indices,etc.)?	5	100	4	80	0	0	
2	How many engineers in your district have access to the PMS data?	4	80					
	a. 1 to 5			0	0			
	b. 6 to 10			0	0			
	c. More than 10			4	100			
3	Do you use the PMS data? If no, go to question 5	5	100	4	80	0	0	
4	You use the PMS data to:							
	a. Obtain the present distress conditions of pavement projects	4	80	2	50	2	50	
	b. View the overall							
	1. Condition distress index	4	80	2	50	1	25	
	2. Composite distress index	4	80	3	75	1	25	
	3. IRI index	4	80	4	100	0	0	
	4. Individual distress indices	4	80	4	100	0	0	
	5. Remaining service life	4	80	0	0	2	50	
	c. Identify the type of treatment required (preventive, maintenance, rehabilitation, reconstruction, etc.)	4	80	2	50	2	50	
	d. Track the performance of applied treatments	4	80	2	50	1	25	
	e. Assess safety related issues	4	80	3	75	0	0	
	f. Obtain roadway sign locations	4	80	3	75	0	0	
	g. Obtain inventory data	4	80	2	50	1	25	
	h. Assess the pavement condition and select projects	4	80	3	75	1	25	
	i. Prioritize between projects	4	80	3	75	1	25	
	j. Other (please specify)							

Table A-3 Summary of Return of 5 Survey questionnaires that were mailed to all Traffic Engineers (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
5	What type of reports would you like to receive from the PMS office?							
	a. Project-level report	4	80	0	0	4	100	
	b. Network-level report	4	80	1	25	3	75	
	c. Others, please explain							
6	How often would you like to receive reports from the PMS office?	4	80					
	a. Once a year			3	75			
	b. Twice a year			0	0			
	c. Others			1	25			
7	Do you receive visual aids such as maps presenting suggested highway treatments, treatment years, and roughness from the PMS office? If no, go to question number 10	5	100	1	20	4	80	
8	Do you use the visual aids or maps to assist in decision making (e.g. project and treatment selection, others)?	2	40	2	100	0	0	
9	How do you rate the quality of the visual aids or maps in accommodating your needs?	2	40					
	a. Excellent			0	0			
	b. V. Good			1	50			
	c. Good			1	50			
	d. Fair			0	0			
	e. Poor			0	0			
10	How long does it take the PMS office to respond to your request?	1	20					
	a. One-day			0	0			
	b. One-week			1	100			
	c. One-month			0	0			
	d. Too long			0	0			
11	Is the information in the reports adequate for your work?	2	40					
	a. Just Right			2	100			
	b. Too Little			0	0			
	c. Too much			0	0			

Table A-3 Summary of Return of 5 Survey questionnaires that were mailed to all Traffic Engineers (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
12	In what format would you like to see the PMS Data?	4	80					
	a. Pie Chart			0	0			
	b. Bar Chart			0	0			
	c. Strip Charts			0	0			
	d. Tables			2	50			
	e. Visual maps			2	50			
	f. Others:			0	0			
13	What percentages of the annual pavement projects selected by the district are the same as those recommended by the PMS office?	2	40					
	a. 0%			0	0			
	b. 25%			1	50			
	c. 50%			0	0			
	d. 75%			0	0			
	e. 100%			1	50			
14	Does the district report the following activities to the PMS office (e.g. Mainframe data entry, TOPS, LETS, etc.)?							
	a. Reconstruction	2	40	2	100	0	0	
	b. Rehabilitation	2	40	2	100	0	0	
	c. Preservation	2	40	2	100	0	0	
	d. Routine maintenance	2	40	2	100	0	0	
15	Does your district maintain records of maintenance and construction activities?							
	a. Hard Files	4	80	4	100	0	0	
	b. Digital files stored in Computers	4	80	4	100	0	0	
16	Are there any concerns and issues regarding the following PMS information?							
	a. Accuracy of data	3	60	2	67	1	33	
	b. Value of the indices	3	60	1	33	2	67	
	c. Recommended treatments	3	60	2	67	1	33	
	d. Remaining service life	3	60	1	33	2	67	

Table A-3 Summary of Return of 5 Survey questionnaires that were mailed to all Traffic Engineers (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Com-ments
				Yes		No		
		Num-ber	%	Num-ber	%	Num-ber	%	
17	Do you have any concerns about the reference location systems?	5	100	4	80	1	20	
18	What reference location system are you using?							
	a. Control Section Log mile	5	100	5	100	0	0	
	b. Route Point mile	4	80	2	50	2	50	
	c. Route Milepost	5	100	3	60	2	40	
	d. GPS	5	100	2	40	3	60	
	e. Other _____							
19	Would you like to have Unified Reference Location System?	4	80	3	75	1	25	
20	Please state any recommendations that you may have regarding the PMS operation							
21	Based on the 2003 –04 FHWA and LADOTD surveys, several recommendations were made and forwarded to the PMS office. Do you know that the following items have been implemented?							
	a. The Pavement Management Manual was completed and distributed in May 2006.	4	80	2	50	2	50	
	b. The highways are surveyed in both directions. The images are collected in both directions and the distresses are rated in one direction on undivided highways and in both directions on divided highways.	4	80	4	100	0	0	
	c. PMS Training sessions were conducted for each district.	4	80	3	75	1	25	
	d. The trigger values, resets, index deduct tables, and data dictionary of terms were supplied to each district when James Lee and Leslie Mix went to each District for the training purposes.	4	80	2	50	2	50	
	e. A users manual is available on PMS and District Servers under PMS VISIDATA FILES. Documents are VisiQuickRef_New.pdf, Surveyor.pdf and Visidata.pdf.	4	80	3	75	1	25	
	f. The Distress Rating Documentation/ Definitions (LADOTD Distress protocols) are available upon request.	4	80	0	0	4	100	
	g. The PMS web application includes the capability to click on a map of Control Sections that will bring up VISIWEB for that Control Section	4	80	1	25	3	75	

Table A-3 Summary of Return of 5 Survey questionnaires that were mailed to all Traffic Engineers (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
	h. Surveyor application can be used to measure distances to obstacles, signs, lane widths, shoulder widths, etc.	**4**	**80**	2	50	2	50	
	i. The PMS data of the 2007 survey will have the following capabilities:							
	1. Fore slopes and cross slopes data.	**5**	**100**	1	20	4	80	
	2. Bridge clearance and ramps	**5**	**100**	1	20	4	80	
	3. Object heights and distances using the surveyor tools	**5**	**100**	1	20	4	80	
	4. High definition quality sharp images	**5**	**100**	1	20	4	80	
	5. Degree of curvatures based on AASHTO classification	**5**	**100**	1	20	4	80	
	6. Electronic data in smaller intervals than a tenth of a mile.	**5**	**100**	0	0	5	100	
	j. Upon request from the districts the PMS office is collecting data for over-sized loads in both directions (i.e., rice, sugar cane, timber, lignite, etc.)?	**5**	**100**	0	0	5	100	
22	How often would you like to receive the training on the PMS data (VISIDATA, VISIWEB, Surveyor Tool, Distress Indices, etc.)?	**5**	**100**					
	a. Once a Year			4	80			
	b. Twice a year			0	0			
	c. Others			1	20			
23	Do you like to receive a copy of the tabulated response of this survey?	**5**	**100**	1	20	4	80	

Table A-4 Summary of Return of 9 Survey questionnaires that were mailed to all Design Engineers

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
1	Do you have access to the Pavement Management System (PMS) Data (VISIDATA, VISIWEB, Surveyor Tool, Distresses, Indices,etc.)?	9	100	8	89	1	11	
2	How many engineers in your district have access to the PMS data?	7	78					
	a. 1 to 5			1	14			
	b. 6 to 10			0	0			
	c. More than 10			6	86			
3	Do you use the PMS data? If no, go to question 5	8	89	7	88	1	13	
4	You use the PMS data to:							
	a. Obtain the present distress conditions of pavement projects	8	89	7	88	1	13	
	b. View the overall							
	1. Condition distress index	8	89	6	75	2	25	
	2. Composite distress index	7	78	5	71	2	29	
	3. IRI index	8	89	8	100	0	0	
	4. Individual distress indices	6	67	5	83	1	17	
	5. Remaining service life	7	78	3	43	4	57	
	c. Identify the type of treatment required (preventive, maintenance, rehabilitation, reconstruction, etc.)	8	89	4	50	4	50	
	d. Track the performance of applied treatments	8	89	1	13	7	88	
	e. Assess safety related issues	8	89	4	50	4	50	
	f. Obtain roadway sign locations	8	89	5	63	3	38	
	g. Obtain inventory data	8	89	4	50	4	50	
	h. Assess the pavement condition and select projects	8	89	5	63	3	38	
	i. Prioritize between projects	8	89	7	88	1	13	
	j. Other (please specify)							

Table A-4 Summary of Return of 9 Survey questionnaires that were mailed to all Design Engineers (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
5	What type of reports would you like to receive from the PMS office?							
	a. Project-level report	6	67	4	67	2	33	
	b. Network-level report	6	67	5	83	1	17	
	c. Others, please explain							
6	How often would you like to receive reports from the PMS office?	7	78					
	a. Once a year			6	86			
	b. Twice a year			1	14			
	c. Others			0	0			
7	Do you receive visual aids such as maps presenting suggested highway treatments, treatment years, and roughness from the PMS office? If no, go to question number 10	8	89	3	38	5	63	
8	Do you use the visual aids or maps to assist in decision making (e.g. project and treatment selection, others)?	5	56	3	60	2	40	
9	How do you rate the quality of the visual aids or maps in accommodating your needs?	5	56					
	a. Excellent			0	0			
	b. V. Good			2	40			
	c. Good			2	40			
	d. Fair			1	20			
	e. Poor			0	0			
10	How long does it take the PMS office to respond to your request?	5	56					
	a. One-day			2	40			
	b. One-week			2	40			
	c. One-month			1	20			
	d. Too long			0	0			
11	Is the information in the reports adequate for your work?	6	67					
	a. Just Right			5	83			
	b. Too Little			0	0			
	c. Too much			1	17			

Table A-4 Summary of Return of 9 Survey questionnaires that were mailed to all Design Engineers (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
12	In what format would you like to see the PMS Data?	9	100					
	a. Pie Chart			0	0			
	b. Bar Chart			1	11			
	c. Strip Charts			0	0			
	d. Tables			2	22			
	e. Visual maps			5	56			
	f. Others:			1	11			
13	What percentages of the annual pavement projects selected by the district are the same as those recommended by the PMS office?	7	78					
	a. 0%			0	0			
	b. 25%			2	29			
	c. 50%			4	57			
	d. 75%			1	14			
	e. 100%			0	0			
14	Does the district report the following activities to the PMS office (e.g. Mainframe data entry, TOPS, LETS, etc.)?							
	a. Reconstruction	8	89	1	13	7	88	
	b. Rehabilitation	8	89	1	13	7	88	
	c. Preservation	8	89	2	25	6	75	
	d. Routine maintenance	7	78	0	0	7	100	
15	Does your district maintain records of maintenance and construction activities?							
	a. Hard Files	8	89	8	100	0	0	
	b. Digital files stored in Computers	8	89	7	88	1	13	
16	Are there any concerns and issues regarding the following PMS information?							
	a. Accuracy of data	8	89	4	50	4	50	
	b. Value of the indices	8	89	3	38	5	63	
	c. Recommended treatments	8	89	5	63	3	38	
	d. Remaining service life	8	89	4	50	4	50	

Table A-4 Summary of Return of 9 Survey questionnaires that were mailed to all Design Engineers (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
17	Do you have any concerns about the reference location systems?	8	89	4	50	4	50	
18	What reference location system are you using?		0					
	a. Control Section Log mile	6	67	8	133	0	0	
	b. Route Point mile	6	67	0	0	6	100	
	c. Route Milepost	6	67	2	33	4	67	
	d. GPS	6	67	1	17	5	83	
	e. Other _____							
19	Would you like to have Unified Reference Location System?	8	89	5	63	3	38	
20	Please state any recommendations that you may have regarding the PMS operation							
21	Based on the 2003 –04 FHWA and LADOTD surveys, several recommendations were made and forwarded to the PMS office. Do you know that the following items have been implemented?							
	a. The Pavement Management Manual was completed and distributed in May 2006.	8	89	6	75	2	25	
	b. The highways are surveyed in both directions. The images are collected in both directions and the distresses are rated in one direction on undivided highways and in both directions on divided highways.	8	89	8	100	0	0	
	c. PMS Training sessions were conducted for each district.	8	89	7	88	1	13	
	d. The trigger values, resets, index deduct tables, and data dictionary of terms were supplied to each district when James Lee and Leslie Mix went to each District for the training purposes.	8	89	7	88	1	13	
	e. A users manual is available on PMS and District Servers under PMS VISIDATA FILES. Documents are VisiQuickRef_New.pdf, Surveyor.pdf and Visidata.pdf.	8	89	5	63	3	38	
	f. The Distress Rating Documentation/ Definitions (LADOTD Distress protocols) are available upon request.	8	89	3	38	5	63	
	g. The PMS web application includes the capability to click on a map of Control Sections that will bring up VISIWEB for that Control Section	8	89	3	38	5	63	

Table A-4 Summary of Return of 9 Survey questionnaires that were mailed to all Design Engineers (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
	h. Surveyor application can be used to measure distances to obstacles, signs, lane widths, shoulder widths, etc.	**7**	**78**	5	71	2	29	
	i. The PMS data of the 2007 survey will have the following capabilities:							
	1. Fore slopes and cross slopes data.	**7**	**78**	1	14	6	86	
	2. Bridge clearance and ramps	**7**	**78**	1	14	6	86	
	3. Object heights and distances using the surveyor tools	**7**	**78**	2	29	5	71	
	4. High definition quality sharp images	**7**	**78**	0	0	7	100	
	5. Degree of curvatures based on AASHTO classification	**7**	**78**	0	0	7	100	
	6. Electronic data in smaller intervals than a tenth of a mile.	**7**	**78**	0	0	7	100	
	j. Upon request from the districts the PMS office is collecting data for over-sized loads in both directions (i.e., rice, sugar cane, timber, lignite, etc.)?	**7**	**78**	2	29	5	71	
22	How often would you like to receive the training on the PMS data (VISIDATA, VISIWEB, Surveyor Tool, Distress Indices, etc.)?	**8**	**89**					
	a. Once a Year			6	75			
	b. Twice a year			0	0			
	c. Others			2	25			
23	Do you like to receive a copy of the tabulated response of this survey?	**8**	**89**	5	63	3	38	

APPENDIX B

Table B-1 Summary of Return of 4 Survey questionnaires that were mailed to District 02

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
1	Do you have access to the Pavement Management System (PMS) Data (VISIDATA, VISIWEB, Surveyor Tool, Distresses, Indices,etc.)?	4	100	4	100	0	0	
2	How many engineers in your district have access to the PMS data?	4	100					
	a. 1 to 5			0	0			
	b. 6 to 10			0	0			
	c. More than 10			4	100			
3	Do you use the PMS data? If no, go to question 5	4	100	3	75	1	25	
4	You use the PMS data to:							
	a. Obtain the present distress conditions of pavement projects	3	75	2	67	1	33	
	b. View the overall							
	1. Condition distress index	2	50	1	50	1	50	
	2. Composite distress index	2	50	1	50	1	50	
	3. IRI index	3	75	2	67	1	33	
	4. Individual distress indices	2	50	1	50	1	50	
	5. Remaining service life	2	50	1	50	1	50	
	c. Identify the type of treatment required (preventive, maintenance, rehabilitation, reconstruction, etc.)	3	75	2	67	1	33	
	d. Track the performance of applied treatments	2	50	0	0	2	100	
	e. Assess safety related issues	3	75	3	100	0	0	
	f. Obtain roadway sign locations	3	75	3	100	0	0	
	g. Obtain inventory data	3	75	3	100	0	0	
	h. Assess the pavement condition and select projects	3	75	2	67	1	33	
	i. Prioritize between projects	3	75	2	67	1	33	
	j. Other (please specify)	1	25					Gather Survey Infomation

Table B-1 Summary of Return of 4 Survey questionnaires that were mailed to District 02 (continued).

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
5	What type of reports would you like to receive from the PMS office?							
	a. Project-level report	**4**	**100**	3	75	1	25	
	b. Network-level report	**2**	**50**	2	100	0	0	
	c. Others, please explain	**1**	**25**					
6	How often would you like to receive reports from the PMS office?	**4**	**100**					
	a. Once a year			2	50			
	b. Twice a year			1	25			
	c. Others			1	25			As needed
7	Do you receive visual aids such as maps presenting suggested highway treatments, treatment years, and roughness from the PMS office? If no, go to question number 10	**4**	**100**	1	25	3	75	
8	Do you use the visual aids or maps to assist in decision making (e.g. project and treatment selection, others)?	**3**	**75**	2	67	1	33	
9	How do you rate the quality of the visual aids or maps in accommodating your needs?	**2**	**50**					
	a. Excellent			0	0			
	b. V. Good			0	0			
	c. Good			1	50			
	d. Fair			1	50			
	e. Poor			0	0			
10	How long does it take the PMS office to respond to your request?	**1**	**25**					
	a. One-day			1	100			
	b. One-week			0	0			
	c. One-month			0	0			
	d. Too long			0	0			Never Asked
11	Is the information in the reports adequate for your work?	**3**	**75**					
	a. Just Right			3	100			
	b. Too Little			0	0			
	c. Too much			0	0			

Table B-1 Summary of Return of 4 Survey questionnaires that were mailed to District 02 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
12	In what format would you like to see the PMS Data?	3	75					
	a. Pie Chart			0	0			
	b. Bar Chart			0	0			
	c. Strip Charts			0	0			
	d. Tables			2	67			
	e. Visual maps			0	0			
	f. Others:			1	33			No preference
13	What percentages of the annual pavement projects selected by the district are the same as those recommended by the PMS office?	3	75					
	a. 0%			0	0			
	b. 25%			0	0			
	c. 50%			3	100			
	d. 75%			0	0			
	e. 100%			0	0			
14	Does the district report the following activities to the PMS office (e.g. Mainframe data entry, TOPS, LETS, etc.)?							
	a. Reconstruction	2	50	0	0	2	100	
	b. Rehabilitation	2	50	0	0	2	100	
	c. Preservation	2	50	0	0	2	100	
	d. Routine maintenance	2	50	0	0	2	100	
15	Does your district maintain records of maintenance and construction activities?							
	a. Hard Files	4	100	4	100	0	0	
	b. Digital files stored in Computers	3	75	3	100	0	0	
16	Are there any concerns and issues regarding the following PMS information?							
	a. Accuracy of data	3	75	1	33	2	67	
	b. Value of the indices	3	75	1	33	2	67	
	c. Recommended treatments	3	75	1	33	2	67	
	d. Remaining service life	3	75	1	33	2	67	

Table B-1 Summary of Return of 4 Survey questionnaires that were mailed to District 02 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
17	Do you have any concerns about the reference location systems?	4	100	2	50	2	50	
18	What reference location system are you using?							
	a. Control Section Log mile	4	100	4	100	0	0	
	b. Route Point mile	2	50	0	0	2	100	
	c. Route Milepost	3	75	1	33	2	67	
	d. GPS	2	50	1	50	1	50	
	e. Other							
19	Would you like to have Unified Reference Location System?	3	75	1	33	2	67	
20	Please state any recommendations that you may have regarding the PMS operation	1	25					*1) A unified Reference Location System would be helpful since everyone (surveyers, state troopers) use different systems*
21	Based on the 2003 –04 FHWA and LADOTD surveys, several recommendations were made and forwarded to the PMS office. Do you know that the following items have been implemented?							
	a. The Pavement Management Manual was completed and distributed in May 2006.	4	100	3	75	1	25	
	b. The highways are surveyed in both directions. The images are collected in both directions and the distresses are rated in one direction on undivided highways and in both directions on divided highways.	4	100	4	100	0	0	
	c. PMS Training sessions were conducted for each district.	4	100	3	75	1	25	
	d. The trigger values, resets, index deduct tables, and data dictionary of terms were supplied to each district when James Lee and Leslie Mix went to each District for the training purposes.	4	100	2	50	2	50	

Table B-1 Summary of Return of 4 Survey questionnaires that were mailed to District 02 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
	e. A users manual is available on PMS and District Servers under PMS VISIDATA FILES. Documents are VisiQuickRef_New.pdf, Surveyor.pdf and Visidata.pdf.	**4**	**100**	3	75	1	25	
	f. The Distress Rating Documentation/ Definitions (LADOTD Distress protocols) are available upon request.	**4**	**100**	2	50	2	50	
	g. The PMS web application includes the capability to click on a map of Control Sections that will bring up VISIWEB for that Control Section	**4**	**100**	3	75	1	25	
	h. Surveyor application can be used to measure distances to obstacles, signs, lane widths, shoulder widths, etc.	**3**	**75**	2	67	1	33	
	i. The PMS data of the 2007 survey will have the following capabilities:							
	1. Fore slopes and cross slopes data.	**4**	**100**	1	25	3	75	
	2. Bridge clearance and ramps	**4**	**100**	1	25	3	75	
	3. Object heights and distances using the surveyor tools	**4**	**100**	1	25	3	75	
	4. High definition quality sharp images	**4**	**100**	1	25	3	75	
	5. Degree of curvatures based on AASHTO classification	**4**	**100**	1	25	3	75	
	6. Electronic data in smaller intervals than a tenth of a mile.	**4**	**100**	1	25	3	75	
	j. Upon request from the districts the PMS office is collecting data for over-sized loads in both directions (i.e., rice, sugar cane, timber, lignite, etc.)?	**4**	**100**	2	50	2	50	
22	How often would you like to receive the training on the PMS data (VISIDATA, VISIWEB, Surveyor Tool, Distress Indices, etc.)?	**3**	**75**					
	a. Once a Year			3	100			
	b. Twice a year			0	0			
	c. Others			0	0			
23	Do you like to receive a copy of the tabulated response of this survey?	**4**	**100**	3	75	1	25	

Table B-2 Summary of Return of 3 Survey questionnaires that were mailed to District 03

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
1	Do you have access to the Pavement Management System (PMS) Data (VISIDATA, VISIWEB, Surveyor Tool, Distresses, Indices,etc.)?	3	100	3	100	0	0	
2	How many engineers in your district have access to the PMS data?	3	100					
	a. 1 to 5			2	67			
	b. 6 to 10			0	0			
	c. More than 10			1	33			
3	Do you use the PMS data? If no, go to question 5	3	100	3	100	0	0	
4	You use the PMS data to:							
	a. Obtain the present distress conditions of pavement projects	3	100	2	67	1	33	
	b. View the overall							
	1. Condition distress index	3	100	1	33	2	67	
	2. Composite distress index	3	100	1	33	2	67	
	3. IRI index	3	100	2	67	1	33	
	4. Individual distress indices	2	67	1	50	1	50	
	5. Remaining service life	2	67	0	0	2	100	
	c. Identify the type of treatment required (preventive, maintenance, rehabilitation, reconstruction, etc.)	3	100	2	67	1	33	
	d. Track the performance of applied treatments	3	100	0	0	3	100	
	e. Assess safety related issues	3	100	1	33	2	67	
	f. Obtain roadway sign locations	3	100	1	33	2	67	
	g. Obtain inventory data	3	100	1	33	2	67	
	h. Assess the pavement condition and select projects	3	100	2	67	1	33	
	i. Prioritize between projects	3	100	2	67	1	33	
	j. Other (please specify)	1	33					On r/w request, we verify the locations with VISIWEB

Table B-2 Summary of Return of 3 Survey questionnaires that were mailed to District 03 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
5	What type of reports would you like to receive from the PMS office?							
	a. Project-level report	1	33	1	100	0	0	
	b. Network-level report	2	67	0	0	0	0	
	c. Others, please explain							
6	How often would you like to receive reports from the PMS office?	2	67					
	a. Once a year			2	100			
	b. Twice a year			0	0			
	c. Others			0	0			
7	Do you receive visual aids such as maps presenting suggested highway treatments, treatment years, and roughness from the PMS office? If no, go to question number 10	3	100	1	33	2	67	
8	Do you use the visual aids or maps to assist in decision making (e.g. project and treatment selection, others)?	2	67	1	50	1	50	
9	How do you rate the quality of the visual aids or maps in accommodating your needs?	2	67					
	a. Excellent			0	0			
	b. V. Good			1	50			
	c. Good			1	50			
	d. Fair			0	0			
	e. Poor			0	0			
10	How long does it take the PMS office to respond to your request?	1	33					
	a. One-day			0	0			
	b. One-week			1	100			
	c. One-month			0	0			
	d. Too long			0	0			
11	Is the information in the reports adequate for your work?	2	67					
	a. Just Right			1	50			
	b. Too Little			1	50			
	c. Too much			0	0			

Table B-2 Summary of Return of 3 Survey questionnaires that were mailed to District 03 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
12	In what format would you like to see the PMS Data?	3	100					
	a. Pie Chart			0	0			
	b. Bar Chart			1	25			
	c. Strip Charts			0	0			
	d. Tables			1	25			
	e. Visual maps			2	50			
	f. Others:			0	0			
13	What percentages of the annual pavement projects selected by the district are the same as those recommended by the PMS office?	2	67					
	a. 0%			0	0			
	b. 25%			0	0			
	c. 50%			2	100			
	d. 75%			0	0			
	e. 100%			0	0			
14	Does the district report the following activities to the PMS office (e.g. Mainframe data entry, TOPS, LETS, etc.)?							
	a. Reconstruction	3	100	0	0	3	100	
	b. Rehabilitation	3	100	0	0	3	100	
	c. Preservation	3	100	1	33	2	67	
	d. Routine maintenance	3	100	0	0	3	100	
15	Does your district maintain records of maintenance and construction activities?							
	a. Hard Files	3	100	2	67	1	33	
	b. Digital files stored in Computers	3	100	2	67	1	33	
16	Are there any concerns and issues regarding the following PMS information?							
	a. Accuracy of data	3	100	0	0	3	100	
	b. Value of the indices	3	100	0	0	3	100	
	c. Recommended treatments	3	100	0	0	3	100	
	d. Remaining service life	3	100	0	0	3	100	

Table B-2 Summary of Return of 3 Survey questionnaires that were mailed to District 03 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
17	Do you have any concerns about the reference location systems?	2	67	0	0	2	100	
18	What reference location system are you using?							
	a. Control Section Log mile	3	100	3	100	0	0	
	b. Route Point mile	3	100	1	33	2	67	
	c. Route Milepost	3	100	2	67	1	33	
	d. GPS	3	100	0	0	3	100	
	e. Other							
19	Would you like to have Unified Reference Location System?	2	67	1	50	1	50	
20	Please state any recommendations that you may have regarding the PMS operation	1	33					*Would perfer that data be obtained every year. A unified system of reference is needed.*
21	Based on the 2003 –04 FHWA and LADOTD surveys, several recommendations were made and forwarded to the PMS office. Do you know that the following items have been implemented?							
	a. The Pavement Management Manual was completed and distributed in May 2006.	2	67	2	100	0	0	
	b. The highways are surveyed in both directions. The images are collected in both directions and the distresses are rated in one direction on undivided highways and in both directions on divided highways.	2	67	2	100	0	0	
	c. PMS Training sessions were conducted for each district.	2	67	2	100	0	0	
	d. The trigger values, resets, index deduct tables, and data dictionary of terms were supplied to each district when James Lee and Leslie Mix went to each District for the training purposes.	2	67	1	50	1	50	

Table B-2 Summary of Return of 3 Survey questionnaires that were mailed to District 03 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
	e. A users manual is available on PMS and District Servers under PMS VISIDATA FILES. Documents are VisiQuickRef_New.pdf, Surveyor.pdf and Visidata.pdf.	**2**	**67**	1	50	1	50	
	f. The Distress Rating Documentation/ Definitions (LADOTD Distress protocols) are available upon request.	**2**	**67**	1	50	1	50	
	g. The PMS web application includes the capability to click on a map of Control Sections that will bring up VISIWEB for that Control Section	**2**	**67**	1	50	1	50	
	h. Surveyor application can be used to measure distances to obstacles, signs, lane widths, shoulder widths, etc.	**1**	**33**	1	100	0	0	
	i. The PMS data of the 2007 survey will have the following capabilities:							
	1. Fore slopes and cross slopes data.	**1**	**33**	0	0	1	100	
	2. Bridge clearance and ramps	**1**	**33**	0	0	1	100	
	3. Object heights and distances using the surveyor tools	**1**	**33**	0	0	1	100	
	4. High definition quality sharp images	**1**	**33**	0	0	1	100	
	5. Degree of curvatures based on AASHTO classification	**1**	**33**	0	0	1	100	
	6. Electronic data in smaller intervals than a tenth of a mile.	**1**	**33**	0	0	1	100	
	j. Upon request from the districts the PMS office is collecting data for over-sized loads in both directions (i.e., rice, sugar cane, timber, lignite, etc.)?	**1**	**33**	0	0	1	100	
22	How often would you like to receive the training on the PMS data (VISIDATA, VISIWEB, Surveyor Tool, Distress Indices, etc.)?	**2**	**67**					
	a. Once a Year			2	100			
	b. Twice a year			0	0			
	c. Others			0	0			
23	Do you like to receive a copy of the tabulated response of this survey?	**3**	**100**	2	67	1	33	

Table B-3 Summary of Return of 4 Survey questionnaires that were mailed to District 04

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
1	Do you have access to the Pavement Management System (PMS) Data (VISIDATA, VISIWEB, Surveyor Tool, Distresses, Indices,etc.)?	4	100	4	100	0	0	
2	How many engineers in your district have access to the PMS data?	4	100					
	a. 1 to 5			0	0			
	b. 6 to 10			0	0			
	c. More than 10			4	100			
3	Do you use the PMS data? If no, go to question 5	4	100	4	100	0	0	
4	You use the PMS data to:							
	a. Obtain the present distress conditions of pavement projects	4	100	2	50	2	50	Can not Obtain
	b. View the overall							
	1. Condition distress index	3	75	2	67	1	33	
	2. Composite distress index	4	100	3	75	1	25	
	3. IRI index	4	100	4	100	0	0	
	4. Individual distress indices	4	100	4	100	0	0	
	5. Remaining service life	2	50	0	0	2	100	
	c. Identify the type of treatment required (preventive, maintenance, rehabilitation, reconstruction, etc.)	4	100	2	50	2	50	I review the info
	d. Track the performance of applied treatments	3	75	2	67	1	33	Not yet
	e. Assess safety related issues	3	75	3	100	0	0	
	f. Obtain roadway sign locations	4	100	3	75	0	0	
	g. Obtain inventory data	4	100	2	50	1	25	
	h. Assess the pavement condition and select projects	4	100	3	75	1	25	
	i. Prioritize between projects	4	100	3	75	1	25	
	j. Other (please specify)	1	25					IRI & rutting numbers are of primary importance

Table B-3 Summary of Return of 4 Survey questionnaires that were mailed to District 04 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
5	What type of reports would you like to receive from the PMS office?							
	a. Project-level report	0	0	0	#	0	#	
	b. Network-level report	0	0	0	#	0	#	
	c. Others, please explain	2	50					Simplified reports specific to each level, Color-code maps showing tenths of a mile for rutting & IRI
6	How often would you like to receive reports from the PMS office?	4	100					
	a. Once a year			3	75			
	b. Twice a year			0	0			
	c. Others			1	25			or upon request
7	Do you receive visual aids such as maps presenting suggested highway treatments, treatment years, and roughness from the PMS office? If no, go to question number 10	3	75	3	100	0	0	It would be good for the district to be able to general maps from the data
8	Do you use the visual aids or maps to assist in decision making (e.g. project and treatment selection, others)?	4	100	3	75	1	25	
9	How do you rate the quality of the visual aids or maps in accommodating your needs?	4	100					
	a. Excellent			0	0			
	b. V. Good			2	50			
	c. Good			1	25			
	d. Fair			1	25			
	e. Poor			0	0			
10	How long does it take the PMS office to respond to your request?	4	100					sometimes just who to ask is hard to find
	a. One-day			0	0			
	b. One-week			0	0			
	c. One-month			2	50			
	d. Too long			2	50			

Table B-3 Summary of Return of 4 Survey questionnaires that were mailed to District 04 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
11	Is the information in the reports adequate for your work?	4	100					
	a. Just Right			2	50			
	b. Too Little			0	0			
	c. Too much			2	50			
12	In what format would you like to see the PMS Data?	4	100					
	a. Pie Chart			0	0			
	b. Bar Chart			1	13			
	c. Strip Charts			1	13			
	d. Tables			1	13			
	e. Visual maps			2	25			
	f. Others:			3	38			as necessary, Depends on data
13	What percentages of the annual pavement projects selected by the district are the same as those recommended by the PMS office?	3	75					
	a. 0%			1	33			
	b. 25%			2	67			
	c. 50%			0	0			
	d. 75%			0	0			
	e. 100%			0	0			
14	Does the district report the following activities to the PMS office (e.g. Mainframe data entry, TOPS, LETS, etc.)?							not sure
	a. Reconstruction	2	50	1	50	1	50	
	b. Rehabilitation	2	50	1	50	1	50	
	c. Preservation	2	50	1	50	1	50	
	d. Routine maintenance	2	50	1	50	1	50	
15	Does your district maintain records of maintenance and construction activities?							
	a. Hard Files	4	100	4	100	0	0	
	b. Digital files stored in Computers	4	100	4	100	0	0	

Table B-3 Summary of Return of 4 Survey questionnaires that were mailed to District 04 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
16	Are there any concerns and issues regarding the following PMS information?							
	a. Accuracy of data	**3**	**75**	2	67	1	33	
	b. Value of the indices	**3**	**75**	2	67	1	33	
	c. Recommended treatments	**3**	**75**	3	100	0	0	
	d. Remaining service life	**3**	**75**	3	100	0	0	
	e. Others							
17	Do you have any concerns about the reference location systems?	**3**	**75**	1	33	2	67	
18	What reference location system are you using?							
	a. Control Section Log mile	**4**	**100**	4	100	0	0	
	b. Route Point mile	**2**	**50**	2	100	0	0	
	c. Route Milepost	**2**	**50**	2	100	0	0	
	d. GPS	**2**	**50**	1	50	1	50	
19	Would you like to have Unified Reference Location System?	**2**	**50**	2	100	0	0	Don't know what this is

Table B-3 Summary of Return of 4 Survey questionnaires that were mailed to District 04 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
20	Please state any recommendations that you may have regarding the PMS operation	2	50					*1) Let the districts pull the nessary info to generate tables, maps etc. Let district know how to request info. Too much detail in reports currently generated exapmle each 0.1 mile section has defenate recommendation of rehab nessary, porjects need to cover more than .1 section. 2)Can video detection also classify and count opposing lane truck traffic? Add simpler present query tabs to sort miles of benchmark IRI and rutting. Cross-reference PMS rutting & IRI with ground penetrating radar measurements of surfacing. Regularly distribute color-coded rutting & IRI measurements on a 24" x 24" map. You will find method variances in determining a degree of curvature for a roadway that never had vertical or horizontal control.*
21	Based on the 2003 –04 FHWA and LADOTD surveys, several recommendations were made and forwarded to the PMS office. Do you know that the following items have been implemented?							
	a. The Pavement Management Manual was completed and distributed in May 2006.	2	50	2	100	0	0	Don't know
	b. The highways are surveyed in both directions. The images are collected in both directions and the distresses are rated in one direction on undivided highways and in both directions on divided highways.	3	75	3	100	0	0	
	c. PMS Training sessions were conducted for each district.	2	50	2	100	0	0	

Table B-3 Summary of Return of 4 Survey questionnaires that were mailed to District 04 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
	d. The trigger values, resets, index deduct tables, and data dictionary of terms were supplied to each district when James Lee and Leslie Mix went to each District for the training purposes.	1	25	1	100	0	0	
	e. A users manual is available on PMS and District Servers under PMS VISIDATA FILES. Documents are VisiQuickRef_New.pdf, Surveyor.pdf and Visidata.pdf.	1	25	0	0	1	100	
	f. The Distress Rating Documentation/ Definitions (LADOTD Distress protocols) are available upon request.	2	50	1	50	1	50	but from who?
	g. The PMS web application includes the capability to click on a map of Control Sections that will bring up VISIWEB for that Control Section	2	50	2	100	0	0	
	h. Surveyor application can be used to measure distances to obstacles, signs, lane widths, shoulder widths, etc.	3	75	1	33	2	67	
	i. The PMS data of the 2007 survey will have the following capabilities:							
	1. Fore slopes and cross slopes data.	1	25	0	0	1	100	
	2. Bridge clearance and ramps	1	25	0	0	1	100	
	3. Object heights and distances using the surveyor tools	1	25	0	0	1	100	
	4. High definition quality sharp images	1	25	0	0	1	100	
	5. Degree of curvatures based on AASHTO classification	2	50	0	0	2	100	
	6. Electronic data in smaller intervals than a tenth of a mile.	1	25	0	0	1	100	
	j. Upon request from the districts the PMS office is collecting data for over-sized loads in both directions (i.e., rice, sugar cane, timber, lignite, etc.)?	1	25	0	0	1	100	
22	How often would you like to receive the training on the PMS data (VISIDATA, VISIWEB, Surveyor Tool, Distress Indices, etc.)?	3	75					
	a. Once a Year			3	100			
	b. Twice a year			0	0			
	c. Others			0	0			
23	Do you like to receive a copy of the tabulated response of this survey?	3	75	2	67	1	33	

Table B-4 Summary of Return of 2 Survey questionnaires that were mailed to District 05

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
1	Do you have access to the Pavement Management System (PMS) Data (VISIDATA, VISIWEB, Surveyor Tool, Distresses, Indices,etc.)?	**2**	**100**	2	100	0	0	
2	How many engineers in your district have access to the PMS data?	**2**	**100**					
	a. 1 to 5			0	0			
	b. 6 to 10			0	0			
	c. More than 10			2	100			
3	Do you use the PMS data? If no, go to question 5	**2**	**100**	2	100	0	0	
4	You use the PMS data to:							
	a. Obtain the present distress conditions of pavement projects	**2**	**100**	2	100	0	0	
	b. View the overall							
	1. Condition distress index	**2**	**100**	1	50	1	50	
	2. Composite distress index	**1**	**50**	0	0	1	100	
	3. IRI index	**2**	**100**	2	100	0	0	
	4. Individual distress indices	**2**	**100**	0	0	2	100	
	5. Remaining service life	**2**	**100**	0	0	2	100	
	c. Identify the type of treatment required (preventive, maintenance, rehabilitation, reconstruction, etc.)	**2**	**100**	1	50	1	50	
	d. Track the performance of applied treatments	**2**	**100**	0	0	2	100	
	e. Assess safety related issues	**2**	**100**	0	0	2	100	
	f. Obtain roadway sign locations	**2**	**100**	0	0	2	100	
	g. Obtain inventory data	**2**	**100**	0	0	2	100	
	h. Assess the pavement condition and select projects	**2**	**100**	2	100	0	0	
	i. Prioritize between projects	**2**	**100**	2	100	0	0	
	j. Other (please specify)							

Table B-4 Summary of Return of 2 Survey questionnaires that were mailed to District 05 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
5	What type of reports would you like to receive from the PMS office?							
	a. Project-level report	2	100	1	50	1	50	
	b. Network-level report	2	100	2	100	0	0	
	c. Others, please explain							
6	How often would you like to receive reports from the PMS office?	2	100					
	a. Once a year			2	100			
	b. Twice a year			0	0			
	c. Others			0	0			
7	Do you receive visual aids such as maps presenting suggested highway treatments, treatment years, and roughness from the PMS office? If no, go to question number 10	2	100	0	0	2	100	
8	Do you use the visual aids or maps to assist in decision making (e.g. project and treatment selection, others)?	1	50	0	0	1	100	
9	How do you rate the quality of the visual aids or maps in accommodating your needs?	1	50					
	a. Excellent			0	0			
	b. V. Good			1	100			
	c. Good			0	0			
	d. Fair			0	0			
	e. Poor			0	0			
10	How long does it take the PMS office to respond to your request?	1	50					Never had a request
	a. One-day			1	100			
	b. One-week			0	0			
	c. One-month			0	0			
	d. Too long			0	0			
11	Is the information in the reports adequate for your work?	2	100					addequate
	a. Just Right			2	100			
	b. Too Little			0	0			
	c. Too much			0	0			

Table B-4 Summary of Return of 2 Survey questionnaires that were mailed to District 05 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
12	In what format would you like to see the PMS Data?	2	100					
	a. Pie Chart			0	0			
	b. Bar Chart			0	0			
	c. Strip Charts			1	50			
	d. Tables			0	0			
	e. Visual maps			2	100			
	f. Others:			0	0			
13	What percentages of the annual pavement projects selected by the district are the same as those recommended by the PMS office?	1	50					Not sure
	a. 0%			0	0			
	b. 25%			0	0			
	c. 50%			1	100			
	d. 75%			0	0			
	e. 100%			0	0			
14	Does the district report the following activities to the PMS office (e.g. Mainframe data entry, TOPS, LETS, etc.)?							
	a. Reconstruction	2	100	0	0	2	100	
	b. Rehabilitation	2	100	0	0	2	100	
	c. Preservation	2	100	0	0	2	100	
	d. Routine maintenance	2	100	0	0	2	100	Not sure
15	Does your district maintain records of maintenance and construction activities?							
	a. Hard Files	2	100	2	100	0	0	
	b. Digital files stored in Computers	2	100	2	100	0	0	
16	Are there any concerns and issues regarding the following PMS information?							
	a. Accuracy of data	2	100	0	0	2	100	
	b. Value of the indices	2	100	0	0	2	100	
	c. Recommended treatments	2	100	1	50	1	50	
	d. Remaining service life	2	100	0	0	2	100	

Table B-4 Summary of Return of 2 Survey questionnaires that were mailed to District 05 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
17	Do you have any concerns about the reference location systems?	2	100	0	0	2	100	
18	What reference location system are you using?							
	a. Control Section Log mile	2	100	2	100	0	0	
	b. Route Point mile	2	100	0	0	2	100	
	c. Route Milepost	2	100	0	0	2	100	
	d. GPS	2	100	0	0	2	100	
	e. Other							
19	Would you like to have Unified Reference Location System?	2	100	1	50	1	50	
20	Please state any recommendations that you may have regarding the PMS operation	0	0					
21	Based on the 2003 –04 FHWA and LADOTD surveys, several recommendations were made and forwarded to the PMS office. Do you know that the following items have been implemented?							
	a. The Pavement Management Manual was completed and distributed in May 2006.	2	100	1	50	1	50	
	b. The highways are surveyed in both directions. The images are collected in both directions and the distresses are rated in one direction on undivided highways and in both directions on divided highways.	2	100	2	100	0	0	
	c. PMS Training sessions were conducted for each district.	2	100	2	100	0	0	
	d. The trigger values, resets, index deduct tables, and data dictionary of terms were supplied to each district when James Lee and Leslie Mix went to each District for the training purposes.	2	100	1	50	1	50	

Table B-4 Summary of Return of 2 Survey questionnaires that were mailed to District 05 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
	e. A users manual is available on PMS and District Servers under PMS VISIDATA FILES. Documents are VisiQuickRef_New.pdf, Surveyor.pdf and Visidata.pdf.	**2**	**100**	1	50	1	50	
	f. The Distress Rating Documentation/ Definitions (LADOTD Distress protocols) are available upon request.	**2**	**100**	1	50	1	50	
	g. The PMS web application includes the capability to click on a map of Control Sections that will bring up VISIWEB for that Control Section	**2**	**100**	0	0	2	100	
	h. Surveyor application can be used to measure distances to obstacles, signs, lane widths, shoulder widths, etc.	**2**	**100**	2	100	0	0	
	i. The PMS data of the 2007 survey will have the following capabilities:							
	1. Fore slopes and cross slopes data.	**2**	**100**	0	0	2	100	
	2. Bridge clearance and ramps	**2**	**100**	0	0	2	100	
	3. Object heights and distances using the surveyor tools	**2**	**100**	1	50	1	50	
	4. High definition quality sharp images	**2**	**100**	0	0	2	100	
	5. Degree of curvatures based on AASHTO classification	**2**	**100**	0	0	2	100	
	6. Electronic data in smaller intervals than a tenth of a mile.	**2**	**100**	0	0	2	100	
	j. Upon request from the districts the PMS office is collecting data for over-sized loads in both directions (i.e., rice, sugar cane, timber, lignite, etc.)?	**2**	**100**	0	0	2	100	
22	How often would you like to receive the training on the PMS data (VISIDATA, VISIWEB, Surveyor Tool, Distress Indices, etc.)?	**2**	**100**					
	a. Once a Year			2	100			
	b. Twice a year			0	0			
	c. Others			0	0			
23	Do you like to receive a copy of the tabulated response of this survey?	**2**	**100**	1	50	1	50	

Table B-5 Summary of Return of 3 Survey questionnaires that were mailed to District 07

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
1	Do you have access to the Pavement Management System (PMS) Data (VISIDATA, VISIWEB, Surveyor Tool, Distresses, Indices,etc.)?	3	100	3	100	0	0	
2	How many engineers in your district have access to the PMS data?	3	100					
	a. 1 to 5			0	0			
	b. 6 to 10			0	0			
	c. More than 10			3	100			
3	Do you use the PMS data? If no, go to question 5	3	100	3	100	0	0	
4	You use the PMS data to:							
	a. Obtain the present distress conditions of pavement projects	3	100	3	100	0	0	
	b. View the overall							
	1. Condition distress index	3	100	2	67	1	33	
	2. Composite distress index	3	100	0	0	3	100	
	3. IRI index	3	100	3	100	0	0	
	4. Individual distress indices	3	100	0	0	2	67	
	5. Remaining service life	3	100	0	0	3	100	
	c. Identify the type of treatment required (preventive, maintenance, rehabilitation, reconstruction, etc.)	3	100	2	67	1	33	
	d. Track the performance of applied treatments	3	100	2	67	1	33	
	e. Assess safety related issues	3	100	0	0	3	100	
	f. Obtain roadway sign locations	3	100	1	33	2	67	
	g. Obtain inventory data	3	100	1	33	2	67	
	h. Assess the pavement condition and select projects	3	100	2	67	1	33	
	i. Prioritize between projects	3	100	3	100	0	0	
	j. Other (please specify)							

Table B-5 Summary of Return of 3 Survey questionnaires that were mailed to District 07 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
5	What type of reports would you like to receive from the PMS office?							
	a. Project-level report	3	100	3	100	0	0	
	b. Network-level report	1	33	1	100	0	0	
	c. Others, please explain	1	33					District Level Reports; grouped by control section and sorted by ADT, surface type, IRI, etc
6	How often would you like to receive reports from the PMS office?	2	67					
	a. Once a year			0	0			
	b. Twice a year			2	100			
	c. Others			0	0			
7	Do you receive visual aids such as maps presenting suggested highway treatments, treatment years, and roughness from the PMS office? If no, go to question number 10	3	100	0	0	3	100	
8	Do you use the visual aids or maps to assist in decision making (e.g. project and treatment selection, others)?	0	0	0	0	0	0	
9	How do you rate the quality of the visual aids or maps in accommodating your needs?	0	0					
	a. Excellent			0	0			
	b. V. Good			0	0			
	c. Good			0	0			
	d. Fair			0	0			
	e. Poor			0	0			
10	How long does it take the PMS office to respond to your request?	2	67					
	a. One-day			0	0			
	b. One-week			2	100			
	c. One-month			0	0			
	d. Too long			0	0			

Table B-5 Summary of Return of 3 Survey questionnaires that were mailed to District 07 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
11	Is the information in the reports adequate for your work?	2	67					
	a. Just Right			2	100			
	b. Too Little			0	0			
	c. Too much			0	0			
12	In what format would you like to see the PMS Data?	2	67					
	a. Pie Chart			0	0			
	b. Bar Chart			0	0			
	c. Strip Charts			0	0			
	d. Tables			0	0			
	e. Visual maps			2	100			
	f. Others:			0	0			
13	What percentages of the annual pavement projects selected by the district are the same as those recommended by the PMS office?	0	0					
	a. 0%			0	0			
	b. 25%			0	0			
	c. 50%			0	0			
	d. 75%			0	0			
	e. 100%			0	0			
14	Does the district report the following activities to the PMS office (e.g. Mainframe data entry, TOPS, LETS, etc.)?							
	a. Reconstruction	3	100	2	67	1	33	
	b. Rehabilitation	3	100	2	67	1	33	
	c. Preservation	3	100	2	67	1	33	
	d. Routine maintenance	3	100	2	67	1	33	
15	Does your district maintain records of maintenance and construction activities?							
	a. Hard Files	3	100	3	100	0	0	
	b. Digital files stored in Computers	3	100	3	100	0	0	

Table B-5 Summary of Return of 3 Survey questionnaires that were mailed to District 07 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
16	Are there any concerns and issues regarding the following PMS information?							
	a. Accuracy of data	3	100	0	0	3	100	
	b. Value of the indices	3	100	0	0	3	100	
	c. Recommended treatments	3	100	1	33	2	67	
	d. Remaining service life	3	100	1	33	2	67	
	e. Others							
17	Do you have any concerns about the reference location systems?	3	100	0	0	3	100	
18	What reference location system are you using?							
	a. Control Section Log mile	3	100	3	100	0	0	
	b. Route Point mile	3	100	0	0	3	100	
	c. Route Milepost	3	100	3	100	0	0	
	d. GPS	3	100	1	33	2	67	
	e. Other	1	33					Louisiana State Plane Coordinates
19	Would you like to have Unified Reference Location System?	3	100	3	100	0	0	
20	Please state any recommendations that you may have regarding the PMS operation	0	0					
21	Based on the 2003 –04 FHWA and LADOTD surveys, several recommendations were made and forwarded to the PMS office. Do you know that the following items have been implemented?							
	a. The Pavement Management Manual was completed and distributed in May 2006.	3	100	2	67	1	33	
	b. The highways are surveyed in both directions. The images are collected in both directions and the distresses are rated in one direction on undivided highways and in both directions on divided highways.	3	100	3	100	0	0	
	c. PMS Training sessions were conducted for each district.	3	100	3	100	0	0	
	d. The trigger values, resets, index deduct tables, and data dictionary of terms were supplied to each district when James Lee and Leslie Mix went to each District for the training purposes.	3	100	3	100	0	0	

Table B-5 Summary of Return of 3 Survey questionnaires that were mailed to District 07 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
	e. A users manual is available on PMS and District Servers under PMS VISIDATA FILES. Documents are VisiQuickRef_New.pdf, Surveyor.pdf and Visidata.pdf.	**3**	**100**	3	100	0	0	
	f. The Distress Rating Documentation/ Definitions (LADOTD Distress protocols) are available upon request.	**3**	**100**	2	67	1	33	
	g. The PMS web application includes the capability to click on a map of Control Sections that will bring up VISIWEB for that Control Section	**3**	**100**	2	67	1	33	
	h. Surveyor application can be used to measure distances to obstacles, signs, lane widths, shoulder widths, etc.	**3**	**100**	0	0	3	100	
	i. The PMS data of the 2007 survey will have the following capabilities:							
	1. Fore slopes and cross slopes data.	**3**	**100**	0	0	3	100	
	2. Bridge clearance and ramps	**3**	**100**	0	0	3	100	
	3. Object heights and distances using the surveyor tools	**3**	**100**	0	0	3	100	
	4. High definition quality sharp images	**3**	**100**	2	67	1	33	
	5. Degree of curvatures based on AASHTO classification	**3**	**100**	0	0	3	100	
	6. Electronic data in smaller intervals than a tenth of a mile.	**3**	**100**	2	67	1	33	
	j. Upon request from the districts the PMS office is collecting data for over-sized loads in both directions (i.e., rice, sugar cane, timber, lignite, etc.)?	**3**	**100**	0	0	3	100	
22	How often would you like to receive the training on the PMS data (VISIDATA, VISIWEB, Surveyor Tool, Distress Indices, etc.)?	**3**	**100**					
	a. Once a Year			3	100			
	b. Twice a year			0	0			
	c. Others			0	0			
23	Do you like to receive a copy of the tabulated response of this survey?	**3**	**100**	3	100	0	0	

Table B-6 Summary of Return of 5 Survey questionnaires that were mailed to District 08

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
1	Do you have access to the Pavement Management System (PMS) Data (VISIDATA, VISIWEB, Surveyor Tool, Distresses, Indices,etc.)?	**5**	**100**	5	100	0	0	
2	How many engineers in your district have access to the PMS data?	**4**	**80**					
	a. 1 to 5			0	0			
	b. 6 to 10			0	0			
	c. More than 10			4	100			
3	Do you use the PMS data? If no, go to question 5	**5**	**100**	3	60	2	40	
4	You use the PMS data to:							
	a. Obtain the present distress conditions of pavement projects	**3**	**60**	1	33	2	67	
	b. View the overall							
	1. Condition distress index	**3**	**60**	1	33	2	67	
	2. Composite distress index	**3**	**60**	1	33	2	67	
	3. IRI index	**3**	**60**	1	33	2	67	
	4. Individual distress indices	**3**	**60**	1	33	2	67	
	5. Remaining service life	**3**	**60**	1	33	2	67	
	c. Identify the type of treatment required (preventive, maintenance, rehabilitation, reconstruction, etc.)	**3**	**60**	2	67	1	33	
	d. Track the performance of applied treatments	**3**	**60**	0	0	3	100	
	e. Assess safety related issues	**3**	**60**	3	100	0	0	
	f. Obtain roadway sign locations	**3**	**60**	1	33	2	67	
	g. Obtain inventory data	**3**	**60**	0	0	3	100	
	h. Assess the pavement condition and select projects	**3**	**60**	2	67	1	33	
	i. Prioritize between projects	**3**	**60**	1	33	2	67	
	j. Other (please specify)							

Table B-6 Summary of Return of 5 Survey questionnaires that were mailed to District 08 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
5	What type of reports would you like to receive from the PMS office?							
	a. Project-level report	**3**	**60**	2	67	1	33	
	b. Network-level report	**2**	**40**	1	50	1	50	
	c. Others, please explain							
6	How often would you like to receive reports from the PMS office?	**3**	**60**					
	a. Once a year			1	33			
	b. Twice a year			2	67			
	c. Others			0	0			
7	Do you receive visual aids such as maps presenting suggested highway treatments, treatment years, and roughness from the PMS office? If no, go to question number 10	**5**	**100**	0	0	5	100	
8	Do you use the visual aids or maps to assist in decision making (e.g. project and treatment selection, others)?	**0**	**0**	0	0	0	0	
9	How do you rate the quality of the visual aids or maps in accommodating your needs?	**0**	**0**					
	a. Excellent			0	0			
	b. V. Good			0	0			
	c. Good			0	0			
	d. Fair			0	0			
	e. Poor			0	0			
10	How long does it take the PMS office to respond to your request?	**1**	**20**					
	a. One-day			0	0			
	b. One-week			1	100			
	c. One-month			0	0			
	d. Too long			0	0			
11	Is the information in the reports adequate for your work?	**1**	**20**					
	a. Just Right			1	100			
	b. Too Little			0	0			
	c. Too much			0	0			

Table B-6 Summary of Return of 5 Survey questionnaires that were mailed to District 08 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
12	In what format would you like to see the PMS Data?	2	40					
	a. Pie Chart			0	0			
	b. Bar Chart			0	0			
	c. Strip Charts			1	50			
	d. Tables			1	50			
	e. Visual maps			0	0			
	f. Others:			0	0			
13	What percentages of the annual pavement projects selected by the district are the same as those recommended by the PMS office?	2	40					
	a. 0%			0	0			
	b. 25%			0	0			
	c. 50%			1	50			
	d. 75%			0	0			
	e. 100%			1	50			
14	Does the district report the following activities to the PMS office (e.g. Mainframe data entry, TOPS, LETS, etc.)?							
	a. Reconstruction	3	60	3	100	0	0	
	b. Rehabilitation	3	60	3	100	0	0	
	c. Preservation	3	60	3	100	0	0	
	d. Routine maintenance	4	80	4	100	0	0	
15	Does your district maintain records of maintenance and construction activities?							
	a. Hard Files	4	80	4	100	0	0	
	b. Digital files stored in Computers	4	80	3	75	1	25	
16	Are there any concerns and issues regarding the following PMS information?							
	a. Accuracy of data	5	100	2	40	3	60	
	b. Value of the indices	4	80	1	25	3	75	
	c. Recommended treatments	4	80	1	25	3	75	
	d. Remaining service life	4	80	1	25	3	75	
	e. Others							

Table B-6 Summary of Return of 5 Survey questionnaires that were mailed to District 08 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
17	Do you have any concerns about the reference location systems?	5	100	2	40	3	60	
18	What reference location system are you using?							
	a. Control Section Log mile	5	100	5	100	0	0	
	b. Route Point mile	3	60	2	67	1	33	
	c. Route Milepost	3	60	2	67	1	33	
	d. GPS	3	60	0	0	3	100	
	e. Other							
19	Would you like to have Unified Reference Location System?	3	60	3	100	0	0	Don't know
20	Please state any recommendations that you may have regarding the PMS operation	0	0					
21	Based on the 2003 –04 FHWA and LADOTD surveys, several recommendations were made and forwarded to the PMS office. Do you know that the following items have been implemented?							
	a. The Pavement Management Manual was completed and distributed in May 2006.	5	100	2	40	3	60	
	b. The highways are surveyed in both directions. The images are collected in both directions and the distresses are rated in one direction on undivided highways and in both directions on divided highways.	5	100	5	100	0	0	
	c. PMS Training sessions were conducted for each district.	5	100	2	40	3	60	
	d. The trigger values, resets, index deduct tables, and data dictionary of terms were supplied to each district when James Lee and Leslie Mix went to each District for the training purposes.	5	100	4	80	1	20	

Table B-6 Summary of Return of 5 Survey questionnaires that were mailed to District 08 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
	e. A users manual is available on PMS and District Servers under PMS VISIDATA FILES. Documents are VisiQuickRef_New.pdf, Surveyor.pdf and Visidata.pdf.	**5**	**100**	3	60	2	40	
	f. The Distress Rating Documentation/ Definitions (LADOTD Distress protocols) are available upon request.	**5**	**100**	1	20	4	80	
	g. The PMS web application includes the capability to click on a map of Control Sections that will bring up VISIWEB for that Control Section	**5**	**100**	2	40	3	60	
	h. Surveyor application can be used to measure distances to obstacles, signs, lane widths, shoulder widths, etc.	**5**	**100**	3	60	2	40	
	i. The PMS data of the 2007 survey will have the following capabilities:							
	1. Fore slopes and cross slopes data.	**5**	**100**	1	20	4	80	
	2. Bridge clearance and ramps	**5**	**100**	1	20	4	80	
	3. Object heights and distances using the surveyor tools	**5**	**100**	2	40	3	60	
	4. High definition quality sharp images	**5**	**100**	2	40	3	60	
	5. Degree of curvatures based on AASHTO classification	**5**	**100**	1	20	4	80	
	6. Electronic data in smaller intervals than a tenth of a mile.	**5**	**100**	1	20	4	80	
	j. Upon request from the districts the PMS office is collecting data for over-sized loads in both directions (i.e., rice, sugar cane, timber, lignite, etc.)?	**5**	**100**	1	20	4	80	
22	How often would you like to receive the training on the PMS data (VISIDATA, VISIWEB, Surveyor Tool, Distress Indices, etc.)?	**5**	**100**					
	a. Once a Year			4	80			
	b. Twice a year			0	0			
	c. Others			1	20			Every few years
23	Do you like to receive a copy of the tabulated response of this survey?	**5**	**100**	2	40	3	60	

Table B-7 Summary of Return of 2 Survey questionnaires that were mailed to District 58 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
1	Do you have access to the Pavement Management System (PMS) Data (VISIDATA, VISIWEB, Surveyor Tool, Distresses, Indices,etc.)?	2	100	2	100	0	0	
2	How many engineers in your district have access to the PMS data?	2	100					
	a. 1 to 5			0	0			
	b. 6 to 10			0	0			
	c. More than 10			2	100			
3	Do you use the PMS data? If no, go to question 5	2	100	1	50	1	50	
4	You use the PMS data to:							
	a. Obtain the present distress conditions of pavement projects	2	100	2	100	0	0	
	b. View the overall							
	1. Condition distress index	1	50	1	100	0	0	
	2. Composite distress index	1	50	1	100	0	0	
	3. IRI index	2	100	2	100	0	0	
	4. Individual distress indices	1	50	1	100	0	0	
	5. Remaining service life	1	50	1	100	0	0	
	c. Identify the type of treatment required (preventive, maintenance, rehabilitation, reconstruction, etc.)	2	100	1	50	1	50	
	d. Track the performance of applied treatments	2	100	1	50	1	50	
	e. Assess safety related issues	2	100	1	50	1	50	
	f. Obtain roadway sign locations	2	100	1	50	1	50	
	g. Obtain inventory data	1	50	0	0	1	100	
	h. Assess the pavement condition and select projects	2	100	1	50	1	50	
	i. Prioritize between projects	2	100	2	100	0	0	
	j. Other (please specify)	1	50					Use as a guide to selecting projects and treatments but I make the final decision

Table B-7 Summary of Return of 2 Survey questionnaires that were mailed to District 58 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
5	What type of reports would you like to receive from the PMS office?							
	a. Project-level report	2	100	1	50	1	50	
	b. Network-level report	2	100	1	50	1	50	
	c. Others, please explain							
6	How often would you like to receive reports from the PMS office?	2	100					
	a. Once a year			2	100			
	b. Twice a year			0	0			
	c. Others			0	0			
7	Do you receive visual aids such as maps presenting suggested highway treatments, treatment years, and roughness from the PMS office? If no, go to question number 10	2	100	2	100	0	0	
8	Do you use the visual aids or maps to assist in decision making (e.g. project and treatment selection, others)?	2	100	2	100	0	0	
9	How do you rate the quality of the visual aids or maps in accommodating your needs?	2	100					
	a. Excellent			0	0			
	b. V. Good			1	50			
	c. Good			0	0			
	d. Fair			1	50			
	e. Poor			0	0			
10	How long does it take the PMS office to respond to your request?	0	0					Never made a request
	a. One-day			0	0			
	b. One-week			0	0			
	c. One-month			0	0			
	d. Too long			0	0			
11	Is the information in the reports adequate for your work?	2	100					
	a. Just Right			1	50			
	b. Too Little			1	50			
	c. Too much			0	0			

Table B-7 Summary of Return of 2 Survey questionnaires that were mailed to District 58 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
12	In what format would you like to see the PMS Data?	2	100					
	a. Pie Chart			0	0			
	b. Bar Chart			0	0			
	c. Strip Charts			0	0			
	d. Tables			1	50			
	e. Visual maps			2	100			
	f. Others:			0	0			
13	What percentages of the annual pavement projects selected by the district are the same as those recommended by the PMS office?	1	50					
	a. 0%			0	0			
	b. 25%			1	100			
	c. 50%			0	0			
	d. 75%			0	0			
	e. 100%			0	0			
14	Does the district report the following activities to the PMS office (e.g. Mainframe data entry, TOPS, LETS, etc.)?							
	a. Reconstruction	1	50	1	100	0	0	
	b. Rehabilitation	1	50	1	100	0	0	
	c. Preservation	2	100	1	50	1	50	
	d. Routine maintenance	1	50	0	0	1	100	
15	Does your district maintain records of maintenance and construction activities?							
	a. Hard Files	2	100	2	100	0	0	
	b. Digital files stored in Computers	1	50	1	100	0	0	
16	Are there any concerns and issues regarding the following PMS information?							
	a. Accuracy of data	2	100	2	100	0	0	
	b. Value of the indices	2	100	1	50	1	50	
	c. Recommended treatments	2	100	2	100	0	0	
	d. Remaining service life	2	100	1	50	1	50	
	e. Others							

Table B-7 Summary of Return of 2 Survey questionnaires that were mailed to District 58 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
17	Do you have any concerns about the reference location systems?	2	100	1	50	1	50	
18	What reference location system are you using?							
	a. Control Section Log mile	2	100	2	100	0	0	
	b. Route Point mile	2	100	0	0	2	100	
	c. Route Milepost	2	100	1	50	1	50	
	d. GPS	2	100	0	0	2	100	
	e. Other							
19	Would you like to have Unified Reference Location System?	2	100	2	100	0	0	
20	Please state any recommendations that you may have regarding the PMS operation	0	0					
21	Based on the 2003 –04 FHWA and LADOTD surveys, several recommendations were made and forwarded to the PMS office. Do you know that the following items have been implemented?							
	a. The Pavement Management Manual was completed and distributed in May 2006.	2	100	2	100	0	0	
	b. The highways are surveyed in both directions. The images are collected in both directions and the distresses are rated in one direction on undivided highways and in both directions on divided highways.	2	100	2	100	0	0	
	c. PMS Training sessions were conducted for each district.	2	100	2	100	0	0	
	d. The trigger values, resets, index deduct tables, and data dictionary of terms were supplied to each district when James Lee and Leslie Mix went to each District for the training purposes.	2	100	2	100	0	0	

Table B-7 Summary of Return of 2 Survey questionnaires that were mailed to District 58 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
	e. A users manual is available on PMS and District Servers under PMS VISIDATA FILES. Documents are VisiQuickRef_New.pdf, Surveyor.pdf and Visidata.pdf.	**2**	**100**	2	100	0	0	
	f. The Distress Rating Documentation/ Definitions (LADOTD Distress protocols) are available upon request.	**2**	**100**	0	0	2	100	
	g. The PMS web application includes the capability to click on a map of Control Sections that will bring up VISIWEB for that Control Section	**2**	**100**	1	50	1	50	
	h. Surveyor application can be used to measure distances to obstacles, signs, lane widths, shoulder widths, etc.	**2**	**100**	1	50	1	50	
	i. The PMS data of the 2007 survey will have the following capabilities:							
	1. Fore slopes and cross slopes data.	**2**	**100**	1	50	1	50	
	2. Bridge clearance and ramps	**2**	**100**	1	50	1	50	
	3. Object heights and distances using the surveyor tools	**2**	**100**	1	50	1	50	
	4. High definition quality sharp images	**2**	**100**	1	50	1	50	
	5. Degree of curvatures based on AASHTO classification	**2**	**100**	1	50	1	50	
	6. Electronic data in smaller intervals than a tenth of a mile.	**2**	**100**	1	50	1	50	
	j. Upon request from the districts the PMS office is collecting data for over-sized loads in both directions (i.e., rice, sugar cane, timber, lignite, etc.)?	**2**	**100**	0	0	2	100	
22	How often would you like to receive the training on the PMS data (VISIDATA, VISIWEB, Surveyor Tool, Distress Indices, etc.)?	**2**	**100**					
	a. Once a Year			1	50			
	b. Twice a year			0	0			
	c. Others			1	50			Every 3 years
23	Do you like to receive a copy of the tabulated response of this survey?	**2**	**100**	1	50	1	50	

Table B-8 Summary of Return of 4 Survey questionnaires that were mailed to District 61

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
1	Do you have access to the Pavement Management System (PMS) Data (VISIDATA, VISIWEB, Surveyor Tool, Distresses, Indices,etc.)?	**4**	**100**	4	100	0	0	
2	How many engineers in your district have access to the PMS data?	**4**	**100**					
	a. 1 to 5			0	0			
	b. 6 to 10			1	25			
	c. More than 10			3	75			
3	Do you use the PMS data? If no, go to question 5	**4**	**100**	4	100	0	0	
4	You use the PMS data to:							
	a. Obtain the present distress conditions of pavement projects	**4**	**100**	4	100	0	0	
	b. View the overall							
	1. Condition distress index	**4**	**100**	1	25	3	75	
	2. Composite distress index	**4**	**100**	2	50	2	50	
	3. IRI index	**4**	**100**	1	25	3	75	
	4. Individual distress indices	**4**	**100**	2	50	2	50	
	5. Remaining service life	**4**	**100**	1	25	3	75	
	c. Identify the type of treatment required (preventive, maintenance, rehabilitation, reconstruction, etc.)	**4**	**100**	3	75	1	25	
	d. Track the performance of applied treatments	**4**	**100**	1	25	3	75	
	e. Assess safety related issues	**4**	**100**	3	75	1	25	
	f. Obtain roadway sign locations	**4**	**100**	3	75	1	25	
	g. Obtain inventory data	**4**	**100**	1	25	3	75	
	h. Assess the pavement condition and select projects	**4**	**100**	3	75	1	25	
	i. Prioritize between projects	**4**	**100**	3	75	1	25	
	j. Other (please specify)							

Table B-8 Summary of Return of 2 Survey questionnaires that were mailed to District 61 (continued).

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
5	What type of reports would you like to receive from the PMS office?							
	a. Project-level report	3	75	2	67	1	33	
	b. Network-level report	3	75	2	67	1	33	
	c. Others, please explain							
6	How often would you like to receive reports from the PMS office?	4	100					
	a. Once a year			3	75			
	b. Twice a year			0	0			
	c. Others			1	25			
7	Do you receive visual aids such as maps presenting suggested highway treatments, treatment years, and roughness from the PMS office? If no, go to question number 10	4	100	1	25	3	75	
8	Do you use the visual aids or maps to assist in decision making (e.g. project and treatment selection, others)?	1	25	1	100	0	0	
9	How do you rate the quality of the visual aids or maps in accommodating your needs?	1	25					
	a. Excellent			0	0			
	b. V. Good			0	0			
	c. Good			1	100			
	d. Fair			0	0			
	e. Poor			0	0			
10	How long does it take the PMS office to respond to your request?	2	50					
	a. One-day			1	50			
	b. One-week			1	50			
	c. One-month			0	0			
	d. Too long			0	0			
11	Is the information in the reports adequate for your work?	2	50					
	a. Just Right			0	0			
	b. Too Little			1	50			
	c. Too much			1	50			

Table B-8 Summary of Return of 2 Survey questionnaires that were mailed to District 61 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
12	In what format would you like to see the PMS Data?	4	100					
	a. Pie Chart			0	0			
	b. Bar Chart			1	25			
	c. Strip Charts			0	0			
	d. Tables			1	25			
	e. Visual maps			2	50			
	f. Others:			0	0			
13	What percentages of the annual pavement projects selected by the district are the same as those recommended by the PMS office?	2	50					Unknown
	a. 0%			0	0			
	b. 25%			1	50			
	c. 50%			0	0			
	d. 75%			1	50			
	e. 100%			0	0			
14	Does the district report the following activities to the PMS office (e.g. Mainframe data entry, TOPS, LETS, etc.)?							Unknown, The construction section does not
	a. Reconstruction	2	50	0	0	2	100	
	b. Rehabilitation	2	50	0	0	2	100	
	c. Preservation	2	50	0	0	2	100	
	d. Routine maintenance	2	50	0	0	2	100	
15	Does your district maintain records of maintenance and construction activities?							
	a. Hard Files	4	100	4	100	0	0	
	b. Digital files stored in Computers	4	100	3	75	1	25	
16	Are there any concerns and issues regarding the following PMS information?							
	a. Accuracy of data	3	75	2	67	1	33	
	b. Value of the indices	3	75	2	67	1	33	
	c. Recommended treatments	3	75	1	33	2	67	
	d. Remaining service life	4	100	3	75	1	25	

Table B-8 Summary of Return of 4 Survey questionnaires that were mailed to District 61

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
17	Do you have any concerns about the reference location systems?	4	100	2	50	2	50	
18	What reference location system are you using?							
	a. Control Section Log mile	4	100	4	100	0	0	
	b. Route Point mile	2	50	1	50	1	50	
	c. Route Milepost	2	50	1	50	1	50	
	d. GPS	2	50	0	0	2	100	
	e. Other							
19	Would you like to have Unified Reference Location System?	2	50	2	100	0	0	Don't know what that is?
20	Please state any recommendations that you may have regarding the PMS operation	1	25					*More frequent updates to data- twice per year, Ability to acquire data for the new performance based budgeting, flexibility in changing the data that can be acquired*
21	Based on the 2003 –04 FHWA and LADOTD surveys, several recommendations were made and forwarded to the PMS office. Do you know that the following items have been implemented?							
	a. The Pavement Management Manual was completed and distributed in May 2006.	4	100	3	75	1	25	
	b. The highways are surveyed in both directions. The images are collected in both directions and the distresses are rated in one direction on undivided highways and in both directions on divided highways.	4	100	4	100	0	0	
	c. PMS Training sessions were conducted for each district.	4	100	3	75	1	25	
	d. The trigger values, resets, index deduct tables, and data dictionary of terms were supplied to each district when James Lee and Leslie Mix went to each District for the training purposes.	4	100	2	50	2	50	

Table B-8 Summary of Return of 4 Survey questionnaires that were mailed to District 61

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
	e. A users manual is available on PMS and District Servers under PMS VISIDATA FILES. Documents are VisiQuickRef_New.pdf, Surveyor.pdf and Visidata.pdf.	**3**	**75**	2	67	1	33	
	f. The Distress Rating Documentation/ Definitions (LADOTD Distress protocols) are available upon request.	**4**	**100**	1	25	3	75	
	g. The PMS web application includes the capability to click on a map of Control Sections that will bring up VISIWEB for that Control Section	**4**	**100**	3	75	1	25	
	h. Surveyor application can be used to measure distances to obstacles, signs, lane widths, shoulder widths, etc.	**4**	**100**	1	25	3	75	
	i. The PMS data of the 2007 survey will have the following capabilities:							
	1. Fore slopes and cross slopes data.	**4**	**100**	0	0	4	100	
	2. Bridge clearance and ramps	**4**	**100**	0	0	4	100	
	3. Object heights and distances using the surveyor tools	**4**	**100**	0	0	4	100	
	4. High definition quality sharp images	**4**	**100**	0	0	4	100	
	5. Degree of curvatures based on AASHTO classification	**4**	**100**	0	0	4	100	
	6. Electronic data in smaller intervals than a tenth of a mile.	**4**	**100**	0	0	4	100	
	j. Upon request from the districts the PMS office is collecting data for over-sized loads in both directions (i.e., rice, sugar cane, timber, lignite, etc.)?	**4**	**100**	2	50	2	50	
22	How often would you like to receive the training on the PMS data (VISIDATA, VISIWEB, Surveyor Tool, Distress Indices, etc.)?	**4**	**100**					
	a. Once a Year			3	75			
	b. Twice a year			1	25			
	c. Others			0	0			
23	Do you like to receive a copy of the tabulated response of this survey?	**4**	**100**	2	50	2	50	

Table B-9 Summary of Return of 3 Survey questionnaires that were mailed to District 62

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
1	Do you have access to the Pavement Management System (PMS) Data (VISIDATA, VISIWEB, Surveyor Tool, Distresses, Indices,etc.)?	3	100	2	67	1	33	Yes on PMS Data/Visiweb, No on the Surveyor Tool
2	How many engineers in your district have access to the PMS data?	1	33					
	a. 1 to 5			0	0			
	b. 6 to 10			0	0			
	c. More than 10			1	100			
3	Do you use the PMS data? If no, go to question 5	2	67	2	100	0	0	
4	You use the PMS data to:							
	a. Obtain the present distress conditions of pavement projects	1	33	1	100	0	0	
	b. View the overall							
	1. Condition distress index	1	33	1	100	0	0	
	2. Composite distress index	1	33	1	100	0	0	
	3. IRI index	1	33	1	100	0	0	
	4. Individual distress indices	1	33	1	100	0	0	
	5. Remaining service life	1	33	1	100	0	0	
	c. Identify the type of treatment required (preventive, maintenance, rehabilitation, reconstruction, etc.)	1	33	1	100	0	0	
	d. Track the performance of applied treatments	1	33	1	100	0	0	
	e. Assess safety related issues	1	33	1	100	0	0	
	f. Obtain roadway sign locations	1	33	1	100	0	0	
	g. Obtain inventory data	1	33	1	100	0	0	
	h. Assess the pavement condition and select projects	1	33	1	100	0	0	
	i. Prioritize between projects	1	33	1	100	0	0	
	j. Other (please specify)							

Table B-9 Summary of Return of 3 Survey questionnaires that were mailed to District 62 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
5	What type of reports would you like to receive from the PMS office?							
	a. Project-level report	2	67	1	50	1	50	
	b. Network-level report	2	67	1	50	1	50	
	c. Others, please explain	1	33					Sign/signal type and location, Same as current
6	How often would you like to receive reports from the PMS office?	2	67					
	a. Once a year			1	50			
	b. Twice a year			0	0			
	c. Others			1	50			As needed
7	Do you receive visual aids such as maps presenting suggested highway treatments, treatment years, and roughness from the PMS office? If no, go to question number 10	2	67	0	0	2	100	
8	Do you use the visual aids or maps to assist in decision making (e.g. project and treatment selection, others)?	1	33	1	100	0	0	
9	How do you rate the quality of the visual aids or maps in accommodating your needs?	1	33					
	a. Excellent			0	0			
	b. V. Good			0	0			
	c. Good			1	100			
	d. Fair			0	0			
	e. Poor			0	0			
10	How long does it take the PMS office to respond to your request?	1	33					
	a. One-day			1	100			
	b. One-week			0	0			
	c. One-month			0	0			
	d. Too long			0	0			

Table B-9 Summary of Return of 3 Survey questionnaires that were mailed to District 62 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
11	Is the information in the reports adequate for your work?	0	0					
	a. Just Right			0	#			
	b. Too Little			0	#			
	c. Too much			0	#			
12	In what format would you like to see the PMS Data?	2	67					
	a. Pie Chart			0	0			
	b. Bar Chart			0	0			
	c. Strip Charts			0	0			
	d. Tables			0	0			
	e. Visual maps			1	50			
	f. Others:			1	50			no change
13	What percentages of the annual pavement projects selected by the district are the same as those recommended by the PMS office?	1	33					
	a. 0%			0	0			
	b. 25%			0	0			
	c. 50%			1	100			
	d. 75%			0	0			
	e. 100%			0	0			
14	Does the district report the following activities to the PMS office (e.g. Mainframe data entry, TOPS, LETS, etc.)?							
	a. Reconstruction	1	33	0	0	1	100	
	b. Rehabilitation	1	33	0	0	1	100	
	c. Preservation	1	33	0	0	1	100	
	d. Routine maintenance	1	33	0	0	1	100	
15	Does your district maintain records of maintenance and construction activities?							
	a. Hard Files	1	33	1	100	0	0	
	b. Digital files stored in Computers	1	33	1	100	0	0	

Table B-9 Summary of Return of 3 Survey questionnaires that were mailed to District 62 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
16	Are there any concerns and issues regarding the following PMS information?							
	a. Accuracy of data	1	33	1	100	0	0	
	b. Value of the indices	1	33	1	100	0	0	
	c. Recommended treatments	1	33	0	0	1	100	
	d. Remaining service life	1	33	0	0	1	100	
	e. Others							
17	Do you have any concerns about the reference location systems?	2	67	2	100	0	0	
18	What reference location system are you using?		67					
	a. Control Section Log mile	2	67	2	100	0	0	
	b. Route Point mile	2	67	1	50	1	50	
	c. Route Milepost	2	67	1	50	1	50	
	d. GPS	2	67	1	50	1	50	
	e. Other		67					
19	Would you like to have Unified Reference Location System?	2	67	1	50	1	50	GPS based system

Table B-9 Summary of Return of 3 Survey questionnaires that were mailed to District 62 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Num-ber	%	
20	Please state any recommendations that you may have regarding the PMS operation	1	33					*1) Intergrated location Map to heop determine position of cameras on state highway system, 2)Regular discrepancies are encountered regarding the accuracy of log mile distances for various routes. Something is in error regarding our log mile system or the programming for the ARAN. Would like distances to match need study/log mile books. In the future training should be geared more toward querying the system to develop reports.*
21	Based on the 2003 –04 FHWA and LADOTD surveys, several recommendations were made and forwarded to the PMS office. Do you know that the following items have been implemented?							
	a. The Pavement Management Manual was completed and distributed in May 2006.	1	33	0	0	1	100	
	b. The highways are surveyed in both directions. The images are collected in both directions and the distresses are rated in one direction on undivided highways and in both directions on divided highways.	1	33	1	100	0	0	
	c. PMS Training sessions were conducted for each district.	1	33	1	100	0	0	
	d. The trigger values, resets, index deduct tables, and data dictionary of terms were supplied to each district when James Lee and Leslie Mix went to each District for the training purposes.	1	33	1	100	0	0	

Table B-9 Summary of Return of 3 Survey questionnaires that were mailed to District 62 (continued)

No	Survey Questions	Statistics of total responses		Specific Responses				Comments
				Yes		No		
		Number	%	Number	%	Number	%	
	e. A users manual is available on PMS and District Servers under PMS VISIDATA FILES. Documents are VisiQuickRef_New.pdf, Surveyor.pdf and Visidata.pdf.	1	33	1	100	0	0	
	f. The Distress Rating Documentation/ Definitions (LADOTD Distress protocols) are available upon request.	1	33	0	0	1	100	
	g. The PMS web application includes the capability to click on a map of Control Sections that will bring up VISIWEB for that Control Section	1	33	0	0	1	100	
	h. Surveyor application can be used to measure distances to obstacles, signs, lane widths, shoulder widths, etc.	1	33	1	100	0	0	
	i. The PMS data of the 2007 survey will have the following capabilities:							
	1. Fore slopes and cross slopes data.	2	67	2	100	0	0	
	2. Bridge clearance and ramps	2	67	2	100	0	0	
	3. Object heights and distances using the surveyor tools	2	67	2	100	0	0	
	4. High definition quality sharp images	2	67	1	50	1	50	
	5. Degree of curvatures based on AASHTO classification	2	67	1	50	1	50	
	6. Electronic data in smaller intervals than a tenth of a mile.	2	67	0	0	2	100	
	j. Upon request from the districts the PMS office is collecting data for over-sized loads in both directions (i.e., rice, sugar cane, timber, lignite, etc.)?	2	67	0	0	2	100	
22	How often would you like to receive the training on the PMS data (VISIDATA, VISIWEB, Surveyor Tool, Distress Indices, etc.)?	2	67					
	a. Once a Year			1	50			
	b. Twice a year			0	0			
	c. Others			1	50			every 2 years
23	Do you like to receive a copy of the tabulated response of this survey?	2	67	0	0	2	100	