

# CHAPTER 1

## INTRODUCTION

### 1.1. BACKGROUND

The Metropolitan Government of Nashville-Davidson County is responsible for providing the Metro with a safe and efficient transportation system. Metro Public Works maintains all roadways within Metro Nashville Davidson County except roads that are private, state routes maintained by TDOT, and roads maintained by satellite cities.

The Department of Public Works delivers a wide range of services that help define the quality of life for residents of Nashville/Davidson County. Over 400 dedicated Public Works employees work day and night to help ensure a safe, clean and convenient transportation network of public streets and alleys, and to provide an efficient system for managing trash and other waste in Davidson County. These "unsung heroes" repair potholes and public sidewalks; mow grass and trim tree limbs near Metro roadways; change traffic signal bulbs; create and put up street signs; and clean up roadside dumping and litter.

In order to better manage the maintenance and rehabilitation of the 2320 miles of roadway pavement in Davidson County's roadway network, Metro Public Works implemented a comprehensive strategic plan in 2003. This document is an update of that plan that reflects changes implemented since the program started.

The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, section 1034 of ISTEA amended title 23, called for the development of six (6) management systems by State Highway Agencies (SHA) beginning in Federal fiscal year 1995. Although Pavement Management Systems (PMS) have been around much longer than 1995, this was the first major legislation on the part of the Federal Government to mandate the use of PMS within State and local municipalities. It was anticipated in the beginning that PMS would be designed at various levels of technical complexity depending on the nature of the pavement network. It quickly became apparent to many government agencies that they had to learn what software features to evaluate when selecting a pavement management software program.

PMS programs come in varying levels of complexity. There are those that are extremely sophisticated with a steep learning curve and there are simple programs that are user friendly that require very little training. There are pavement management software programs that are so data intense that some government agencies cannot afford to collect the data on a regular basis to keep the system working.

The Metropolitan Government of Nashville and Davidson County, TN (Metro) implemented its first formal pavement management program in 1993 by retaining Infrastructure Management Services (IMS) to install and configure PavePro PMS software and perform a pavement evaluation survey of all Metro streets. The system used roughness, rutting, distress, and deflection data collected by a survey vehicle to calculate a pavement condition rating for each pavement segment. These data were used to develop paving lists and perform "what if" scenarios for budgeting and planning purposes.

While the system was well designed, the scope was not tailored to the needs of Metro. An audit by Maximus, Inc., revealed that the system had fallen into disuse by 2002 due to the cost of collecting data and maintaining the system. Deflection data were particularly costly, and therefore not collected, which resulted in pavement condition ratings that were not accurate. The system could not generate useful pavement condition data, and therefore pavement models and paving plans, without the required deflection data. Paving plans were generated from a mix of PMS condition data and Metro council member input.

The audit also faulted the program for focusing on overlays as the only treatment prescribed by the pavement management system. Pavement was left to deteriorate until its condition was poor enough to justify an overlay. Maximus auditors estimated that implementation of a pavement preservation program, which would treat pavement before it failed, would save Metro between 2.0 million and 4.7 million dollars annually.

Based on the recommendations of the Maximus audit, Metro has been improving its pavement management program since 2002. This project addressed two major recommendations of the Maximus audit report:

- "The Department should amend its method of identification of street segments for repaving" (p II-54)
- "The use by Metro Nashville of surface treatments, such as slurry seal, used for preventive maintenance of asphalt pavement needs to be expanded" (p IV-61).

A new PMS software package was selected to aid in identifying street segments for repaving. The new software was selected, installed, and customized to reflect Metro's needs in a PMS, particularly the amount and type of data required to maintain the PMS. Various surface treatments, including but not limited to slurry seals, were evaluated and the most appropriate treatments were incorporated into the pavement management program.

Based on field trials of various surface treatments and pavement rejuvenators, MPW began a preservation program that extends pavement life while reducing maintenance costs. A letter dated May 9, 2005 from Maximus discusses a review of the new preservation program and acknowledges that it should result in a cost savings of approximately \$1.5 million per year over the previous paving program.

## **1.2. PROJECT SCOPE AND OBJECTIVES**

MPW has maintenance responsibilities for over 2,320 centerline miles (5,600 lane miles) of roadway pavement network. This network consists of local streets, connector routes, and arterial routes and is comprised almost entirely of asphalt concrete (AC) pavement. To enhance its overall pavement management approach and develop a long-range strategic paving plan, MPW awarded a contract in 2003 to review the existing pavement management system and assist MPW with the implementation of an improved PMS program. The ultimate goal for the Metro's pavement management system is an easy-to-use system that can:

- Compile past information (construction records, materials information, traffic data, and condition information) on a segment-by-segment basis.
- Conduct new distress surveys to define distress types, levels, and conditions.
- Project future pavement conditions based on realistic pavement deterioration models.

- Project future pavement rehabilitation needs (short- and long-term needs) based on pavement conditions and any other priorities and criteria specified by Metro Nashville and established through the new project.
- Provide detailed reports and graphical displays.
- Provide a logical basis for identifying and selecting roadway improvement projects.
- Incorporate new maintenance policies, repair techniques, and advanced surfacing materials and methods.
- Link with the existing geographical information system (GIS) to provide graphical summaries of data and analysis results.
- Prepare 5-year (and beyond) plans that include prioritized lists of projects to be conducted each year to maintain a specified level of service and estimated costs for each project.

To achieve the goal, Metro Nashville identified several major tasks to be included in the PMS contract:

- Evaluate the existing pavement management program, compare with state-of-the-art systems, and recommend the most effective system for Metro Nashville.
- Establish levels of service consistent with roadway usage, traffic levels, and other priorities.
- Evaluate and recommend new/improved paving systems.
- Conduct a cost analysis of in-house maintenance and rehabilitation (M&R) activities versus contract services.
- Develop an objective-paving program to aid Metro Nashville officials in making effective short- and long-term budgeting recommendations.
- Develop strategies to implement a three-tier program of reconstruction, rehabilitation, and preventive maintenance.
- Develop and implement an educational program aimed to reach out to citizens.
- Prepare recommendations for staff organization and workload equalization.
- Develop guidelines for selection of appropriate preventive maintenance treatments.
- Establish recommended annual budgets associated with the M&R program.

This strategic plan describes how these goals have been met and put into practice.

### 1.3. CURRENT PAVING PROGRAM

Metro Public Works is responsible for maintaining approximately 2300 centerline miles (5600 lane miles) of roadway pavements. In order to better manage the large road network, the paving program was divided into five groups, with each group having its own budget. Group boundaries are generally defined as I-40, I-65, and the downtown loop. Paving projects are let on a group basis, i.e., paving contracts consist of roads selected from a single paving group. The five groups and their associated statistics in 2007 are listed in Table 1.1. Group boundaries are shown in Figure 1.1.

Table 1.1. Paving group statistics.

	Group 1	Group 2	Group 3	Group 4	Group 5
Centerline miles	445	491	350	446	596

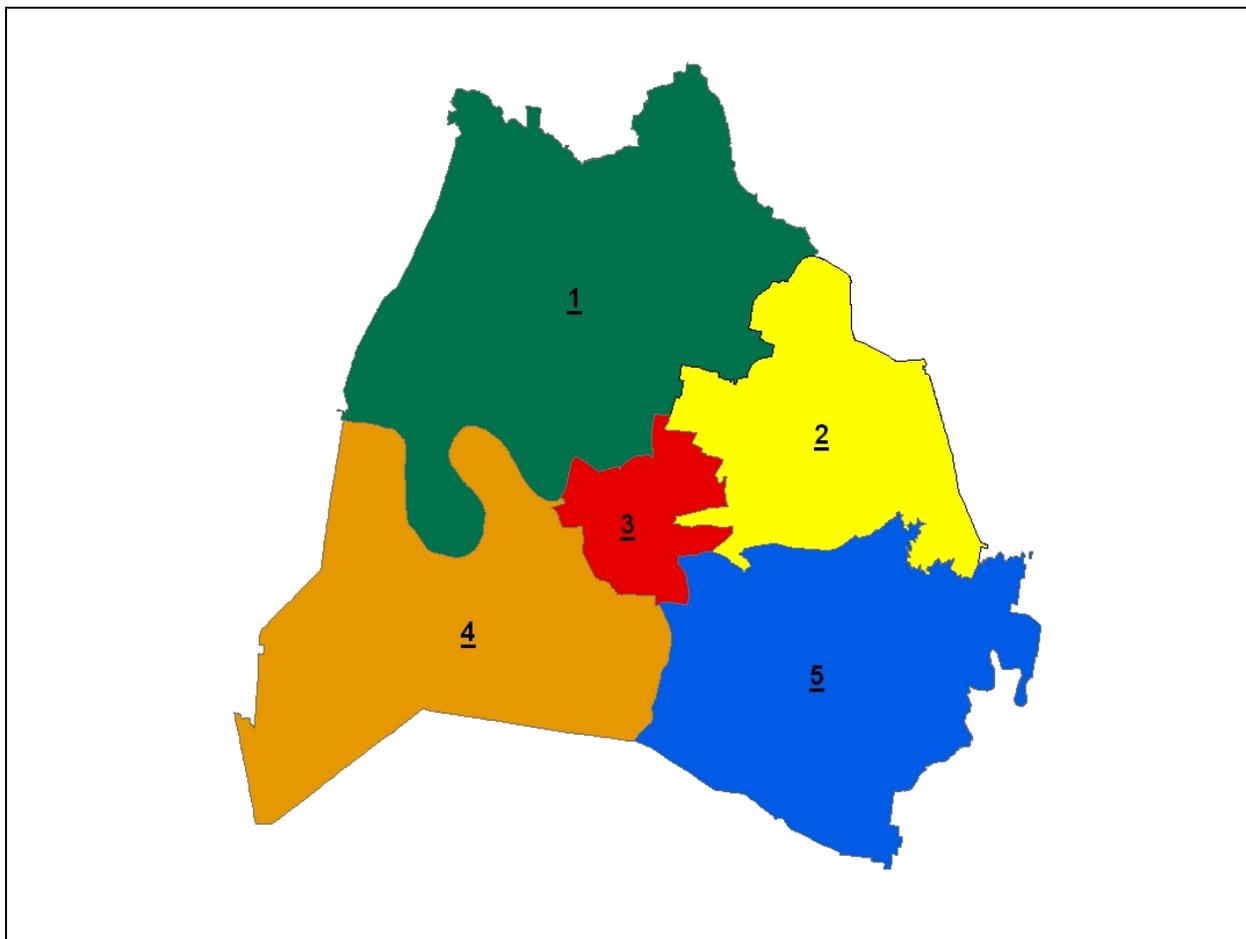


Figure 1-1. Metro paving groups.