Development of a Prototype Pavement Management System for Municipal Maintained Roads and the Integration with a Geographic Information System

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DEVELOPMENT OF A PROTOTYPE PAVEMENT MANAGEMENT SYSTEM FOR MUNICIPAL MAINTAINED ROADS AND THE INTEGRATION WITH A GEOGRAPHIC INFORMATION SYSTEM

BY

OLUMIDE ADEDAMOLA ADEYINKA

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN CIVIL AND ENVIRONMENTAL ENGINEERING

UNIVERSITY OF RHODE ISLAND 1992
MASTER OF SCIENCE THESIS
OF
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APPROVED:
Thesis Committee
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ABSTRACT

A pavement management system (PMS) is a set of tools or methods that assist decision makers in finding optimum strategies for providing and maintaining pavements in a serviceable condition over a given period of time at the least cost. Without such a routine pavement maintenance program, roads require more frequent reconstruction, thereby costing the state and local governments additional dollars.

In this study, a prototype PMS for municipal maintained roads was developed for a typical township in Rhode Island, the Town of South Kingstown. Based on the results of a questionnaire survey and comparative analysis, Micro PAVER was selected as the most appropriate microcomputer-based PMS for this particular purpose. A prototype PMS was prepared using Micro PAVER as the core. Pilot implementation of the Micro PAVER PMS was conducted in the Town of South Kingstown. Surface distresses were visually observed to evaluate the pavement condition, and the prioritization was based on the derived pavement condition index (PCI). The developed prototype PMS used a ten percent sampling technique for pavement condition surveys. A preliminary list of techniques and costs for maintenance and rehabilitation (M & R) was prepared, and deterioration rate curves were developed for the selected network.

The establishment of a GIS network for the town consisted of developing the following coverages: a town boundary, pavement management zone boundary, study area boundary, and a road network in the study area. The coverages were developed using the PC ARC/INFO GIS and the United States Geological Survey (USGS 7.5 minute series) 1:24,000 digitized maps. The data integration involved bringing together separate software components and reducing database management duplication. The GIS integration process required the PMS data to be in ASCII format. The Micro PAVER management data were converted to R:BASE SYSTEM V and exported as an ASCII fixed file. TABLES database manager under PC ARC/INFO starter kit was used to create templates that formed the attribute data e.g., pavement age, surface type, zone identification, pavement rank, branch number, section number, and
street name. The pavement condition data were then imported to TABLES and linked to roadway network using the pavement section identification numbers. These ID numbers are common to the digitized road network and the pavement data. Templates were also created for the study area boundary coverage with attributes such as average PCI, number of sections, and area of pavements. Once the databases were complete, the data were queried to create maps for various attribute criteria such as PCI, age, required maintenance and repair.

Integration of a PMS and a GIS proves to be useful in the display of pavement data for decision making. Data interpretation is assisted by the ability to visually display the relationship of pavement management data with other relevant data, such as traffic volumes, soil data, and land use. Graphical outputs (such as pavement conditions, age, surface type) indicating network conditions and projects could be easily comprehended by engineers, planners, politicians and citizens.

This study serves as a guide to cities and towns that wish to implement the developed prototype PMS and practice. The study also shows how the integration of transportation related data (pavement management condition data) using a GIS for graphical display can greatly assist in the decision making.
ACKNOWLEDGEMENTS

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The unlimited support from the author’s family and friends is also appreciated, especially the author’s wife Susan Adeola Adeyinka for her endless support and encouragement. To these wonderful people I am very grateful. This thesis is dedicated to the author’s father, the late Isaiah Oludele Adeyinka, who during his lifetime as a civil engineer helped the author develop the same interest he had in this field.

Olumide A. Adeyinka
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CHAPTER 1. INTRODUCTION

The problem of maintaining roads in an orderly and systematic fashion has been around for many years. Every public works official is familiar with the problem of crumbling streets, cracked pavements, and potholes. The issue is not one of familiarity, but how and when, and with what treatment to obtain the optimum return on the dollar. Today, local governments are faced with the problems of deteriorating infrastructure and reduced funding. Rising costs, reduced resources, increased utilization of the system, needs that far exceed revenues, and a changing emphasis from system expansion to system rehabilitation are issues which highway administrators and engineers must address.

A pavement management system (PMS) is a systematic approach that assists highway administrators and engineers in finding accurate information and optimum strategies needed to effectively manage their highway pavements. It includes the collection, processing, analysis and reporting of data on pavement sections and their construction and maintenance history. The analysis and reporting capabilities of a PMS are directed towards identifying current and future deficiencies and needs, developing rehabilitation programs, priority programming of projects and funds, and providing feedback on the performance of designs, materials, rehabilitation techniques, and maintenance levels.

An attempt was made to develop a prototype PMS for Rhode Island Municipal Maintained roads in this study. It started with the statewide inventory of current pavement management practices for local roads and streets as administered by all thirty-nine Rhode Island communities. Existing micro computer-based pavement management programs were then evaluated for use in Rhode Island, and Micro PAVER was selected as the most appropriate software package. The Micro PAVER program was utilized as the core of the prototype PMS for the Rhode Island Municipal Maintained roads. The road network of the Kingston Campus of the University of Rhode Island located within the Town of South Kingstown was used during the development of the prototype PMS.
The developed prototype network was implemented and tested for the road network of the Town of South Kingstown. The implementation consisted of data collection, data entry, data analysis, and a review of the maintenance and repair policies of the town. The first phase of implementing the prototype PMS for the town was completed in June 1989. The average pavement condition was determined, and the Town subsequently used the PMS to develop and justify projects for the Road Improvement Program.

Further development has been done to integrate the town’s PMS data with a Geographic Information System (GIS). The roadway condition and treatments are typically printed in tabular form, and it is up to the highway engineer to transfer this information to a base map by hand as a first step in developing projects. A map based interface and geocoded data would greatly facilitate the process of project development and scheduling. It would help in developing and producing graphical outputs indicating the condition of a PMS network and scheduling projects.

A GIS data model involves storage of tabular data (attributes) in association with simple cartographic features (points, lines, and polygons). Cartographic data is stored not as graphics primitives or symbols but as tables in a non-symbolized form that stands in relation to other attributes. While similar to a CAD approach in its use of coordinates, the data model for this technology is fundamentally different in its simplicity and approach. It provides the use of topology (networks) to store relationship among spatial objects (1 & 2). A GIS can be used as a tool for automated drafting, simple storage, and regeneration of graphics and plots of information maintained in the database. Rather than storing map features as graphic symbology, the GIS data structure organizes features with descriptive characteristics. GIS software makes it easy to manage, organize, query, and display large collections of spatial information (2). The PC ARC/INFO version 3.4D GIS was used for the development of the town’s 1989 pavement management network structure. Two zones, i.e. Worden’s Pond and West Kingston of the town’s eight zones in the roadway network were used for the integration process. This process serves as a prototype for further development to complete the integration of the town’s network.
This thesis presents the results of research in the following format. Chapter 2 summarizes the fundamental concepts of a PMS. Chapter 3 describes the development process of a prototype PMS with the Micro Paver computer program for the Rhode Island Municipal Maintained roads. The implementation of a municipal pavement management system in the Town of South Kingstown is described in Chapter 4. Chapter 5 presents concepts of a geographic information system, the modules of the PC ARC/INFO software, and a description of the integration of the Micro Paver PMS with PC ARC/INFO GIS. The last chapter includes conclusions and recommendations based on the findings of this study.
2.1. Fundamental Concepts of Pavement Management

Pavement management is the effective and efficient directing of the activities involved in providing and sustaining pavements in an acceptable condition at the lowest life-cycle cost. A pavement management system (PMS) is an established, documented procedure that treats all of the activities involved in pavement management in a systematic and coordinated manner (3).

Pavement management is most conveniently described in terms of two generalized levels: 1) the network level and 2) the project level. The network level, incorporates the key administrative decisions that effect programs for road networks, and the project level, in which technical management decisions are made for specific projects. The functions of a PMS at these two levels are shown in Figure 2.1. At the network level, the management system provides information pertinent to the development of an agency-wide program of new construction, maintenance, or rehabilitation that will optimize the use of available resources. At the project level, detailed consideration is given to alternative design, construction, maintenance, or rehabilitation activities for a particular roadway section or project within the overall program (4).

The primary objectives of pavement management are to obtain the best possible value for the available public funds and to provide a transportation system that is safe, economical and comfortable. Highway agencies are adopting PMS’s for a variety of other reasons: to develop a physical inventory, to prioritize maintenance needs, and to justify maintenance budget increases. A PMS also improves the efficiency of decision-making, provides feedback on the consequences of decisions, facilitates the coordination of activities within the agency, and ensures the consistency of decisions made at different management levels within the same organization.
Figure 2.1 Functions of a Pavement Management System
The most important attribute of a PMS, however, is that it assists agencies to attain the best possible road network for the least amount of money. Several engineering studies have shown that the most economical way to preserve pavements is through preventive and timely application of the correct maintenance alternative (5). As shown in Figure 2.2, for about seventy five percent of a pavement’s life, its serviceability is good and its cost of maintenance is less than one-fifth the cost of maintaining/rehabilitating a pavement which has been allowed to enter the rapid deterioration stage of the last quarter of its design life. By monitoring pavement deterioration with well developed condition rating schemes, agencies can identify this critical condition or optimum maintenance period, and schedule appropriate pavement investments to maintain the network at a high service level at the lowest possible cost.

2.2 Statewide Inventory of Municipal-Level Pavement Management Practices

One of the initial tasks of this project was to conduct a questionnaire survey of the status of municipal pavement management programs in Rhode Island’s thirty-nine communities. The purpose of this survey was threefold:

1) to identify the existing pavement maintenance practices;
2) to identify the use and availability of computers within the municipalities’ public works and highway maintenance departments; and
3) to develop an interest in the implementation of a computerized pavement management system (PMS).

The Pavement Management Program Questionnaires were distributed in July 1988. By May 1989, all thirty-nine cities and towns responded to the survey. The reaction by the communities confirmed the need for statewide implementation of a microcomputer based PMS in Rhode Island.

The questionnaire results indicated that each Rhode Island community maintains an average of 130 miles of roadway. The responses from each community are shown in Table 2.1. Only one community identified maintenance responsibilities for portland cement concrete (PCC) road surfaces (a total length of only 2 miles).
Figure 2.2. Road Deterioration and Comparative Deterioration Costs Over Time (5)
| MUNICIPALITY       | MILES OF MUNICIPAL ROADS | MILES OF MUNICIPAL ASPHALT CONCRETE ROADS | CONCERNED ABOUT PAVEMENT DETERIORATION | METHOD TO DETERMINE USE OF RESOURCES | REGULAR ROAD MAINTENANCE PROGRAM-TYPE | SIZE OF MAINTENANCE STAFF | USE COMPUTERS AT LOCATION/ AT OTHER LOCATION | TYPE OF COMPUTER | TYPE OF DATA MANAGEMENT SOFTWARE | COMPELTERIZED FMS IN USE | INTERESTED IN IMPLEMENTING A COMPUTERIZED FMS |
|-------------------|--------------------------|------------------------------------------|----------------------------------------|--------------------------------------|----------------------------------------|--------------------------|--------------------------------------------|------------------|----------------------------------|-------------------|----------------------------------|
| Barrington        | 41                       | 81                                       | YES                                    | Inspection/Survey                     | No                                     | 6                        | Yes                                        | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| Bristol           | 100                      | 99                                       | YES                                    | Inspection/Survey                     | Yes - Annually                         | 6                        | No - Yes                                   | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| Burnsville        | 114,63                   | 114,65                                   | YES                                    | Inspection/Survey                     | Yes - Annually                         | 6                        | No - Yes                                   | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| Center Falls      | 28                       | 28                                       | YES                                    | Inspection/Survey                     | Yes - Annually                         | 6                        | No - Yes                                   | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| Charlestown       | 42                       | 5.5                                      | YES                                    | Inspection/Survey                     | Yes - Annually                         | 5                        | No - Yes                                   | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| Cromwell          | 208                      | 363                                      | YES                                    | Condition Ranking                     | Yes - Other                            | 21                       | Yes                                        | IBM PC           | D Base III | MAYBE                        | NO | YES                        |
| Crotona           | 395                      | 363                                      | YES                                    | Condition Ranking                     | Yes - Other                            | 22                       | Yes                                        | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| Cumberland        | 218                      | 33.99                                    | YES                                    | Priority/Available Budget             | Yes - Semi-annual                      | 12                       | Yes                                        | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| East Greenwhich   | 155                      | 155                                      | YES                                    | Condition Ranking                     | Yes - Semi-annual                      | 30                       | Yes                                        | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| Ector             | 100                      | 10                                       | YES                                    | Road/Drainage Prior                   | Yes - Annually                         | 5                        | No - No                                    | IBM PC           | D Base III | MAYBE                        | NO | YES                        |
| Foster            | 80                       | 30                                       | YES                                    | Road/Drainage Prior                   | Yes - Quarterly                        | 5                        | No - No                                    | IBM PC           | D Base III | MAYBE                        | NO | YES                        |
| Colchester        | 90                       | 3                                        | YES                                    | Road/Drainage Prior                   | Yes - Other                            | 4                        | No - Yes                                   | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| Hopkinton         | 144                      | 10                                       | YES                                    | Road/Drainage Prior                   | Yes - Annually                         | 9                        | Yes                                        | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| Janesvood         | 55                       | 10                                       | YES                                    | Road/Drainage Prior                   | Yes - Annually                         | 5                        | Yes                                        | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| Johnston          | 130                      | 120                                      | YES                                    | Road/Drainage Prior                   | Yes - Semi-annual                      | 20                       | Yes                                        | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| Lynn              | 43                       | 43                                       | YES                                    | Road/Drainage Prior                   | Yes - Annually                         | 9                        | No - Yes                                   | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| Littleton         | 21                       | 21                                       | YES                                    | Road/Drainage Prior                   | Yes - Other                            | 12                       | Yes                                        | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| Middletown        | 125                      | 125                                      | YES                                    | Road/Drainage Prior                   | Yes - Semi-annual                      | 12                       | Yes                                        | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| Hockessett        | 100                      | 40                                       | YES                                    | Road/Drainage Prior                   | Yes - Semi-annual                      | 12                       | Yes                                        | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| Newport           | 100                      | 98                                       | YES                                    | Road/Drainage Prior                   | Yes - Semi-annual                      | 12                       | Yes                                        | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| New Shoreham      | 83                       | 4                                        | YES                                    | Road/Drainage Prior                   | Yes - Semi-annual                      | 12                       | Yes                                        | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| North Kingsness   | 162,8                    | 160                                      | YES                                    | Inspection/Survey                     | Yes - Semi-annual                      | 16                       | Yes                                        | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| North Providence  | 106                      | 106                                      | YES                                    | Inspection/Survey                     | Yes - Semi-annual                      | 16                       | Yes                                        | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| North Saidfield   | 90                       | 40                                       | YES                                    | Inspection/Survey                     | Yes - Semi-annual                      | 10                       | Yes                                        | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| Pompton            | 197                      | 197                                      | YES                                    | Inspection/Survey                     | Yes - Semi-annual                      | 12                       | Yes                                        | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| Portmouth         | 90                       | 85                                       | YES                                    | Inspection/Survey                     | Yes - Semi-annual                      | 24                       | Yes                                        | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| Providence        | 365                      | 5                                        | YES                                    | Inspection/Survey                     | Yes - Semi-annual                      | 12                       | Yes                                        | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| Ridgeland         | 63                       | 1                                        | YES                                    | Inspection/Survey                     | Yes - Semi-annual                      | 13                       | Yes                                        | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| Rockdale          | 60                       | 75                                       | YES                                    | Inspection/Survey                     | Yes - Semi-annual                      | 13                       | Yes                                        | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| Smithfield        | 120                      | 85                                       | YES                                    | Priority/Available Budget             | Yes - Other                            | 9                        | No - No                                    | IBM PC           | D Base III | MAYBE                        | NO | YES                        |
| South Kingsness   | 123                      | 15                                       | YES                                    | Priority/Available Budget             | Yes - Semi-annual                      | 25                       | Yes                                        | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| Southfield        | 303                      | 5                                        | YES                                    | Inspection/Survey                     | Yes - Semi-annual                      | 5                        | No - Yes                                   | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| Warren            | 25                       | 45                                       | YES                                    | Inspection/Survey                     | Yes - Semi-annual                      | 10                       | Yes                                        | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| Warwick           | 440                      | 430                                      | YES                                    | Inspection/Survey                     | Yes - Semi-annual                      | 60                       | Yes                                        | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| Wantley           | 140                      | 145                                      | YES                                    | Inspection/Survey                     | Yes - Semi-annual                      | 13                       | No - Yes                                   | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| West Greenwich    | 70                       | 70                                       | YES                                    | Inspection/Survey                     | Yes - Semi-annual                      | 4                        | No - No                                    | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| West Warwick      | 130                      | 130                                      | YES                                    | Inspection/Survey                     | Yes - Semi-annual                      | 20                       | No - Yes                                   | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
| Woonsocket        | 175                      | 175                                      | YES                                    | Inspection/Survey                     | Yes - Semi-annual                      | 20                       | Yes                                        | IBM PC           | D Base III | YES                          | NO | MAYBE                      |
All thirty-nine communities expressed concern about the deterioration of their municipally maintained pavements. However, their written responses to deciding the most cost-effective method for spending limited resources varied. Eleven communities reported the use of some type of inspection or survey method, and two municipalities responded as currently utilizing a condition ranking system. Priority or available budget is the decision factor in six municipalities. One locality utilized a comprehensive road and drainage plan. Unfortunately, the remaining nineteen responses were either inappropriate or blank.

According to the survey, thirty-three communities (85 percent) utilize a regular maintenance program. These programs are conducted annually in fifteen communities, semi-annually in one community, and seasonally in six communities. Six municipalities considered their maintenance program as something other than those previously mentioned. The question regarding the size of the municipal maintenance staff was misinterpreted by several communities. Some respondents considered "maintenance staff" to include all public works department personnel, but others identified only the number of workers in field crews. Answers ranged from 3 to 60 people with an average of 14 people. In addition, two towns reported that maintenance work was contracted, and consequently maintenance personnel were not employed.

Only eleven of the thirty-nine communities (28 percent) actually use computers within the public works departments. However, eighteen of the remaining twenty-eight communities have access to computers at another location. In terms of the type of computer available, nine communities have IBM PC's compatible computers. Only ten municipalities do not have any access to a computer. The most commonly used software for data management, according to ten communities, is dBase III. Six communities use some other type of data management software and three respondents were uncertain as to what type(s) were available. Most of the communities however, do not have any data management software.

Although all thirty-nine communities expressed concern about the deterioration of their municipally maintained pavements, an overwhelming majority of the communities (92
percent) do not have a computerized PMS in use. Further investigation of the three towns which claimed to have a PMS revealed that only one of the municipalities has a computerized PMS with limited capabilities; another has a computerized budget management system; and the third had hired an engineering consulting firm to implement its PMS. Not including the town with the PMS installed by the consultant, at least twenty-two municipalities indicated an interest in implementing a computerized PMS, while four other communities indicated they possibly may be interested. Only four towns actually expressed no desire to install a PMS; while the eight remaining communities did not respond to this question.
CHAPTER 3. DEVELOPMENT OF A PROTOTYPE PMS FOR MUNICIPALLY MAINTAINED ROADS IN RHODE ISLAND

The responses by the communities to the questionnaire confirmed the lack of rational, systematic methods for the upkeep of municipally maintained pavements throughout the state. The diversity of the responses also established the primary requirements for a municipal level pavement management system (PMS): the system must be low cost, microcomputer-based, simple to maintain and easy to operate.

3.1 Evaluation of Computer Programs and Systems

The process of evaluating the multitude of pavement and infrastructure management systems was simplified by performing the procedure in two phases. The first phase of the evaluation involved a preliminary review of available literature and software (6). The second phase consisted of a more detailed comparison of the most promising programs identified in the first phase.

3.1.1 Preliminary Review

The first phase of the evaluation assessed the programs general features, operations, costs, developer support, degree of completeness, simplicity, and capabilities. Although ratings or rankings were not assigned to each category, the following general guidelines were considered essential for the programs:

1) The overall operation and implementation of the system must be simple. The most desirable PMS would be user friendly, with menu-driven software employing an online self-help feature, which the municipal engineering staffs can maintain with minimal outside assistance.

2) The initial cost and annual maintenance fees should be minimal. The ideal program would be non-proprietary, with little or no development costs imposed on the users.

3) The system should be based on visual observations of pavement distresses and possible overall riding quality.
4) The collected data should be converted into an index number which indicates the pavement performance condition. The employed distress survey methodology must be objective and repeatable, and the derived index must allow prioritization of road sections for maintenance.

5) The system should include, as a minimum, the following capabilities: storing pavement condition data, developing an objective pavement condition index, prioritizing pavement sections for maintenance needs, providing maintenance alternatives, performing life-cycle cost analysis, and providing annual budget requirements to keep pavements in acceptable condition.

6) The software should run on an IBM or compatible system configuration.

The programs reviewed in this first phase are listed in Table 3.1. More detailed descriptions and specifications for these programs are contained in Appendix A.

3.1.2 Program Comparison

After the preliminary review in the first phase, seven promising computer programs were selected for a more thorough investigation of the second phase. The non-quantified examination addressed the following seven specific characteristics:

1) Ease of Program Use
2) Clarity and Completeness of Documentation
3) Accessibility and Quality of Support and Updating Procedures
4) Program Costs
5) Data Management Components
   A. Database
      · condition rating data (distress, non-destructive testing)
      · cost data
      · maintenance history
      · inventory information
   B. Retrieval methods
      · file flexibility
      · output flexibility
6) Pavement Management Levels
   A. Network level
   B. Project level
7) Interim and Long Term Use Feasibility
Table 3.1 Microcomputer-Based Pavement Management System Software

| PROGRAM                               | DEVELOPER/VENDOR                                                                 |
|---------------------------------------|----------------------------------------------------------------------------------|
| 1. CANDLINK                           | West Virginia University                                                         |
| 2. COSTOMIZE                          | Pavement Management Systems                                                      |
| 3. Flexible PMS                       | FHWA Region 9/West Virginia Univ.                                                |
| 4. FPMS                               | CALTRANS                                                                         |
| 5. HCPM                               | Capital District Transportation Committee                                       |
| 6. Inventory                          | Bernardino and Associates                                                         |
| 7. Local Roads Forecasting Model      | Metro Area Planning Council                                                      |
| 8. Low-Volume Road Maintenance        | West Virginia University                                                         |
| 9. Metro Pavement Management          | Metropolitan Transportation Commission                                           |
| 10. Micro PAVER                       | U.S. Army Construction Engin. Research Laboratory/American Public Works Assoc.    |
| 11. Pavement Management System        | BSI Consultants, Inc.                                                            |
| 12. Pavement Management System        | Carter Associates, Inc.                                                           |
| 13. Pavement Management System        | Morrison, Knudsen                                                                 |
| 14. Pavement Management System        | PMS Inc. of Cambridge, Ontario                                                   |
| 15. Pavement Management System        | Tulare County Association of Government                                          |
| 16. Pavement Management System        | Vanasse Hangen Brustlin, Inc.                                                    |
| 17. Pavement Management System        | Washington Department of Transportation                                          |
| 18. PMI Pavement Management System    | Harris and Associates                                                            |
| 19. PMP                                | Midwest Pavement Management                                                      |
| 20. PMS                               | Allan Davis & Associates                                                         |
| 21. PMS                               | De Leuw Cather & Co.                                                             |
| 22. PMS-ITRE                          | University of North Carolina                                                     |
| 23. PMS Series 10A-10G Infrastructure | Pavement Management Systems, Inc.                                                |
| Database Management Series            | Pavement Management Systems, Inc.                                                |
| 24. PMS Series 20 Annual Maintenance  | Pavement Management Systems, Inc.                                                |
| Program Analysis                      | Pavement Management Systems, Inc.                                                |
| 25. PMS Series 30 Pavement            | Pavement Management Systems, Inc.                                                |
| Management Rehabilitation Program     | Pavement Management Systems, Inc.                                                |
|   |   |   |
|---|---|---|
| 26. | PMS Series 40 Pavement Management Fully Optimized Rehabilitation Program | Pavement Management Systems, Inc. |
| 27. | PMS Series 50 Project Level | Pavement Management Systems, Inc. |
| 28. | PMS Series 60 Customized Pavement Management System | Pavement Management Systems, Inc. |
| 29. | Regional Highway Planning | Capital District Transportation Committee |
| 30. | Road Manager | Christman Associates, Inc. |
| 31. | RSMMS | Wilbur Smith Associates, BTML Division |
| 32. | RSMS | Technology Transfer Center, Univ. of New Hampshire |
| 33. | STAMPP | Pennsylvania Department of Transportation |
|   |   |   |
| **INFRASTRUCTURE RELATED SYSTEMS** |   |   |
| 34. | IMS-I | Public Works Software, Inc. |
| 35. | IMS-II | Public Works Software, Inc. |
| 36. | IMS Pavement Management System | Infrastructure Management |
| 37. | INFRACON | Infrastructure Management Consultants, Inc. |
| 38. | MAPCON | McTrans Center, University of Florida |
| 39. | Public Works Maintenance Management System | Burke & Associates |
| 40. | Roadway Management | Engineering Technology Corporation |
| 41. | Street Inventory System | Hoffman Associates |
|   |   |   |
| **AUTOMATED SYSTEMS** |   |   |
| 42. | ARAI 1 | MHM Associates, Inc. |
| 43. | ARAN and PURD | Federal Technical Surveys |
| 44. | ARIA 2 | MHM Associates, Inc. |
| 45. | PAS 1 | Pavedex, Inc. |
Most of the programs appeared to be fairly easy to learn and use. Documentation for most of the software was explicit; some packages included detailed examples and applications. The accessibility and quality of support appeared to be adequate; most developers identified contact individuals who are familiar with the product, while others provided newsletters and/or an electronic bulletin board. The programs with larger numbers of users experienced significant input about problems and potential improvements which facilitates updating procedures. The costs of the programs were reasonable; the consultant-developed packages with customized software options generally cost more and require an annual or periodic support fees. Table 3.2 lists the seven programs and also shows a comparison of their major features.

The quality of the data management components depended on the limitations of the database manager used in its development. Most of the packages were deficient in terms of file flexibility, especially those which used input and output file coding other than the American Standard Code for Information Interchange (ASCII). ASCII files contain standard text characters which may be read by different computer operating systems, and appear in a readable form when displayed on the screen. The degree of output flexibility was fairly standard among the programs; in most of the packages, specific information can be generated by selecting the appropriate options, and then the reports can be sent to a disk file, screen or printer. The data analysis methods of most of the programs were very similar. A numeric pavement condition index or rating is derived from the quantity and severity of pavement distress. The distress data and pavement condition index are then used in other analysis routines within the program.

Most of the programs allowed both network and project level analyses, although some of the programs included capabilities for only one level of analysis. All seven of the packages were suitable for municipal use, but only a few appeared adaptable for site specific modifications at a future time.
| Software Name (Source) | Type of Developer | Relative Cost | Developer Support | Survey Method | Pavement Inventory | Condition Assessment | Pavement History | Maintenance Policy | Estimate of Quantities and Costs | Project Maintenance Costs | Overall Condition Frequency | Budget Planning Analysis | Future Inspection Scheduling | Alternative Strategy Evaluation |
|------------------------|-------------------|---------------|------------------|--------------|-------------------|---------------------|-----------------|------------------|-----------------------------|---------------------------|--------------------------|-----------------------------|-----------------------------|-----------------------------|
| Flexible PMS (Caltrans) | State             | Low           | No               | Visual       | Yes               | Yes                 | No              | Yes              | Costs Only               | Yes                       | No                       | No                          | No                          | No                          |
| Metro Pavement Management (Metropolitan Transportation Commission) | Agency           | Moderate      | Yes              | Visual       | Yes               | Yes                 | Yes             | Yes              | Yes                        | Yes                       | Yes                      | Yes                        | Yes                        | Yes                        |
| Micro PAVER (APWA)     | Agency            | Low           | Yes              | Visual       | Yes               | Yes                 | Yes             | Yes              | Yes                        | Yes                       | Yes                      | Yes                        | Yes                        | Yes                        |
| Pavement Management System (Vanasse Hangen Brustlin) | Consultant        | High          | Yes              | Visual       | Yes               | Yes                 | Yes             | Yes              | Yes                        | Yes                       | Yes                      | Yes                        | Yes                        | Yes                        |
| Road Manager (Christman Associates) | Consultant        | Moderate to High | Yes              | Visual       | Yes               | Yes                 | Yes             | Yes              | Yes                        | Yes                       | Yes                      | Yes                        | Yes                        | Yes                        |
| RSMMS (Wilbur Smith Associates BTML Division) | Consultant        | High          | Yes              | Visual       | Yes               | Yes                 | Yes             | Yes              | Yes                        | No                       | Yes                      | Yes                        | Yes                        | Yes                        |
| STAMMP (Pennsylvania Department of Transportation) | State             | Low           | No               | Visual       | Yes               | Yes                 | No              | Yes              | No                         | No                       | Yes                      | No                         | No                          | No                          |
3.3 Selection of Micro PAVER Computer Program

The pavement management system evaluation process identified several excellent microcomputer-based programs. Some useful functions were unique to certain programs; thus no single program included all the necessary capabilities of the ideal pavement management system. The features of Micro PAVER, however, distinguish it as the most appropriate PMS software for Rhode Island municipalities.

Micro PAVER is one of the simplest menu-driven microcomputer-based programs which features an objective and repeatable visual distress survey methodology. Since it was developed by a government agency, Micro PAVER is non-proprietary and does not require any development costs. Continuous support is provided by the American Public Works Association (APWA) and periodic updates are furnished to its users. In October 1989, Micro PAver Version 2.1 was released. Accordingly, Micro PAVER is one of the most widely utilized programs; more than 110 users are organized as a non-profit user group to assist each other and facilitate program updates (7).

The Micro PAVER system provides the user with a practical decision approach for identifying cost-effective maintenance strategies for roads and streets. Interface programs of Micro PAVER provide report generation capabilities for critical information which allows objective input to the decision-making process. Other important capabilities include data storage and retrieval, pavement network definition, pavement condition index (PCI)/rating (PCR), project prioritization, inspection scheduling, determination of present and future network condition, determination of needs for maintenance and repair (M & R), performance of economic analysis, and budget planning (8,9,10,11 & 12).

3.4 Development of a Prototype PMS for Municipal Maintained Roads In Rhode Island

During the evaluation process of available microcomputer based pavement management systems, two pilot networks were created: the Kingston campus of the University of Rhode Island (URI) and the Town of South Kingstown (TSK). The roadway
system of the URI campus was established to investigate the adaptability of promising computer programs to an actual street layout and to develop a prototype PMS for Rhode Island municipal-maintained roads.

3.4.1 Development of Guidelines for Data Collection

Before data can be collected, a municipality must first identify its pavement network components. A zone is the largest subdivision within a network. Zone boundaries are usually defined by permanent or physical obstructions (such as natural/semi-natural barriers, state/major local roads), or less commonly, by administrative divisions (such as voting wards or school districts). A branch is any identifiable part of the network that is a single entity and has distinct function, such as an individual street. Ideally, each branch should be contained in one individual zone, but occasionally, branches may be components of two or more zones.

Sections are those portions of branches which are uniform in pavement structure composition, traffic, construction history, pavement rank, drainage facilities and shoulders. Other factors to be considered in defining sections include management, data availability, costs, and whether section limits can be changed. Since no formal length restrictions are imposed on sections, a branch may consist of a single section. For example, minor residential streets and dead end roads typically have identical characteristics throughout, and therefore consist of only one section. Sample units are the smallest component of the network. The sample is the portion of the section which is actually inspected; therefore the sample(s) must be a representative of the entire section. For sections with asphalt surfaces, the sample unit(s) consist of 2500 ± 1000 square feet (250 ± 100 square meters).

Accurate section PCI’s are essential to both network and project level decisions. However, inspection of every sample unit within a pavement section would involve considerable time and effort. Such a practice would require more manpower, funds and time than are available in most municipalities. Since sections have been defined as having common characteristics (including surface type, structure, maintenance history,
traffic conditions, and about the same level of deterioration), statistical extrapolation is applied to reduce the collection effort of distress data. Thus, only selected sample units are inspected and the PCI for the entire section is extrapolated. For initial network implementation, a ten percent sampling level should be sufficient as shown in Table 3.3. Figure 3.1 shows a typical application of sections and sample units for a branch. The first and last sample units of a section are not usually inspected since they may include pavement characteristics of the intersection.

A municipality should select its sampling level according to the desired level of accuracy. Since additional sampling can always be performed in the future, a community’s first-time sampling needs could be underestimated without jeopardizing this previously collected data. All subsequent inspections should always include the previously surveyed samples. Periodic inspection of the same sample unit assures the repeatability and reproducibility of the PCI methodology and also yields a more accurate deterioration rate for the pavement section.

3.4.2 Development of a Prototype PMS on Pilot Network

The URI Kingston campus features a roadway network similar to most municipalities in the state, but only at a smaller scale. The roadways on the campus are primarily two-lane streets with asphalt concrete surfaces with functional classifications ranging from service roads to circulators (Heavily traveled).

The URI network was used for training of municipal personnel and as a pilot network (13 & 14). This pilot network was also utilized in examining the repeatability (technically reproducibility) of the procedure. The network will serve as a standard for calibration of condition surveys and continuous evaluation of the prototype Micro PAVER PMS.

The URI is a medium-size state university with its main campus located in the rural village of Kingston in southern Rhode Island. The campus is representative of a
Table 3.3 Recommended Sampling Strategy for the Prototype Micro PAVER PMS

| Number of Sample Units per Section | Recommended Sample(s) to Inspect (if representative) |
|-----------------------------------|-----------------------------------------------------|
| 1 - 10                            | 2nd                                                 |
| 11 - 20                           | 2nd, 12th                                           |
| 21 - 30                           | 2nd, 12th, 22nd                                     |
| 31 - 40                           | 2nd, 12th, 22nd, 32nd                               |
| --                                | --                                                  |
| --                                | --                                                  |
Figure 3.1 A Typical Branch/Section/Sample Unit Application
suburban area; the highway network generally consists of two-lane asphalt concrete surfaced roadways which are functionally classified as circulator, access, or service roads (Table 3.4). On-street parking and sidewalks are present on some streets in the network. The URI campus network is divided into two zones as shown in Figure 3.2. The zone boundaries were established by using Route 138, which divides the main campus from other URI facilities.

The pavement condition surveys were performed with the developed guidelines in the summer of 1988 and spring of 1989 by two different survey crews, with supervision of a research assistant. In 1988, the survey was done by TSK personnel as part of a training exercise in data collection and pavement evaluation procedures. In 1989, the survey was performed by civil engineering students in the highway engineering and pavement management classes, as a training exercise in pavement management data collection. The use of different survey parties provides a test of Micro PAVER PMS for repeatability.

Branch inspections and data collection were performed either from west to east, or south to north. Branch numbers were sequentially assigned to an alphabetized list of the branches. Pavement sections were based on the structural composition or surface type. A twenty percent sampling level was used and the inspected sample units were representative of the entire section. Crews of two or three people recorded the quantity and severity of nineteen types of visual distress.

The results of the network level inspections using the developed guideline showed a fair pavement condition, with an average PCI of 52. However, more than half of the total network area (51.3 percent) has a PCI of 55 or better.

The repeatability of the PCI procedure was analyzed by comparing the condition data for the five branches which had been surveyed in both years. Both sample and section PCI's were used in this process. The analysis revealed the importance of inspecting the same sample units each time the branch is surveyed; more accurate
| BRANCH NUMBER | BRANCH NAME             | BRANCH USE | FUNCTIONAL CLASSIFICATION | BRANCH AREA (SF) | NUMBER OF SECTIONS |
|---------------|-------------------------|------------|---------------------------|------------------|--------------------|
| 10010         | Alumni Ave. East        | Roadway    | Circulator                | 23,505           | 3                  |
| 10020         | Alumni Ave. West        | Roadway    | Circulator                | 50,996           | 2                  |
| 10030         | Baird Hill Road         | Roadway    | Circulator                | 23,100           | 1                  |
| 10040         | Butterfield Road        | Roadway    | Circulator                | 46,696           | 2                  |
| 10050         | Chafee Road             | Roadway    | Access                    | 19,551           | 1                  |
| 10060         | Davis Road              | Roadway    | Service                   | 13,522           | 2                  |
| 10070         | Faculty Apt. Cir.       | Roadway    | Access                    | 29,200           | 1                  |
| 10080         | Farmhouse Road          | Roadway    | Access                    | 11,550           | 1                  |
| 10090         | Flagg Road              | Roadway    | Circulator                | 186,680          | 2                  |
| 10100         | Fraternity Circle       | Roadway    | Access                    | 53,525           | 5                  |
| 10110         | Grad. VIII. East        | Roadway    | Access                    | 19,250           | 1                  |
| 10120         | Grad. VII West          | Roadway    | Access                    | 19,251           | 1                  |
| 10130         | Greenhouse Road         | Roadway    | Access                    | 21,855           | 3                  |
| 10140         | Heatham Road            | Roadway    | Access                    | 23,790           | 1                  |
| 10150         | Keaney Road             | Roadway    | Access                    | 21,781           | 1                  |
| 10160         | Lippitt Road            | Roadway    | Service                   | 5,900            | 2                  |
| 10170         | Lower College Rd.       | Roadway    | Circulator                | 45,382           | 3                  |
| 10180         | Peckham Farm Road       | Roadway    | Access                    | 12,240           | 1                  |
| 10190         | Powerhouse Road         | Roadway    | Service                   | 9,600            | 1                  |
| 10200         | Quarry Road             | Roadway    | Access                    | 7,410            | 1                  |
| 10210         | Ranger Road             | Roadway    | Service                   | 26,104           | 2                  |
| 10220         | Upper College Rd.       | Roadway    | Circulator                | 85,518           | 2                  |
|               | **Totals**             |            |                           | **774,152**      | **39**             |
Figure 3.2 University of Rhode Island Network
section deterioration rates may be determined and discrepancies between samples may be avoided.

The sample PCI correlation between the two different survey crews was reasonable. The PCI deviation ranged from an increase of 14 to a decrease of 24, but the average PCI of a sample decreased by 2.5 points between the two surveys. Table 3.5 summarizes the PCI data for all compatible samples. The section PCI correlation between the two different survey crews was also reasonable. The PCI deviation ranged from an increase of 7 to a decrease of 10, but the average PCI of a section decreased by 1.5 points between the two surveys. Table 3.6 summarizes the section PCI comparison. This analysis shows that the PCI methodology of Micro PAVER is both repeatable. The procedure itself protects against unreasonable observed samples, and additional samples may have to be inspected.

An overall PCI frequency report was generated to determine future network conditions and to help establishing future network maintenance and repair (M & R) needs. The impact of performing no major repairs shows the average network PCI will deteriorate from 52 to 41 over a six-year period (Figure 3.3). Similarly, Table 3.7 shows the estimated frequency of occurrence for the same set of pavement sections for the analysis years assuming no major repairs (such as overlay) have occurred between the last inspection date and the prediction date.

One of the most important attributes of the implementation system was a preliminary list of M & R techniques and costs for both project and network level management. The most feasible M & R alternatives were developed (Table 3.8) based on the results of the evaluation of the pavement condition, current university maintenance practices and performance standards. The ranking of feasible M & R alternatives for any pavement section is based on the impact of the alternative on future pavement performance and the associated costs. The list will be used as a guide until another list is developed.
| BRANCH NAME       | SECTION/SAMPLE NUMBER | PCI RATING |       |       | DEVIATION |
|-------------------|-----------------------|------------|-------|-------|-----------|
| Baird Hill Road   | 001/002               | 43         | 46    | 3     |
|                   | 001/006               | 35         | 21    | -14   |
| Butterfield Road  | 001/001               | 5          | 10    | 5     |
|                   | 002/002               | 6          | 8     | 2     |
| Flagg Road        | 001/002               | 67         | 77    | 10    |
|                   | 001/007               | 90         | 82    | -8    |
|                   | 001/012               | 88         | 93    | 8     |
|                   | 001/017               | 100        | 98    | -2    |
|                   | 001/022               | 91         | 96    | 5     |
|                   | 001/002               | 63         | 77    | 14    |
|                   | 002/006               | 32         | 37    | 5     |
|                   | 002/012               | 79         | 77    | -2    |
|                   | 002/015               | 45         | 48    | 3     |
| Greenhouse Road   | 001/002               | 52         | 54    | 2     |
|                   | 002/001               | 63         | 87    | 24    |
| Keaney Road       | 001/002               | 65         | 70    | 5     |
|                   | 002/008               | 68         | 74    | 6     |
| Lower College Road| 001/001               | 74         | 67    | -7    |
|                   | 002/003               | 74         | 78    | 4     |
|                   | 002/006               | 68         | 59    | -9    |
| Upper College Road| 001/002               | 11         | 31    | 20    |
|                   | 001/008               | 20         | 19    | -1    |
|                   | 002/002               | 72         | 65    | -7    |
|                   | 002/007               | 42         | 37    | -5    |

**AVERAGE PCI DEVIATION = 2.5**
Table 3.6 Section PCI Comparison

| BRANCH NAME        | SECTION NUMBER | SUMMER 1988 | SPRING 1989 | DEVIATION |
|--------------------|----------------|-------------|-------------|-----------|
| Baird Hill Road    | 001            | 33          | 39          | -6        |
|                    | 001            | 14          | 5           | 9         |
|                    | 002            | 59          | 54          | 5         |
|                    | 001            | 90          | 87          | 3         |
|                    | 002            | 59          | 54          | 5         |
| Flagg Road         | 001            | 55          | 52          | 3         |
|                    | 001            | 72          | 66          | 6         |
| Greenhouse Road    | 001            | 67          | 74          | -7        |
|                    | 002            | 64          | 66          | -2        |
| Keaney Road        | 001            | 51          | 57          | -6        |
|                    | 002            | 25          | 15          | 10        |
Figure 3.3 Predicted Network PCI
Table 3.7 Annual Network Deterioration Projections

| PCI RANGE | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 |
|-----------|------|------|------|------|------|------|------|
| 0 - 10    | 1    | 2    | 4    | 4    | 7    | 7    | 8    |
| 11 - 25   | 7    | 6    | 4    | 5    | 2    | 2    | 2    |
| 26 - 40   | 4    | 8    | 8    | 8    | 10   | 10   | 10   |
| 41 - 55   | 9    | 7    | 7    | 7    | 5    | 5    | 6    |
| 56 - 70   | 10   | 8    | 8    | 9    | 10   | 10   | 9    |
| 71 - 85   | 5    | 5    | 6    | 4    | 3    | 4    | 4    |
| 86 - 100  | 4    | 4    | 3    | 3    | 3    | 2    | 2    |

| PCI RANGE | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 |
|-----------|------|------|------|------|------|------|------|
| 0 - 10    | 2.5  | 6.2  | 12.4 | 12.4 | 18.2 | 18.2 | 19.1 |
| 11 - 25   | 16.6 | 13.0 | 6.7  | 9.3  | 3.6  | 3.6  | 2.6  |
| 26 - 40   | 12.1 | 14.9 | 14.9 | 14.9 | 23.2 | 23.2 | 23.2 |
| 41 - 55   | 17.5 | 21.8 | 21.8 | 20.8 | 12.5 | 12.5 | 13.6 |
| 56 - 70   | 23.6 | 16.5 | 16.5 | 20.5 | 21.5 | 21.5 | 20.5 |
| 71 - 85   | 8.4  | 18.4 | 26.1 | 20.5 | 19.6 | 19.9 | 19.9 |
| 86 - 100  | 19.2 | 19.2 | 1.5  | 1.5  | 1.5  | 1.2  | 1.2  |
Table 3.8 M & R Strategies and Unit Costs for Network-Level PMS (Asphalt Concrete)

| PCI Range | M & R Strategy                               | Cost, $/SY | Cost, $/SF |
|-----------|----------------------------------------------|------------|-----------|
| 0 - 20    | Reconstruction or Recycling                  | 12.00      | 1.33      |
| 21 - 40   | Overlay (thick. may vary with PCI)           | 10.00      | 1.11      |
| 41 - 60   | Stone Sealing (Surface Treatment)            | 8.00       | 0.89      |
| 61 - 80   | Minor Repair                                 | 7.00       | 0.78      |
| 81 - 100  | Routine Maintenance                          | 3.00       | 0.33      |

*Note: Adjusted 1988 Costs (11)*
The criteria for establishing priorities for pavement sections requiring routine maintenance are different from those used for sections needing essential repair or rehabilitation. Major maintenance or reconstruction of the pavement surface will bring the road surface back to its original "as-constructed" condition. The length of time between major maintenance operations will depend on the type of road surface. Major maintenance includes the correction of the pavement surface with an asphalt overlay or surface treatments. Routine maintenance includes the correction of pavement distress as it occurs rather than at specified periods of time after construction. This type of maintenance includes patching with both temporary and permanent seals such as fog seals, sand seals, or slurry seals. M & R priorities for sections requiring routine maintenance are a function of the individual distress type and the severity of the distress. The distresses which have a large effect on the operational condition of the pavement are given highest priority.

The primary input for routine network level M & R analysis is the type, severity and amount of distress. Table 3.9 summarizes M & R alternatives for asphalt concrete pavement distress types (15). Priorities for sections requiring major M & R should be based on the PCI and the functional classification. In addition to predicting pavement performance for various M & R alternatives, valuable input to life cycle costs, budgeting, and planning is also provided. Typical total network M & R costs expected for the strategies used on the URI campus are summarized as follows:

- reconstruction or recycling: $163,684
- asphalt overlay: $76,893
- surface treatment: $215,551
- minor repair: $129,341
- routine maintenance: $51,585

These costs were determined based on the present PCI, and are expressed in 1988 dollars.

The other important feature is the deterioration curve developed as a pavement condition model for the network (Figure 3.4). This model includes a best fit curve.
Table 3.9 Asphalt Concrete Pavement Distress Types and Routine M & R Alternatives

| Distress Type       | M&R Method | Do Nothing | Crack Seal | Partial Depth Patch | Full Depth Patch | Skin Patch | Pothole Filling | Apply Heat & Roll Sand | Apply Surface Seal Emulsion | Apply Rejuvenation | Apply Aggregate Seal Coat | NOTES |
|---------------------|------------|------------|------------|---------------------|------------------|------------|----------------|------------------------|---------------------------|------------------------|-------------------------|-------|
| 1 Alligator         | L          | M,H        | M,H        |                     |                  |            |                |                        |                           |                        |                         |       |
| 2 Bleeding          | L          |            |            |                     |                  |            |                |                        |                           |                        |                         |       |
| 3 Block Cracking    | L          |            |            |                     |                  |            |                |                        |                           |                        |                         |       |
| 4 Bumps & Sags      | L          | M,H        | M,H        | M,H                 |                  |            |                |                        |                           |                        |                         |       |
| 5 Corrugation        | L          | M,H        | M,H        |                     |                  |            |                |                        |                           |                        |                         |       |
| 6 Depression        | L          | M,H        | M,H        | M,H                 |                  |            |                |                        |                           |                        |                         |       |
| 7 Edge Cracking     | L          | L,M        | M,H*       | M,H*                |                  |            |                |                        |                           |                        |                         |       |
| 8 Joint Reflective Cracking | L | L,M,H     | H          |                     |                  |            |                |                        |                           |                        |                         |       |
| 9 Lane: Shoulder Drop-off | L |            |            |                     |                  |            |                |                        |                           |                        |                         |       |
| 10 Longitudinal Transverse Cracking | L | L,M,H     | H          |                     |                  |            |                |                        |                           |                        |                         |       |
| 11 Patching & Utility Cut | L | M       | H*         | H*                  |                  |            |                |                        |                           |                        |                         |       |
| 12 Polished Aggregate | A |            |            |                     |                  |            |                |                        |                           |                        |                         |       |
| 13 Potholes         | L          | L,M        | L,M,H      |                     |                  |            |                |                        |                           |                        |                         |       |
| 14 Railroad Crossing | L          |            | L,M,H      |                     |                  |            |                |                        |                           |                        |                         |       |
| 15 Rutting          | L          | L,M,H      | M,H        |                     |                  |            |                |                        |                           |                        |                         |       |
| 16 Shoving          | L          | M,H        |            |                     |                  |            |                |                        |                           |                        |                         |       |
| 17 Slippage Cracking | L          | L          | M,H        |                     |                  |            |                |                        |                           |                        |                         |       |
| 18 Sell             | L          | M,H        |            |                     |                  |            |                |                        |                           |                        |                         |       |
| 19 Weathering & Raveling | L |            | H          |                     |                  |            |                |                        |                           |                        |                         |       |

Note: L = Low Severity; M = medium severity; H = high severity.
Figure 3.4 A Typical Deterioration Curve for Roads with Known Construction Dates in URI Kingston Campus
through the family of data points representing all sections less than twenty years of age. The prediction of section condition assumes that the behavior of the section is similar to the behavior of its family. The curve has been constrained to eliminate positive slope, because the PCI cannot increase with age.

A budget planning analysis was performed using the developed M & R strategies and unit costs to estimate the annual rehabilitation required to maintain pavements above a given condition level for a six-year period. Using the pavement condition repair schedule shown in Table 3.10 and assuming a five-percent annual inflation rate produces the budget plot shown in Figure 3.5. At the end of a six-year period, 24 of the 40 pavement sections within the network would have been repaired at a total cost of $538,200. Based on the parameters established in Table 3.10, the overall condition within the network would be improved gradually by 1994, having an average section PCI of 55.

The inspection schedule report is used to maintain current condition data with efficient inspection effort by producing a six-year schedule of pavement sections to be surveyed. The schedule is based on the minimum PCI that a given pavement type is allowed to reach and the rate of deterioration (loss of PCI points per year). Using a minimum PCI value of 41 (the lower limit for fair pavement condition) and the deterioration schedule shown in Table 3.11, the plot and section list of inspection schedule report have been produced (10). These are shown in Figures 3.6 and Table 3.12 respectively.

Life cycle cost analysis of pavement maintenance alternatives is a proven and acceptable procedure in the process of selecting the preferred alternative. A typical economic analysis report outlining several feasible repair alternatives was applied to a branch on the URI network, this is shown in Table 3.13.
Figure 3.5 Budget Planning Analysis
Table 3.10 Minimum PCI Repair Schedule

| BRANCH USE | PAVEMENT RANK | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|------------|---------------|------|------|------|------|------|------|
| Roadway    | A             | 15   | 25   | 35   | 40   | 45   | 55   |
| Roadway    | B             | 15   | 25   | 35   | 40   | 45   | 55   |
| Roadway    | C             | 15   | 25   | 35   | 40   | 45   | 55   |

Note: A is defined as access roads
      B is defined as service roads; and
      C is defined as circulator roads
Table 3.11 Rate of Deterioration for Inspection Scheduling

| RATE OF DETERIORATION (PCI POINTS PER YEAR) | REINSPECTION INTERVAL (YEARS) |
|--------------------------------------------|-----------------------------|
| > 9                                        | 1                           |
| 6 to 9                                     | 2                           |
| 2 to 9                                     | 3                           |
| < 2                                        | 4                           |
Figure 3.6  Plot of Inspection Schedule Report

Agency Name: University of Rhode Island
Report Date: JUN/29/1989

Branch Use : All
Pavement Rank : All
Surface Type : All
Zone : All
Section Category : All
Last Construction Date: All
PCI : All

Plot of Inspection Schedule Report

| Number of Year to Inspect | Sections to Inspect |
|---------------------------|---------------------|
| 16 1990                   | ****************************** |
|                           |                     |
| 4 1992                    | ********************** |
|                           |                     |
| 20 1993                   | ****************************** |
|                           |                     |
| 0 1994                    |                     |
|                           |                     |
| 0 1995                    |                     |
|                           |                     |

---

Number of Sections

Total Number of Sections to Inspect : 40
Total Number of Sections Not Needing Inspection: 0
Total Number of Missing Values : 0
### Table 3.12 Section List for Inspection Schedule Report

**Inspection Schedule Report**

**Agency Name:** University of Rhode Island  
**Report Date:** JUN/29/1989

#### Section List of Inspection Schedule Report

| Year to Inspect | Num / Section Name  | Use / Rank / Surf / Area(SF) |
|-----------------|---------------------|------------------------------|
| 1990            | 10010 /ALUMNI AVENUE EAST / ROADWAY | 001 / C / AC / 3675 |
| 1990            | 10020 /ALUMNI AVENUE WEST / ROADWAY | 001 / C / AC / 43670 |
| 1990            | 10030 /BAIRD HILL ROAD / ROADWAY | 001 / C / AC / 23110 |
| 1990            | 10040 /BUTTERFIELD ROAD / ROADWAY | 001 / C / AC / 18976 |
| 1990            | 10040 /BUTTERFIELD ROAD / ROADWAY | 002 / C / AC / 27720 |
| 1990            | 10050 /CHAFFEE ROAD / ROADWAY | 001 / A / AC / 19551 |
| 1990            | 10070 /FACULTY APARTMENT CIRCLE / ROADWAY | 001 / A / AC / 29200 |
| 1990            | 10080 /FARMHOUSE ROAD / ROADWAY | 001 / A / AC / 11550 |
| 1990            | 10100 /FRATERNITY CIRCLE / ROADWAY | 001 / A / AC / 14775 |
| 1990            | 10100 /FRATERNITY CIRCLE / ROADWAY | 003 / A / AC / 6424 |
| 1990            | 10100 /FRATERNITY CIRCLE / ROADWAY | 004 / A / AC / 5790 |
| 1990            | 10160 /LIPPIITT ROAD / ROADWAY | 002 / B / AAC / 2800 |
| 1990            | 10170 /LOWER COLLEGE ROAD / ROADWAY | 003 / C / AC / 5832 |
| 1990            | 10200 /QUARRY ROAD / ROADWAY | 001 / A / AC / 7410 |
| 1990            | 10210 /RANGER ROAD / ROADWAY | 001 / B / AAC / 4862 |
| 1990            | 10220 /UPPER COLLEGE ROAD / ROADWAY | 001 / C / AC / 32400 |
| 1992            | 10010 /ALUMNI AVENUE EAST / ROADWAY | 002 / C / AAC / 2592 |
| 1992            | 10090 /FLAGG ROAD / ROADWAY | 002 / C / AC / 52800 |
| 1992            | 10110 /GRADUATE VILLAGE EAST / ROADWAY | 001 / A / AC / 19250 |
| 1992            | 10120 /GRADUATE VILLAGE WEST / ROADWAY | 001 / A / AC / 19521 |
| 1993            | 10010 /ALUMNI AVENUE EAST / ROADWAY | 003 / C / AC / 17228 |
| 1993            | 10020 /ALUMNI AVENUE WEST / ROADWAY | 002 / C / AC / 7326 |
| 1993            | 10060 /DAVIS ROAD / ROADWAY | 001 / B / AAC / 2542 |
| 1993            | 10060 /DAVIS ROAD / ROADWAY | 002 / B / AAC / 10980 |
| 1993            | 10090 /FLAGG ROAD / ROADWAY | 001 / C / AC / 132880 |
| 1993            | 10100 /FRATERNITY CIRCLE / ROADWAY | 002 / A / AC / 15136 |
| 1993            | 10100 /FRATERNITY CIRCLE / ROADWAY | 005 / A / AC / 11400 |
| 1993            | 1010 /GREENHOUSE ROAD / ROADWAY | 002 / A / AC / 7750 |
| 1993            | 10110 /GREENHOUSE ROAD / ROADWAY | 002 / A / AC / 7781 |
| 1993            | 10130 /GREENHOUSE ROAD / ROADWAY | 003 / A / AC / 6324 |
| 1993            | 10140 /HEATHMAN ROAD / ROADWAY | 001 / A / AC / 23790 |
| 1993            | 10150 /KEANEY ROAD / ROADWAY | 001 / A / AC / 21781 |
| 1993            | 10160 /LIPPIITT ROAD / ROADWAY | 001 / B / AAC / 3100 |
| 1993            | 10170 /LOWER COLLEGE ROAD / ROADWAY | 001 / C / AC / 7300 |
| 1993            | 10170 /LOWER COLLEGE ROAD / ROADWAY | 002 / C / AC / 32250 |
| 1993            | 10180 /PECKHAM FARM ROAD / ROADWAY | 001 / A / AC / 12240 |
| 1993            | 10190 /POWERHOUSE ROAD / ROADWAY | 001 / B / AAC / 9600 |
| 1993            | 10210 /RANGER ROAD / ROADWAY | 002 / B / AAC / 21242 |
| 1993            | 10220 /UPPER COLLEGE ROAD / ROADWAY | 002 / C / AC / 34398 |
| 1993            | 10220 /UPPER COLLEGE ROAD / ROADWAY | 003 / C / AC / 18720 |

**Total Number of Sections to Inspect:** 40  
**Total Number of Sections Not Needing Inspection:** 0  
**Total Number of Missing Values:** 0
### Table 3.13 Typical Economic Analysis Report

**DATE:** AUG/14/1989  
**PROJECTED COST ANALYSIS**  

**SECTION ID:** BUTTERFIELD  
**ALTERNATIVE:** RECONSTRUCTION  
**SECTION AREA (S.Y.):** 5196.0  
**LIFE OF ALTERNATIVE:** 20  
**INTEREST RATE:** 10.0  
**INFLATION RATE:** 5.0  

| M&R ACTIVITY      | YEAR | COST ($) | PRESENT VALUE ($) |
|-------------------|------|----------|------------------|
| RECONSTRUCTION    | 1989 | 62280.00 | 62280.00         |
| PAINT LANE MARKERS| 1989 | 600.00   | 600.00           |
| **ANNUAL TOTAL:** |      | 62880.00 | 62880.00         |
| ROUTINE MAINTENANCE| 1991 | 1560.00  | 1421.40          |
| PAINT LANE MARKERS| 1992 | 600.00   | 521.84           |
| ROUTINE MAINTENANCE| 1993 | 1560.00  | 1295.12          |
| PAINT LANE MARKERS| 1995 | 600.00   | 453.87           |
| ROUTINE MAINTENANCE| 1995 | 1560.00  | 1180.06          |
| **ANNUAL TOTAL:** |      | 2160.00  | 1633.93          |
| ROUTINE MAINTENANCE| 1997 | 1560.00  | 1075.22          |
| PAINT LANE MARKERS| 1998 | 600.00   | 394.75           |
| ROUTINE MAINTENANCE| 1999 | 1560.00  | 979.69           |
| PAINT LANE MARKERS| 2001 | 600.00   | 343.33           |
| ROUTINE MAINTENANCE| 2001 | 1560.00  | 892.65           |
| **ANNUAL TOTAL:** |      | 2160.00  | 1235.98          |
| ROUTINE MAINTENANCE| 2003 | 1560.00  | 813.35           |
| PAINT LANE MARKERS| 2004 | 600.00   | 298.61           |
| ROUTINE MAINTENANCE| 2005 | 1560.00  | 741.99           |
| PAINT LANE MARKERS| 2007 | 600.00   | 259.71           |
| ROUTINE MAINTENANCE| 2007 | 1560.00  | 675.25           |
| **ANNUAL TOTAL:** |      | 2160.00  | 934.96           |

**INITIAL COST ($) :=** 62880.00  
**PRESENT VALUE ($) :=** 74225.96  
**EQUIVALENT UNIFORM ANNUAL COST ($) :=** 8718.55  
**EUAC PER SQ. YD. ($) :=** 1.68
CHAPTER 4. IMPLEMENTATION OF THE PROTOTYPE PMS IN A TYPICAL TOWN

The larger road network of the Town of South Kingstown (TSK) was instituted to test the suitability of the developed prototype PMS in a typical community, and also to develop additional municipal implementation.

The TSK, encompasses 62.3 square miles in mostly rural Washington County, in Rhode Island. In addition to its primary attribute as a rural residential town, TSK serves as the commercial hub for much of the southern Rhode Island region.

Approximately 400 miles of roadway are located within TSK's borders. The Town is responsible for maintaining 125 of these miles of roadway. The municipal average for the state is 130 miles. This fact, combined with the proximity of the TSK to the University of Rhode Island, and the presence of both urban and rural areas within the township, made it the ideal municipality for pilot implementation of the developed Micro PAVER PMS.

The TSK is governed by a Town Manager and a five member Town Council. The Director of Public Works reports to these elected officials. The South Kingstown Department of Public Works (DPW) is divided into three divisions: Engineering, Highway, and Maintenance. The Engineering Division is responsible for the implementation of the pavement management system. The Engineering Division is headed by a professional engineer, and has one non-registered engineer, two engineering technicians, one construction inspector and one clerical person. The Division also employs interns, typically engineering students during the summer months. The PMS is currently administered by one full-time engineering technician, with assistance from the intern, under the supervision of the engineers. The engineering technician does have other duties and responsibilities not directly related to the pavement management system.

The TSK began implementation of the prototype Micro PAVER PMS in June, 1988. During the first month of implementation, the standardized URI Kingston campus road network was used to train the Town's engineering technician and a Public Works Intern in the data collection and computer entry procedures of Micro PAVER. In July, 1988, an
appropriate pavement management network structure was developed for the Town based on the developed guidelines. The network structure comprised of a zone layout and, branch and section numbering strategy.

4.1 Network Development and Data Collection

The network development and data collection effort was aided by the "Street Inventory," and an in-house computer file of construction and major maintenance activities. The "Street Inventory", a document maintained by the Engineering Division, identifies the limits (location), right-of-way length and width, road ownership/maintenance status (town, private or state), and other pertinent information for all 575 named roads within the Town's borders (16). Table 4.1 shows part of the inventory file. The construction and major maintenance file is arranged in a similar format and includes data fields for the road width and length, the classification type (Principal Arterial, Minor Arterial, Collector, Local, or Private), the construction or major maintenance activity, and the last service date. However, the construction and maintenance records are not as complete as the "Street Inventory."

The pavement management network was divided in eight zones (Figure 4.1), using permanent or physical obstructions (such as natural/semi-natural barriers, or state/major local roads). Branch numbers were assigned to the roads using five numeric characters (numbers), the first character being the zone number, and the second, third, and fourth characters are consecutive, sequential numbers assigned to an alphabetized list of the branches (roads). The fifth character accommodates for future branches. Appendix B shows the branch list report for the Town. Pavement sections were based on structural composition or surface type, with section lengths of 500 feet and a forty percent sampling rate. The inspection and data collection was performed in directions west to east, and south to north.
Table 4.1 Partial Listing of the Street Inventory File

| STREET NAME & AREA | LOCATION | MAP | ROW | WIDTH FT | LENGTH FT | ROAD STAT | DATE ACCEPTED | REFERENCES | ST. NO. & RANGE |
|--------------------|----------|-----|-----|----------|-----------|-----------|---------------|-------------|--------------|
| Eagle Nest Terrace (Peace Dale) | From Dendron Road north to dead end | P-8 | 50 | 364.8 | T | 4/10/78 | P816/1370-71, L6115/523, TC38/77 | 1-34 |
| East Farm Road (Kingston) | From Kingstown Road east to dead end | D-7 | 970 | S | 4/14/69 | PB9/659, TC32/194 | 1-97 |
| Eastern View Avenue (Green Hill) | From Border Avenue north to Hilltop Avenue | M-2 | 40 | 660 | T | 3/10/41 | PB10/708, L649/530, TC22 | 1-76 |
| Easy Street (Wakefield) | From Hunt Avenue north then west to Gregory Street | F-7 | 40 | 530 | P | 3/10/49 | PB13/939 | 1-52 |
| Edgewater Road (Wakefield) | From Hillcrest Road north to Silver Lake Avenue | G-7 | 40 | 1040 | T | 3/10/49 | PB10/708, L649/530, TC22 | 1-106 |
| Edgewood Farm Road (Wakefield) | From Poor road at the top of Sugar Loaf Hill south to private R.O.W. past Stoneway Road | G-7 | 1930 | P | 3/10/41, 12/15/75 | L635/498 | 1-130 |
| Edwards Avenue (Middlebridge) | From Middlebridge Road east to dead end. (North of Torry Road) | D-10 | 30 | 631 | T | 12/27/67 | LE43/380, LE120/233 | 1-50 |
| Eisenhower Place (Wakefield) | From MacArthur Boulevard to Pershing Avenue | G-8 | 50 | 813 | T | 12/15/75 | PB9/591, PB10/715-16, PB13/1015, TC31/440 | 1-78 |
| Elderberry Lane (Peace Dale) | From Gentian Drive east to dead end | F-6 | 50 | 255 | T | 1/8/79 | P816/1430-40, TC39/34 | 1-20 |
| Eldred Court (Wakefield) | From Kenyon Avenue west to Sunset Avenue | G-7 | 32 | 583.19 | T | 12/8/52 | P812/9018, L650/130, TC26/22 | 1-57 |

Source: Street Inventory, Town of South Kingstown

Notes:
Road Status: T = Town Roads, P = Private Roads, S = State Roads
Reference Code Description: PB = Plan Book, TC = Town Council Book, LE = Land Evidence Book, SH = State Highway Book, LE = Land Evidence Book, SH State Highway Book, OB = Old Book of Highways
Figure 4.1. Pavement Management Zone Structure for the Town of South Kingstown
The pavement condition surveys were performed during a one year period as shown in Figure 4.2. Approximately ten hours per week were expended in the field for the collection of condition data.

4.2 Summary of Existing Conditions

The Micro Paver Pavement Condition Index (PCI) Report was used to analyze the existing conditions of the towns roadways (Appendix C). The majority of the town-maintained paved roads in TSK are in good condition with an average PCI rating of 61. As shown in Figure 4.3, sixty-two percent (sixty-five percent of the area) of the paved roadway sections are in good condition or better. The average pavement condition for the eight zones in the Town (Table 4.2), shows the zone pavement condition ratings to be good, with PCI ratings varying between 56 and 69. As shown in Table 4.3 the pavement condition data was compared by section category, pavement rank and surface type. The comparison of the data for pavement rank shows, the PCI to be 68 for secondary roadways, 66 for primary roadways and 58 for tertiary roadways, which makes up approximately seventy-one percent of the total sections (forty-three percent of the total network area). The comparison between different surface types shows an average PCI of 68 for asphalt concrete pavements, 55 for asphalt concrete overlay and 57 for stone seal pavements.

4.3 Maintenance and Repair Policy

The annual maintenance and repair (M & R) requirements consists of activities for preventive and safety maintenance and repair. Preventive maintenance and repair consists of localized or global maintenance activities that slow deterioration rate to preserve the pavement investment. Localized preventive maintenance includes crack sealing and various patching techniques. Global preventive maintenance includes various methods of surface sealing for asphalt concrete pavements. Safety M & R involves pothole patching and lane shoulder drop-off leveling (10).
Figure 4.2. Network Inspection Schedule for the Town of South Kingstown
Figure 4.3. Average Pavement Condition for the Town of South Kingstown
Table 4.2  Pavement Condition of South Kingstown Roadways by Zone

| Zone | Name                       | Number of Sections | Percent of Sections | Area x 1000 sq. ft. | Percent Area | 'PCI |
|------|----------------------------|--------------------|---------------------|----------------------|--------------|-----|
| 1    | West Kingston              | 31                 | 7.5                 | 1,255                | 8.9          | 69  |
| 2    | University of Rhode Island | 27                 | 6.6                 | 843                  | 6.0          | 59  |
| 3    | Middlebridge               | 18                 | 4.4                 | 639                  | 4.5          | 69  |
| 4    | Matunuck                   | 51                 | 12.4                | 2,221                | 15.8         | 60  |
| 5    | Green Hill                 | 41                 | 10.0                | 1,408                | 10.0         | 56  |
| 6    | Worden's Pond              | 11                 | 2.7                 | 883                  | 6.2          | 64  |
| 7    | Peacedale                  | 63                 | 15.3                | 2,394                | 17.0         | 59  |
| 8    | Wakefield                  | 169                | 41.1                | 4,456                | 31.6         | 60  |

'PCI Report, September 1989
Table 4.3 Pavement Condition by Section Category, Pavement Rank and Surface Type

| Section Category | Number of Sections | Percent of Sections | Area x 1000 sq. ft. | Percent Area | 'PCI |
|------------------|--------------------|---------------------|----------------------|--------------|-----|
| Urban            | 261                | 63.5                | 7,528                | 53.4         | 59  |
| Rural            | 150                | 36.5                | 6,572                | 46.6         | 63  |
| Pavement Rank*  |                    |                     |                      |              |     |
| Primary          | 56                 | 13.6                | 4,622                | 32.8         | 66  |
| Secondary        | 65                 | 15.8                | 3,386                | 24.0         | 68  |
| Tertiary         | 290                | 70.6                | 6,091                | 43.2         | 58  |
| Surface Type     |                    |                     |                      |              |     |
| Asphalt Concrete | 134                | 32.6                | 3,452                | 24.5         | 68  |
| Asphalt Concrete | 41                 | 10.0                | 745                  | 5.3          | 55  |
| Overlay          |                    |                     |                      |              |     |
| Stone Seal       | 234                | 56.9                | 9,899                | 70.2         | 57  |
| Other (bridge    | 2                  | 0.5                 | 4                    | N/A          |     |
| deck surfaces)   |                    |                     |                      |              |     |

'September 1989
N/A = Not Applicable (Wooden Bridge Deck)
Pavement Rank:
Primary includes Principal Arterials and Minor Arterials
Secondary includes Collectors
Tertiary includes Local or Private Roads
The TSK's current maintenance and repair policy (Table 4.4), uses patching for localized preventive maintenance and safety M & R (17). The global preventive maintenance is performed using stone seal (surface treatment), asphalt concrete overlays or reconstruction. The global preventive maintenance is developed as part of the road improvement program which is prepared annually as part of the six year work program. The Road Improvement Program is a six year outline of the estimated costs and scheduling of the proposed projects (18). The projects are classified according to four categories:

1) Asphalt Paving Element: This element identifies Town-owned and maintained highways that cannot be maintained by the conventional stone seal program. It includes major arteries, town or urban type roads, and other roads that do not meet the physical requirements for stone seal;

2) Reconstruction Element: This program provides road reconstruction by a private contractor. These roads can no longer be maintained by stone sealing or asphalt paving program. The problems are structural deterioration of the road surface caused by a combination of poor road base, weight or heavy traffic volumes;

3) Road Upgrading Element: This program provides upgrading of the Towns road system with gravel surface. Once a year, these roads are leveled and graded. The budget provides an annual amount for road building materials and equipment to implement this program;

4) Road Hazard Correction: This program is used to improve roadway hazards such as sight distances, alleviating vertical and horizontal curves, and other similar localized repairs.

Individual road improvement projects are specifically identified for the most important jobs, otherwise the general area is listed. Based on the experience of the town engineer, judgements as to which maintenance and repair policy (treatments) is based on a combination of the following elements:

- The reasons for deterioration of a particular pavement section, such reasons could be poor drainage, bad aggregates, poor construction, or inadequate design of existing structure.
- Past success or failures observed over time.
Table 4.4 Maintenance and Repair Policy for the Town of South Kingstown (17)

| Maintenance and Repair Policy                          | Cost Per Sq. ft ($)\(^*\) |
|--------------------------------------------------------|---------------------------|
| **Localized Preventive Maintenance and Safety M & R**   |                           |
| Patching                                               | .62                       |
| **Global Preventive Maintenance**                      |                           |
| Stone Sealing                                          | .13                       |
| 1½ inch Asphalt Concrete Overlay                       | .30                       |
| 3 inch Asphalt Concrete Overlay                        | .59                       |
| Reconstruction                                         | 1.65                      |

\(^*\)1989 Base Year Costs
Historical records or observations whereby certain treatments have consistently outperformed others or conversely exhibited certain problems after maintenance rehabilitation, or reconstruction.

The priorities for routine maintenance activities are assigned by the Maintenance Division primarily on a complaint/response basis. The TSK does not currently use the prototype Micro PAVER PMS for selection of roads for maintenance and repair. However, the PCI report was used to justify projects for the 1990-91 Road Improvement Program.

4.4 Development of Deterioration Prediction Curves

In order to analyze life cycle for construction practices used by the Town, family prediction analysis was performed using in Micro PAVER. The pavement sections having common characteristics such as pavement type were grouped into families. This was done to develop deterioration prediction curves for stone seal pavements and asphalt concrete pavements. These equations are used to predict the pavement life. Pavement life is the actual number of years in service, starting from the year of construction or rehabilitation, for a pavement section to accumulate the predetermined threshold value of distress points. For a newly constructed pavement section, the life is assumed to be equal to the design life. The actual pavement life could be shorter (the threshold value of distress is reached in a shorter time period than the expected design life) or longer (the threshold value of distress is reached in a longer period than the expected design life) than the design life. The prediction model in Micro PAVER is based on polynomial regression. The fourth degree constrained equations are:

Stone Seal Pavements

\[
\text{PCI} = 100 - 4.441x - 1.533x^2 + .212x^3 - .0073x^4
\]

Asphalt Concrete Pavements

\[
\text{PCI} = 100 - 8.833x + .580x^2 - .0154x^3 + .000123x^4
\]

\[x = \text{number of years}\]
Based on the prediction curves developed, the average pavement life was determined from the points of deterioration changes on the curve. The constrained prediction curve for stone seal pavements (Figure 4.4) shows the average life to be between six and eleven years while that for asphalt concrete pavements (Figure 4.5) is between thirteen and twenty-three years. These deterioration rates are based on the visual inspection of pavement distresses and pavement types. Due to environmental conditions and structural base, these deterioration rates may vary for unique pavement types. These deterioration rates agree with other engineering studies on pavement surface deterioration (19, 20 & 21).

The deterioration curves can be used 1) to assess and understand the impact of rehabilitation strategy on the health of the pavement network, 2) examine the pavement design methods and the impacts of the various design and construction variables on pavement performance, and 3) produce prioritization lists of various uniform sections of the network. An additional aspect of the deterioration curves is the potential for statistical analysis of the pavement performance trends.

4.5 Budget Development for the Road Improvement Program

The funding for TSK's individual street improvement projects is requested by the Director of Public Works on an annual basis through a general road improvement program. Annual projects are not finalized until the Town Manager and the Town Council approve a budget allocation. The budget for routine maintenance activities is established as part of the annual operating budget and is funded from general revenues.

With the data currently collected for the entire network, the Engineering Division used Micro PAVER for development and justification of projects for the 1990-1991 Road Improvement Program.
Figure 4.4 Deterioration Prediction Curve for Stone Seal Pavements

PCI = 1.000000E+03 - 4.411498E+01 X - 1.533111E+01 X^2 + 2.115846E+00 X^3 - 7.262657E-02 X^4
Figure 4.5. Deterioration Prediction Curve for Asphalt Concrete Pavements
Before the implementation of Micro PAVER, the selection of individual projects was based on factors such as available funds, citizen complaints, political considerations, utility information and future development plans, these still play a role in determining the final project list. The 1990-91 budgets were developed using the Micro PAVER developed PCI’s and other physical roadway deficiencies (such as drainage conditions and safety).

The budget estimates (18) for the 1990-1991 Road Improvement Program (Tables 4.5) allocates $290,000 for the first year, and $1,885,000 for the six years, this is developed based on the four categories discussed under Maintenance and Repair Policies. The Road Sealing Program which is developed as part of the operating budget only includes projects on an annual basis, the estimated budget (Table 4.6) for this program is $177,000, while the budget estimate for construction materials needed for routine maintenance is $91,000.
Table 4.5 Six Year (1990-1991) Road Improvement Program

First Year Cost - $290,000
Six Year Cost - $1,885,000

Asphalt Paving Element ($80,000)

| Location                                         | PCI | Yards  | Project Cost ($) | Programmed Cost ($) | Fiscal Year |
|--------------------------------------------------|-----|--------|------------------|---------------------|-------------|
| Allens Avenue                                    | 11  | 6,000  | 30,000           | 30,000              | 90-91       |
| Moonstone Beach Rd. (Route 1 - Matunuck School House) | 39  | 14,300 | 50,000           | 120,000             | 90-91       |
| South Road (Route 138-RR track)                  | 47  | 17,200 | 70,000           | 120,000             | 91-92       |
| Moonstone Beach Rd, (Matunuck School House - Card's Pond) | 58  | 4,300  | 20,000           | 20,000              | 91-92       |
| Green Hill Beach Rd. (Matunuck School - Ocean)   | 58  | 14,000 | 60,000           | 105,000             | 92-93       |
| Rodman St.                                       | 64  | 10,500 | 45,000           |                     | 92-93       |
| Middlebridge Rd. (Radial - Town line)            | 65  | 28,000 | 120,000          | 120,000             | 93-94       |
| North Rd. (Route 108 - Fiore)                    | 65  | 5,800  | 30,000           | 100,000             | 94-95       |
| Matunuck Beach Rd. (Ocean - Carpenter's Stand)   | 66  | 15,300 | 70,000           |                     | 94-95       |
| Green Hill Beach Rd. (Route 1 - School House)    | 67  | 12,000 | 50,000           | 130,000             | 95-96       |
| South Rd. (RR - Curtis Corner)                   | 68  | 10,000 | 40,000           |                     | 95-96       |
| Rose Hill Rd. (Route 138 - Brook)                | 70  | 10,000 | 40,000           |                     | 95-96       |

Reconstruction Element ($100,000)

| Location                                    | PCI | Phase | Footage | Programmed Cost ($) | Fiscal Year |
|---------------------------------------------|-----|-------|---------|---------------------|-------------|
| Matunuck School House Road                  | 32  | II    | 1,000   | 100,000             | 1990-91     |
| Matunuck School House Road                  | 32  | III   | 1,000   | 100,000             | 1991-92     |
| Green Hill Beach Road                       | 58  | II    | 1,000   | 100,000             | 1992-93     |
| Broad Rock Road                             | 16  | I     | 1,000   | 100,000             | 1993-94     |
| Torrey Road                                 | 83  | I     | 1,000   | 100,000             | 1994-95     |
|                                             | 83  | II    | 1,000   | 100,000             | 1995-96     |

Total                                          | 6,000 | 600,000 |

Pavement Condition Index
Drainage Improvements
Table 4.5 Six Year (1990-1991) Road Improvement Program continued

### Construction Element ($50,000)

| Location                             | Programmed Cost ($) | Fiscal Year |
|--------------------------------------|---------------------|-------------|
| Amancio Street, Eastern View Avenue  | 50,000              | 1990-91     |
| Border Avenue                        | 50,000              | 1991-92     |
| Kingston Area                        | 50,000              | 1992-93     |
| Matunuck Area                        | 50,000              | 1993-94     |
| West Kingston Area                   | 50,000              | 1994-95     |
| Matunuck Area                        | 50,000              | 1995-96     |
| **Total**                            | 300,000             |             |

### Road Hazard Correction ($60,000)

| Location                             | Phase | PCI | Cost ($) | Fiscal Year |
|--------------------------------------|-------|-----|----------|-------------|
| Saugatucket at Broad Rock Road        | I     | 100 | 60,000   | 1990-91     |
| Shannock Road                        | I     | 53  | 60,000   | 1991-92     |
| Saugatucket Road                     | II    | 100 | 60,000   | 1992-93     |
| Plains Road                          | II    | 43  | 60,000   | 1993-94     |
| Green Hill Beach Road                | III   | 58  | 60,000   | 1994-95     |
| Torre~ Road                          | I     | 50  | 60,000   | 1995-96     |
| **Total**                            |       |     | 360,000  |             |

*Requested by the Traffic Commission*
Table 4.6 Road Sealing Program

| Location/Street Name | PCI | Length (Feet) | Width (Feet) | Area (Sq. Yds) | Total Cost ($) |
|----------------------|-----|---------------|--------------|----------------|----------------|
| WAKEFIELD            |     |               |              |                |                |
| Audubon Drive        | 49  | 415           | 23           | 1061           | 1230           |
| MacArthur Boulevard  | 68  | 1945          | 22           | 4754           | 5515           |
| Eisenhower Place     | 2-8 | 825           | 23           | 2108           | 2446           |
| Pershing Avenue      | 2-47| 1213          | 23           | 3100           | 3596           |
| Narragansett Avenue East | 35 | 1625          | 36           | 4694           | 5446           |
| Narragansett Avenue West | 33 | 1253          | 22           | 3063           | 3553           |
| Border Avenue        | 78  | 776           | 26           | 2242           | 2600           |
| River Street         | 3-44| 1640          | 32           | 5831           | 6764           |
| Northup Street       | 26  | 505           | 24           | 1347           | 1562           |
| Whitford Street      | 58  | 1540          | 28           | 4791           | 5558           |
| George Street        | 59  | 465           | 18           | 930            | 1079           |
| Highview Avenue      | 44  | 250           | 25           | 694            | 806            |
| Hunt Avenue          | 1-71| 1240          | 25           | 3722           | 4318           |
| Hunt Avenue          | 2-62| 920           | 16           | 1636           | 1897           |
| Gregory Street       | 2-38| 495           | 24           | 1430           | 1659           |
| Rockland Street      | 79  | 765           | 26           | 2210           | 2564           |
| Old Mountain Road    | 38  | 1435          | 21           | 3348           | 3884           |
| Smith Street         | 0   | 520           | 23           | 1329           | 1542           |
| Liberty Street       | 3   | 532           | 23           | 1360           | 1577           |
| Victory Street       | 7   | 775           | 25           | 2153           | 2497           |
| School Lane          |      |               |              |                |                |
| Tucker Avenue        | 11  | 480           | 25           | 1333           | 1546           |
| School Street        | 43  | 210           | 22           | 513            | 595            |
| **SUB TOTAL**        |     | **54,146**    |              | **62,811**     |                |
| PEACE DALE           |     |               |              |                |                |
| Church Street        | 4-56| 2692          | 26           | 7777           | 9021           |
| Branch Street        | 24  | 630           | 21           | 1470           | 1705           |
| Steven Circle        | 47  | 303           | 21           | 707            | 820            |
| Rose Circle          | 53  | 266           | 21           | 621            | 720            |
| Spring Street        | 38  | 1105          | 25           | 3069           | 3561           |
| Pike Street          | 0   | 545           | 25           | 1514           | 1756           |
| Gould Street         | 47  | 775           | 25           | 2153           | 2497           |
| Harrison Avenue      | 62  | 475           | 24           | 1267           | 1469           |
| Austin Street        | 72  | 1280          | 25           | 3556           | 4124           |
| Stedman Court        | 23  | 440           | 20           | 978            | 1134           |
| Schaeffer Street     | 60  | 711           | 27           | 2133           | 2474           |
| Nye Street           | 31  | 340           | 18           | 680            | 789            |
| Dixon Street         | 0   | 535           | 17           | 1011           | 1172           |
| Rodman Street        | 64  | 3094          | 24           | 8251           | 9571           |
| George Schaeffer Street | 15 | 1280          | 22           | 3129           | 3630           |
| Dam Street           | 29  | 1465          | 20           | 3256           | 3776           |
| Hopkins Lane 356'    | 45  | 477           | 15           | 795            | 922            |
| Street Name              | PCI | Length (Feet) | Width (Feet) | Area (Sq. Yds) | Cost ($) |
|-------------------------|-----|---------------|--------------|----------------|----------|
| PEACE DALE continued    |     |               |              |                |          |
| Green Street            | 5   | 730           | 18           | 1460           | 1694     |
|arkin Street            | 20  | 1480          | 28           | 4604           | 5341     |
| Kersey Road            | 33  | 490           | 25           | 1361           | 1579     |
| Amos Street            | 44  | 1517          | 24           | 4045           | 4693     |
| Oak Dell Street        | 40  | 470           | 25           | 1306           | 1515     |
| Fagan Court            | 3   | 240           | 21           | 560            | 650      |
| Kimball Street         | 34  | 445           | 22           | 1088           | 1262     |
| Brown Street           | 36  | 540           | 22           | 1320           | 1531     |
| Indian Run Road        |     |               |              |                |          |
| **SUB TOTAL**           |     |               |              |                | **58,811** | **68,218** |
| GREEN HILL             |     |               |              |                |          |
| Shannock Road          |     | 8266          | 21           | 19287          | 22373    |
| Gravelly Hill Road West End | | 4180          | 22           | 10218          | 11853    |
| **SUB TOTAL**           |     |               |              |                | **29,505** | **34,226** |
| Item B: Sand Sealing   |     |               |              |                |          |
| Little Rest Road       | 47  | 2226          | 22           | 5441           | 6312     |
| Parkwood Drive         | 6   | 1947          | 23           | 4976           | 5772     |
| Marion Road            | 17  | 937           | 21           | 2186           | 2536     |
| Thistledown Road       | 12  | 415           | 19           | 876            | 1016     |
| Mark Glen Court        | 33  | 354           | 23           | 905            | 1050     |
| **SUB TOTAL**           |     |               |              |                | **14,384** | **16,686** |
| **GRAND TOTAL ITEM A & B** | | | | | **156,846** | **181,941** |
CHAPTER 5. INTEGRATION OF A PROTOTYPE PMS FOR MUNICIPAL MAINTAINED ROADS WITH A GIS

5.1 Concepts of a Geographic Information System

A Geographic Information System (GIS) is a data model that involves storage of tabular data (attributes) in association with simple cartographic features (points, lines, and polygons). Cartographic data are stored not as graphics primitives or symbols but as tables in non-symbolized form that stands in relation to other attributes. While similar to Computer Aided Drafting (CAD) approach in its use of coordinates, the data model for this technology is fundamentally different in its simplicity and approach. It provides the use of topology to store relationship among spatial objects. A CAD system differs from a GIS in that it typically has a more developed set of procedures to create an manipulate graphical objects, but does not deduce and store information about relationship between objects (1 & 2). The CAD database model treats spatial information as electronic drawings made up of graphics features organized into layers. CAD does not create, or store topology. A CAD drawing of a highway can thus be viewed as a database of the lowest drawing elements that it is required to store or create a representation of the highway (1 & 2).

A GIS can be used as a tool for automated drafting, simple storage, and regeneration of graphics and plots of information maintained in the database. Rather than storing map features as graphics symbology, the GIS data structure organizes features with descriptive characteristics. GIS software makes it easy to manage, organize, query, and display large collections of spatial information. The location information is represented by points, features such as roads are represented by lines (arcs) and features such as lakes are represented by areas (polygons). The PC ARC/INFO version 3.4D GIS was used in development of the prototype PMS/GIS integration.
5.1.1 Description of pc ARC/INFO Software

The software system PC ARC/INFO was developed by the Environmental Systems Research Institute (ESRI), Redlands, California, a private commercial organization with an extended development history in mapping and analysis. The PC ARC/INFO is a vector-based geographic information system with modular design. Among the modules included with the software are programs for digitizing, interactive editing of graphic and statistical data, drawing and map production, and management of the attribute database. The system integrates geographic analysis and modeling capabilities with a fully interactive system for acquisition, management, and display of spatial data. The PC ARC/INFO system consist of the following modules (22,23 & 24):

- STARTER KIT is used for map creation and digitization, attribute table creation, topologic data structuring, map plotting and host computer communication. The STARTER KIT includes the ARC Digitizing System (ADS) to quickly create and edit map coverages; CLEAN and BUILD to create point, line and area features from raw coordinates; and file management program called TABLES (24).

- PC ARCEDIT is a sophisticated interactive graphics and database editor. This module is used to create and modify coverages. PC ARCEDIT combines all the facilities of the ADS component. It combines capabilities of CAD functions with capabilities of a geographic database (25).

- PC ARCPLOT is used for interactive map creation and display, graphical query, and the generation of high quality maps. PC ARCPLOT allows the use a macro programming language, SML (Simple Macro Language), for developing user interface menus and automation of the cartographic production process (26).

- PC OVERLAY is used for topology analysis such as polygon overlay, line and point-in-polygon overlay, and buffer generation. PC OVERLAY contains six overlay commands (CLIP, ERASE, IDENTITY, INTERSECT, UNION, and UPDATE), which are very useful in geographic analysis (27).

The modules described above were used in the PMS/GIS integration. Other pc ARC/INFO modules are:

- PC INFO is a stand-alone fully featured relational database management system.
PC DATA CONVERSION is used for conversion of vector and grid cell formats to and from ARC/INFO.

PC NETWORK is used for analytical functions for modeling networks, and performing optimal routing, districting, address matching, and geocoding.

5.2 Integration of Micro PAVER PMS with PC ARC/INFO GIS

The data integration process required two steps: understanding the data descriptions for the Micro Paver database, and the data needed for the integration with the GIS network. The functionality of the process is to bring together separate software components to enhance or extend the analysis whereby reducing the database management system duplication. A framework was developed as guide for the integration process (Figure 5.1). This process involves running the Micro PAVER and pc ARC/INFO independently of each other and using R:BASE System V to export the necessary data attributes in American Standard Code for Information Interchange (ASCII) format for import and integration with the roadway network created in pc ARC/INFO. R:BASE System V was developed by Microrim, Incorporated. It is a database management system for microcomputers with powerful and flexible capabilities for storing, organizing, analyzing and retrieving information (27).

5.2.1 Data Conversion In R:BASE SYSTEM V

The Micro PAVER database files ROADINV1.RBF and ROADINV2.RBF were converted from the Micro PAVER database format to R:BASE System V database format. The CONVERT module of R:BASE was used in this process. Three files were created by the conversion process. At the completion of the conversion process, the data attributes necessary for the integration process were exported as ASCII files. In Table 5.1 the shaded area shows the different database tables and attributes used. Tables 5.2 and 5.3 shows the ASCII delimited file SECTION.FIX and BRABCH.FIX.
Figure 5.1. PMS and GIS Integration Process
Table 5.1 Micro PAVER Database Tables in R:BASE

| TABLES   | COLUMNS                                                                 |
|----------|-------------------------------------------------------------------------|
| system   | agency, secur, unit, name, addr, ctysta, zipcde, phone, passwrd         |
| XDIST    | BRANUM, SECNUM, INSDAT, DISCOD, SEV, QUA, DEN, DEDVAL                   |
| BRANCH   | BRANUM, BRANAM, BRAUSE, NUMSEC, BRAARE, BRACOM                         |
| SECTION  | BRANUM, SECNUM, ZON, FRM, TOO, SECCAT, PAVRAN, SURTP, SECLEN, SEOWID,  |
|          | SECARE, SLALEN, SLAWID, NUMSLA, JOINLEN, LASCON, LASINS, LASPCI         |
| NDT      | BRANUM, SECNUM, NDTLOC, NDTDAT, NDTTEM, NDTLOA, MAXDEF, BASARE, DSM, LOATRA |
| POLICY1  | POLNUM, POLDES                                                          |
| POLICY2  | POLNUM, DISCOD, SEV, WORTYP, MATLOD, EXTRA1, EXTRA2                    |
| CONDHIST | BRANUM, SECNUM, INSDAT, RIDQUA, SAF, DRACON, SHOCON, OVECON, FOD, TOTSAM, |
|          | NUMSAM, PCI, TOTRAN, TOTADD, MINSAM, PCISTA, PDVLOA, PDVCLI, PDVOTH     |
| SAMPLE   | BRANUM, SECNUM, INSDAT, SAMNUM, SAMTYP, SAMSIZ, SAMPCI, DISCOD, SEV, QUA |
| WORKHIST | BRANUM, SECNUM, WORTYP, DATCOM, MATCOD, THI, MANACC, WORQUA, TOTCOS,    |
|          | WORCOM, STADAT, IDDAT, PRONUM, PHANUM                                   |
| TRAFFIC  | BRANUM, SECNUM, SURDAT, AIRTYP, ANNDEP, ADT, PERTRA, PER2AT, PER3AT, ESAL, |
|          | TRACOM                                                                  |
| WORREQ   | BRANUM, SECNUM, WORTYP, STADAT, IDDAT, PRONUM, PHANUM, MANACC, WORKQUA, |
|          | TOTCOS, MATCOD, THI, WORCOM                                             |
| MATPRO   | BRANUM, SECNUM, LAYER, TESTYP, TESTLOC, TESTVAL, DEPTH, MATCOM          |

Note: The shaded rows shows attributes that were used in the PMS/GIS integration.
| ID   | WKNGS | ST | AC | Date       | Code   |
|------|-------|----|----|------------|--------|
| 10010| WKNGS | ST | AC | 1371       | 10621982/008/01 |
| 10010| WKNGS | ST | AC | 122        | 219361988/008/01 |
| 10010| WKNGS | ST | AC | 532        | 34161982/008/01 |
| 10010| WKNGS | ST | AC | 1044       | 69161982/008/01 |
| 10020| WKNGS | ST | AC | 1500       | 229681984/008/01 |
| 10020| WKNGS | ST | AC | 200        | 360001981/008/01 |
| 10020| WKNGS | ST | AC | 4212       | 44001981/008/01 |
| 10020| WKNGS | ST | AC | 43         | 884521981/008/01 |
| 10030| WKNGS | ST | AC | 2289       | 6881981/008/01 |
| 10040| WKNGS | ST | AC | 2460       | 572251983/008/01 |
| 10040| WKNGS | ST | AC | 1795       | 484651988/008/01 |
| 10050| WKNGS | ST | AC | 1700       | 323571988/008/01 |
| 10060| WKNGS | ST | AC | 1774       | 942971988/008/01 |
| 10080| WKNGS | ST | AC | 1838       | 390281988/008/01 |
| 10100| WKNGS | ST | AC | 3020       | 294081988/008/01 |
| 10110| WKNGS | ST | AC | 6369       | 1337491988/008/01 |
| 10115| WKNGS | ST | AC | 640        | 134401988/008/01 |
| 10120| WKNGS | ST | AC | 1311       | 340861988/008/01 |
| 10130| WKNGS | ST | AC | 5255       | 120851988/008/01 |
| 10140| WKNGS | ST | AC | 1167       | 291751988/008/01 |
| 10140| WKNGS | ST | AC | 124        | 28521988/008/01 |
| 10140| WKNGS | ST | AC | 3615       | 867601988/008/01 |
| 10140| WKNGS | ST | AC | 41         | 9841988/008/01 |
| 10140| WKNGS | ST | AC | 50         | 12001988/008/01 |
| 10150| WKNGS | ST | AC | 2407       | 52951988/008/01 |
| 60010| WRDPT | ST | AC | 3281       | 590581988/008/01 |
| 60010| WRDPT | ST | AC | 1300       | 234001976/007/01 |
| 60010| WRDPT | ST | AC | 9549       | 2387251988/008/01 |
| 60020| WRDPT | ST | AC | 4550       | 910001988/008/01 |
| 60030| WRDPT | ST | AC | 2300       | 391001982/008/01 |
| 60040| WRDPT | ST | AC | 7941       | 1588201976/007/01 |
| 60050| WRDPT | ST | AC | 610        | 91501971/009/01 |
| 60060| WRDPT | ST | AC | 675        | 128251984/008/01 |
| 60070| WRDPT | ST | AC | 1085       | 282101980/008/01 |
| 60080| WRDPT | ST | AC | 200        | 44001986/008/01 |
| 60080| WRDPT | ST | AC | 5880       | 1352401986/008/01 |
| 60080| WRDPT | ST | AC | 5691       | 1422751988/008/01 |
| BRANCH | ROADWAY | NB | OTHER | OTHER |
|---------|---------|----|-------|-------|
| 10010   | BARBER'S POND ROAD | ROADWAY | 5 | 34730 |
| 10015   | BLACKBIRD ROAD | ROADWAY | 1 | 22968 |
| 10020   | DUG-WAY-BRIDGE ROAD | ROADWAY | 4 | 129540 |
| 10030   | ESTELLE DRIVE | ROADWAY | 1 | 57225 |
| 10040   | FAIRGROUNDS ROAD | ROADWAY | 3 | 199800 |
| 10050   | GLEN ROCK ROAD | ROADWAY | 3 | 157264 |
| 10060   | HUNDRED ACRE POND ROAD | ROADWAY | 1 | 39028 |
| 10070   | HUNDRED ACRE POND RD EAST | OTHER | 0 | |
| 10080   | JAMES TRAIL | ROADWAY | 1 | 29408 |
| 10090   | JINGLE VALLEY ROAD | OTHER | 0 | |
| 10100   | LAUREL LANE | ROADWAY | 1 | 57380 |
| 10110   | LIBERTY LANE | ROADWAY | 1 | 133749 |
| 10115   | OLD USQUEPAUGH ROAD | ROADWAY | 1 | 13440 |
| 10120   | QUEEN'S RIVER DRIVE | ROADWAY | 1 | 34086 |
| 10130   | SAND TURN ROAD | ROADWAY | 1 | 120865 |
| 10140   | WAITES CORNER ROAD | ROADWAY | 6 | 173925 |
| 10150   | YAMOO POND ROAD | ROADWAY | 1 | 59058 |
| 60010   | GRAVEL HILL ROAD | ROADWAY | 2 | 262125 |
| 60020   | LIBERTY LANE | ROADWAY | 1 | 91000 |
| 60030   | MOONSTONE BEACH ROAD | ROADWAY | 1 | 39100 |
| 60040   | SHANNON HILL ROAD | ROADWAY | 2 | 158820 |
| 60050   | SHERMAN AVENUE | ROADWAY | 1 | 9150 |
| 60060   | WATSON ROAD | ROADWAY | 1 | 12825 |
| 60070   | WENDY LANE | ROADWAY | 1 | 28210 |
| 60080   | WORDENS POND ROAD | ROADWAY | 3 | 281915 |
5.2.2 Network Development in pc ARC/INFO

The establishment of a GIS network for the town consisted of developing a town boundary, pavement management zone boundaries, and a roadway network. Two zones from the Town of South Kingstown road network were used in integrating Micro PAVER PMS with the PC ARC/INFO GIS. These zones are the West Kingston and Wordens Pond zones.

The original maps image were obtained from the Rhode Island Geographic Information System database of United States Geographic Survey (USGS) maps. The maps obtained consisted of the Town of South Kingstown's roadway network, town line, rivers, and the State rail lines. Theses coverages are in the Universal Tranverse Mercator (UTMS) coordinate system. The town line coverage (SKTLS) was then copied as a new coverage SKZONES. The various coverages i.e., roadway network, rivers, and rail lines were then each edited in PC ARCEDIT. During the editing, all the features that made up the pavement management zone boundary were selected and put into the new coverage SKZONES. The pavement management zone boundary coverage (SKZONES) were then edited in PC ARCEDIT for overshoots, and then identification labels were assigned to each polygon, of the different PMS zones. The coverage was cleaned and built using the PC ARC/INFO Starter Kit routines CLEAN and BUILD, to create the PMS zone boundary coverage SKZONES. The roadway network coverage (SKRDS) was then intersected with boundary coverage using the PC OVERLAY routine INTERSECT. This procedure was done to assign the pavement management zone numbers to the roadway network. This process created a new roadway coverage PAVE which has PMS zone numbers attached to all lines (arcs).

The new roadway coverage (PAVE) was then edited in PC ARCEDIT, to split and unsplit the arcs which will identify the pavement management sections. The roads belonging to the study areas, Wordens Pond and West Kingston were then selected. All lines (arcs) on the map representing town maintained roadways within the two study zones were then assigned their appropriate branch and section numbers. Since the branch and section numbers are independent in the Micro PAVER database, the
branch and section numbers were combined to form one unique number to represent
the ID assigned to the arcs making up the PMS network. The ID item PAVEIDS is an
eight digit number made up of the five digit branch number and the three digit section
number, e.g., branch number 10080 and section number 001 would have a PAVEID
value equal to 10080001. Once this was completed for all sections in the study, the
coverage was then cleaned and built to create a new coverage PMSRDS. Four new
items were added using the command ADDITEM under the PC ARC/INFO Starter Kit,
theses items BRANCH, SECNUM, HOLD and TEMPID were used to create a common
attribute for joining the roadway network with pavement data. The attribute data for
the ITEMS BRANUM, SECNUM, HOLD and TEMPID were then calculated for the
PMSRDS.AAT file in TABLES.

5.2.3 Development of Network Attributes

The TABLES database manager under pc ARC/INFO Starter Kit was used to create
templates that forms the attribute data. Three data files: SECTION.DAT, AGE.DAT,
and BRANCH.DAT were created. These data files were created using the DEFINE
command in TABLES. The database name, item name, items width, item type, and
number of decimal places are defined with this command. It is important, that the
database structure for the attributes being defined, correspond to the Micro PAVER
database TABLE exported by R:BASE System V. Table 5.4 shows the Data Structure
in TABLES for the files SECTION.DAT, AGE.DAT, and BRANCH.DAT. The items HOLD
and TEMPID were not part of the TABLES definition in SECTION.DAT file, these two
items were added after the ascii data were imported. The fixed ascii delimited files,
exported from R:BASE System V were then imported into the various database
TABLES using the LOAD command under TABLES. The items HOLD and TEMPID were
then added to the SECTIONS.DAT file using the ADDITEM command under PC
ARC/INFO Starter Kit module. The attribute data for the ITEMS "HOLD and TEMPID"
were then calculated for the SECTION.DAT file in TABLES. Tables 5.5, 5.6 and 5.7
show partial listings of the attribute data for SECTION.DAT, AGE.DAT, and
BRANCH.DAT. Once the data structure and the data import was completed, the Arc
Attribute File for the roadway network (PMSRDS.AAT) and the various data tables
Table 5.4 Data Structure in TABLES

| SECTION.DAT          | ITEM NAME | WIDTH | TYPE | N.DEC |
|----------------------|-----------|-------|------|-------|
| 1                    | BRANUM    | 4     | N    | 0     |
| 7                    | SECNUM    | 4     | N    | 0     |
| 11                   | ZON       | 4     | C    | 0     |
| 15                   | PAVRAN    | 4     | C    | 0     |
| 19                   | SURTYP    | 4     | C    | 0     |
| 23                   | SECLN     | 10    | N    | 0     |
| 33                   | SECWID    | 10    | N    | 0     |
| 43                   | SECARE    | 10    | N    | 0     |
| 53                   | LASCON    | 12    | C    | 0     |
| 65                   | LASINS    | 12    | C    | 0     |
| 77                   | LASPCI    | 10    | N    | 0     |
| 87                   | HOLD      | 5     | N    | 3     |
| 92                   | TEMPID    | 12    | N    | 3     |

| AGE.DAT              | ITEM NAME | WIDTH | TYPE | N.DEC |
|----------------------|-----------|-------|------|-------|
| 1                    | TEMPID    | 12    | N    | 3     |
| 13                   | AGE       | 5     | N    | 1     |

| BRANCH.DAT           | ITEM NAME | WIDTH | TYPE | N.DEC |
|----------------------|-----------|-------|------|-------|
| 1                    | BRANUM    | 10    | N    | 0     |
| 11                   | BRANAM    | 27    | C    | 0     |
| 38                   | BRAUSE    | 7     | C    | 0     |

Note: N = Numeric, C = Character
Table 5.5 Partial List of Attribute Data for SECTION.DAT in TABLES

| $RECNO | 1  |
|--------|----|
| BRANUM | 1001 |
| SECNUM | 001 |
| ZON    | WKNG |
| PAVRAN | S   |
| SURTYP | AC  |
| SELLEN | 59  |
| SECWID | 18  |
| SECARE | 1062|
| LASCON | 1982/008/01 |
| LASINS | 1988/008/09 |
| LASPCI | 100  |
| AGE    | 6.0 |
| HOLD   | 0.001 |
| TEMPID | 10010.001 |

| $RECNO | 2  |
|--------|----|
| BRANUM | 10010 |
| SECNUM | 002 |
| ZON    | WKNG |
| PAVRAN | S   |
| SURTYP | ST  |
| SELLEN | 1371|
| SECWID | 16  |
| SECARE | 21936|
| LASCON | 1988/008/01 |
| LASINS | 1988/008/09 |
| LASPCI | 44  |
| AGE    | 0.0 |
| HOLD   | 0.002 |
| TEMPID | 10010.002 |

| $RECNO | 3  |
|--------|----|
| BRANUM | 10010 |
| SECNUM | 003 |
| ZON    | WKNG |
| PAVRAN | S   |
| SURTYP | ST  |
| SELLEN | 100 |
| SECWID | 14  |
| SECARE | 1400 |
| LASCON | 1982/008/01 |
| LASINS | 1988/008/09 |
| LASPCI | 71  |
| AGE    | 6.0 |
| HOLD   | 0.003 |
| TEMPID | 10010.003 |
Table 5.6 Partial List of Attribute Data for AGE.DAT in TABLES

| $RECNO | TEMPID  | AGE |
|--------|---------|-----|
| 1      | 10010.001 | 6.0 |
| 2      | 10010.002 | 0.0 |
| 3      | 10010.003 | 6.0 |
| 4      | 10010.004 | 6.0 |
| 5      | 10010.005 | 6.0 |
| 6      | 10015.001 | 4.0 |
| 7      | 10020.001 | 8.0 |
| 8      | 10020.002 | 8.0 |
| 9      | 10020.003 | 8.0 |
| 10     | 10020.004 | 8.0 |
| 11     | 10030.001 | 5.0 |
| 12     | 10040.001 | 0.2 |
| 13     | 10040.002 | 0.2 |
| 14     | 10040.003 | 5.3 |
| 15     | 10050.001 | 8.0 |
| 16     | 10050.002 | 8.0 |
| 17     | 10050.003 | 8.0 |
| 18     | 10060.001 | 0.6 |
| 19     | 10080.001 | 29.6|
| 20     | 10100.001 | 4.0 |
| 21     | 10110.001 | 0.3 |
| 22     | 10115.001 | 0.0 |
| 23     | 10120.001 | 28.6|
### Table 5.7 List of Attribute Data for BRANCH.DAT in TABLES

| RECNO | BRANUM | BRANAM                        | BRAUSE       |
|-------|--------|-------------------------------|--------------|
| 1     | 10010  | BARBER' POND ROAD             | ROADWAY      |
| 2     | 10015  | BLACKBIRD ROAD                | ROADWAY      |
| 3     | 10020  | DUG-WAY-BRIDGE ROAD           | ROADWAY      |
| 4     | 10030  | ESTELLE DRIVE                 | ROADWAY      |
| 5     | 10040  | FAIRGROUNDS ROAD              | ROADWAY      |
| 6     | 10050  | GLEN ROCK ROAD                | ROADWAY      |
| 7     | 10060  | HUNDRED ARCE POND ROAD        | ROADWAY      |
| 8     | 10070  | HUNDRED ARCE POND ROAD EAST   | OTHER        |
| 9     | 10080  | JAMES TRAIL                   | ROADWAY      |
| 10    | 10090  | JINGLE VALLEY ROAD            | OTHER        |
| 11    | 10100  | LAUREL LANE                   | ROADWAY      |
| 12    | 10110  | LIBERTY LANE                  | ROADWAY      |
| 13    | 10115  | OLD USQUEPAUGH ROAD           | ROADWAY      |
| 14    | 10120  | QUEEN'S RIVER DRIVE           | ROADWAY      |
| 15    | 10130  | SAND TURN ROAD                | ROADWAY      |
| 16    | 10140  | WAITES CORNER ROAD            | ROADWAY      |
| 17    | 10150  | YAWGGO POND ROAD              | ROADWAY      |
| 18    | 60010  | GRAVELLY HILL ROAD            | ROADWAY      |
| 19    | 60020  | LIBERTY LANE                  | ROADWAY      |
| 20    | 60030  | MOONSTONE BEACH ROAD          | ROADWAY      |
| 21    | 60040  | SHANNOCK HILL ROAD            | ROADWAY      |
| 22    | 60050  | SHERMAN AVENUE                | ROADWAY      |
| 23    | 60060  | WATSON ROAD                   | ROADWAY      |
| 24    | 60070  | WENDY LANE                    | ROADWAY      |
| 25    | 60080  | WORDENS POND ROAD             | ROADWAY      |
developed in TABLES were then joined together using the command JOINITEM under the PC ARC/INFO Starter Kit module.

The attribute data for the AGE.DAT file were joined with the SECTION.DAT file using TEMPID attribute, and the attribute data for the BRANCH.DAT file was joined to the SECTION.DAT file using the attribute BRANUM. Adding attribute about features to a coverage involves, associating the new information about features with existing records in the arc attribute table (AAT). The new SECTION.DAT file created from the joining of AGE.DAT and BRANCH.DAT files were then joined to PMSRDS.AAT using the TEMPID attribute. Table 5.8 shows the data structure and items for the PMS/GIS integrated database in TABLES. The shaded area shows the attributes from the original coverage.

5.3 Verification and Map Production/Analysis

The verification of the PMS and GIS was accomplished by querying the data in ARCPLOT and comparing the pavement section data to a 1:1000 scale town map with all the pavement sections marked on it. Queries such as section number, section length, pavement types, pavement age, and pavement condition were done. The graphical queries were also compared to Micro PAVER tabular printouts. The reports used in this process are the PCI and Inventory Reports.

Once the verification process was complete, simple macros, lookup tables, and title keys were created to create plots in PC ARCPLOT. Appendix D contains examples of the simple macro language (SML), lookup tables and key files. The macros were used in ARCPLOT to create plots for PCI (Figure 5.2), surface type (Figure 5.3), pavement age (Figure 5.4) and maintenance and repair (Figure 5.5).
Table 5.8 PMS Data Structure in TABLES

| COLUMN | ITEM NAME   | WIDTH | TYPE | N DEC |
|--------|-------------|-------|------|-------|
| 1      | FNODE_      | 11    | N    | 0     |
| 12     | TNODE_      | 11    | N    | 0     |
| 28     | LPOLY_      | 11    | N    | 0     |
| 34     | RPOLY_      | 11    | N    | 0     |
| 45     | LENGTH      | 13    | N 6  |       |
| 58     | PMSRDS      | 11    | N    | 0     |
| 69     | PMSRDS_ID   | 11    | N    | 0     |
| 80     | ROAD_CLASS  | 1     | N    | 0     |
| 81     | CNTY_CLASS  | 1     | N    | 0     |
| 82     | FUNC_CLASS  | 2     | N    | 0     |
| 84     | STDZONES_1  | 11    | N    | 0     |
| 95     | PAVEIDS     | 12    | N    | 0     |
| 107    | BRANUM      | 10    | N    | 0     |
| 117    | SECNUM      | 4     | N    | 0     |
| 121    | ZON         | 4     | C    | 0     |
| 125    | PAVRAN      | 4     | C    | 0     |
| 129    | SURTYP      | 4     | C    | 0     |
| 133    | SECLEN      | 10    | N    | 0     |
| 143    | SECWID      | 10    | N    | 0     |
| 153    | SECARE      | 10    | N    | 0     |
| 163    | LASCON      | 12    | C    | 0     |
| 175    | LASINS      | 12    | C    | 0     |
| 187    | LASPCI      | 10    | N    | 0     |
| 197    | AGE         | 5     | N    | 1     |
| 202    | BRANAM      | 27    | C    | 0     |
| 229    | BRAUSE      | 7     | C    | 0     |
| 236    | TEMPID      | 12    | N    | 3     |
| 248    | HOLD        | 5     | N    | 3     |

Note: The shaded area shows the attributes from the base coverage.
Figure 5.5: Maintenance and Repair Actions

Legend:

- Maintenance
- Repair
- Strategic
- Emergency
- Technical
- Economic

Town of South Kesteven
CHAPTER 6. CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations based on the results of this study are summarized below.

6.1 Conclusions

1) A questionnaire survey revealed that thirty-three of the thirty-nine municipalities in Rhode Island (eighty-five percent) utilize regular maintenance programs for their highways; however, the statewide absence of a systematic and rational method to manage municipally maintained roads was evident. When this study began, only one of the communities was using a semi-computerized PMS, a proven technique to economically administer highway maintenance and rehabilitation.

2) Micro PAVER was selected as the most appropriate microcomputer-based software for municipally maintained roads in Rhode Island. Micro PAVER is one of the simplest menu-driven programs which provides users with a practical decision making tool for identifying cost effective maintenance and repair alternatives for roads and streets.

3) A prototype PMS was successfully developed for Rhode Island municipally maintained roads by utilizing Micro PAVER software as the core. Through this development process several critical functions and procedures were established:
   i) a procedure for field crew training;
   ii) database to check the reproducibility of pavement condition index (PCI) values;
   iii) guidelines for data collection; and
   iv) recommended M & R strategies and unit costs for the prototype Network-level PMS (asphalt concrete).

4) The developed prototype PMS was successfully implemented on trial networks: the URI Kingston Campus and the Town of South Kingstown (TSK). Through these initial installations several critical functions were established:
i) a standard network (the URI road network) which will allow the future study, training and calibration;

ii) a model municipal network (TSK) to encourage statewide implementation; and

iii) a series of deterioration curves for full networks.

5) The deterioration prediction curves for the TSK indicated that stone sealed pavements have a much shorter average life (six to eleven years) compared to asphalt concrete (thirteen to twenty-three years).

6) The TSK used implementation results of the prototype PMS in development of projects for the 1990-1991 Road Improvement Program.

7) Twenty-six Rhode Island municipalities (represented by a total of sixty-two participants) attended at least one of the pavement management workshops jointly offered by the Rhode Island Department of Transportation (RIDOT) and URI. At least sixteen municipalities have decided to implement the developed prototype. Micro PAVER PMS. Several other communities which expressed little or no interest in a PMS are now recognizing the importance of a systematic and rational method to maintain their municipal pavements.

8) The integration of the PMS and GIS is a promising development which shows that the use of graphical queries complements the pavement management process. The GIS/PMS prototype development addresses procedures and application of the integration process. The integration process could be complex or straight forward depending all the PMS attributes, that are integrated.

6.2 Recommendations

1) The URI PMS team should continue to assist all interested municipalities with the implementation of the developed prototype PMS, and update the list of M & R strategies, costs and pavement service life of all municipal pavement maintenance practices typically in Rhode Island.

2) Implementation and research on the Town of South Kingstown model network should be continued, and all other municipalities should consider utilizing or adapting the results of this pilot network.
3) All systems installed with Micro PAVER 1.0, 1.2 or 2.1 should be upgraded to Version 3.0 or later.

4) Municipalities should consider incorporating their PMS into a total public works management system.
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APPENDIX A. DESCRIPTION OF PMS SOFTWARE
1. **CANDLINK** - Dept. of Civil Engineering, West Virginia University, Morgantown, WV
   Aids user to decide whether to upgrade/rehabilitate unpaved low volume road links. The program is interactive. Input requirements include ADTs, surfacing, drainage, geometric design, soils, bridges, etc. Produces list of road links for upgrade or rehabilitation. System requirement are IBM-PC, PC/XT, PC/AT.

2. **CUSTOMIZE** - Pavement Management Systems, Denver, CO
   Customized system to meet agency needs. System requirements are IBM PC, PC/XT; 640K RAM.

3. **FLEXIBLE PMS** - FHWA Region 9
   Determine the condition of flexible pavements and provides user with ability to reach decisions on which type of reconstruction or rehabilitation is needed. User can adjust distress levels, costs, and priorities and tailor program for lock conditions. The program features user friendly full screen editors to simplify its use. System requirements are IBM-PC, PC/XT, PC/AT.

4. **FPMS** - CALTRANS
   A microcomputer version of the California Flexible Pavement Management System; an inventory and strategy system for evaluation of pavement distress and plotting strategies and priorities for rehabilitation. System requirements are IBM PC compatible; 128K RAM; MS DOS 2.0.

5. **HCPM** (Highway Condition Projection Model) - Capital District Transportation Committee, Albany, NY
   This program projects highway conditions and maintenance costs for up to 99 years into the future, given current highway conditions, repair policies, and rates of road deterioration. The model takes the current highway condition scores and checks them against a matrix of repair policies. If a repair is specified, the road is repaired and the cost of the repair along with other pertinent data is saved. If no repair is specified, the road is deteriorated by the yearly amount. System requirements are XENIX; runs on any system with FORTRAN 77.

6. **INVENTORY** - Bernardin and Associates, Evansville, IN
   Stores pavement type and width, condition, no. of lanes, shoulder type and width, condition; median type and width, right-of-way width, parking curbs, turn lanes, traffic volume, drainage, land-use characteristics, curve and grade statistics. System requirements are IBM-PM, PC/XT, PC/AT; hard disk required.

7. **LOCAL ROADS FORECASTING MODEL** - Metro Area Planning Council, Boston, MA
   Produces 10 year forecasts of road conditions and calculates network's maintenance backlog. Input road maintenance construction costs, deterioration rates, annual maintenance expenditures, current road conditions, etc. System requirements are IBM PC, PC/XT, PC/AT; 128K RAM.

8. **LOW-VOLUME ROAD MAINTENANCE** - Dept. of Civil Engineering, University, Morgantown, WV
   Aids in decisions of upgrading unpaved low-volume unpaved road links. Interactive. User answers question re: road usage, road surfacing, drainage, geometric design, soils,
bridges. Output is list of rehabilitation candidates. System requirements are Apple II, IBM-PC.

9. METRO PAVEMENT MNGT. - Metropolitan Transportation Commission, Oakland, CA
Uses R:Base 4000 database to perform three network level analyses for city and county agencies: preventive maintenance, rehabilitation, and stop-gap measures: utilizes visual survey and seven distress levels. System requirements are IBM PC, PC/XT, PC/AT; 512 RAM; 10 MB hard disk.

10. MICRO PAVER - U.S. Army Construction Engineering Research Laboratory and American Public Works Association, Chicago, IL
Similar to the mainframe PAVER system, Micro PAVER can be used as a tool in pavement management for flexible and rigid pavements such as roads and streets, parking lots, and airfield pavements. The system capabilities include data storage and retrieval, pavement condition prediction, budget planning, inspection scheduling, determination of maintenance and repair needs and economic analysis. Micro PAVER is based on the Pavement Condition Index (PCI), which is a repeatable, objective rating of pavement condition based on observed distress types. Program identifies streets needing rehabilitation and estimates life-cycle costs for various strategies. Includes 6-year budget forecasts, "what-if" scenarios, forecasts future pavement conditions. As additional capabilities and/or technologies become available, the program will be updated. System requirements are IBM PC compatible, 640K RAM; 20 MB hard disk recommended.

11. PAVEMENT MANAGEMENT SYSTEM - BSI Consultants, Inc., San Diego, CA
Features include field inventory program, pavement condition assessments, maintenance rehabilitation programs, priority scheduling, annual budget reports, maintenance history. Integrates with DYNAFLECT testing and destructive sampling. System requirements are IBM-PC, PC/XT, PC/AT; hard disk required.

12. PAVEMENT MANAGEMENT SYSTEM - Carter Associates, Inc., San Diego, CA
Maintenance management program based on inventory data on roadway condition and permitting policy alternatives, budget scenarios, and priority rating component. System requirements are IBM-PC, PC/XT, PC/AT; hard disk recommended.

13. PAVEMENT MANAGEMENT SYSTEM - Morrison, Knudsen, Denver, CO
Based on dBase III; identifies immediate needs for asphalt surfaces only; tracks surface distress year-to-year. System requirements are IBM PC, PC/XT, PC/AT; 512 K RAM; hard disk recommended.

14. PAVEMENT MANAGEMENT SYSTEM - PMS, Inc. Cambridge, Ontario, Canada
The pavement management utilized FORTRAN 77 programs to analyze and manipulate data, and update data files. The access to the entire system is through a series of screen display menus. There are six levels of menus, with a total of 18 different menus available. The menus range from data entry to report generating menus. Streets are ranked using a composite rating termed Pavement Quality Index (PQI). The PQI is a number from 0 to 10 that classifies pavement condition from very poor to brand new (excellent). The PQI is a function of three components of three components: Surface Distress Index (SDI), Surface Roughness Index (SRI) and Structural Adequacy Rating (SAR). System requirements are IBM PC XT/AT or PS/2 compatible, PC/MS DOS, 640K RAM, a 20 MB hard disk. Requires dBASE III+ database software.
PAVEMENT MANAGEMENT SYSTEM - Tulare County Association of Government, Visalia, CA
This program is an adaptation of a pavement management system originally used by the California Department of Transportation to recommend and prioritize corrective maintenance on flexible pavements. System requirements are IBM PC compatible, MS DOS.

PAVEMENT MANAGEMENT SYSTEM - Vanasse Hangen Brustlin, Inc., Boston, MA
The program is customized for particular roadway systems and needs. The program includes budget forecasts and maintenance alternatives to maximize allowable budgets. The system utilizes three separate pavement deterioration curves for local, collector and arterial roadways from which deduct values are assigned for specific distresses and their severity and extent. System requirements are IBM PC or PS/2 compatible.

PAVEMENT MANAGEMENT SYSTEM - Washington Department of Transportation, Olympia, WA
Developed from a mainframe system; allows agency-defined maintenance policies; projects future pavement conditions based on current conditions and past data; prioritizes projects and performs life-cycle analyses. System requirements are IBM PA, PC/XT, PC/AT; 512K RAM; hard disk recommended.

PMI PAVEMENT MANAGEMENT SYSTEM - Harris and Assoc., Concord, CA
Flexible, easy-to-run and menu-driven program, can do budgetary planning for 5-year projections, calculates a preventative maintenance program for each segment, adjusts for climatic and structural design data; includes 20 year optimum maintenance program. System requirements are IBM PC, PC/XT, PC/AT; 512K RAM.

PMP - Midwest Pavement Management, St. Paul, MN
Customized; written in Turbo Pascal; designed for use by non-engineers and non-computer specialists; uses data from visual survey and Mays Ride Meter; consists of core inventory file and nine connected files. System requirement are IBM PC, PC/XT, PC/AT; 512K RAM; hard disk required.

PMS - Allan Davis & Associates, Norwalk, CT
Developed for Trumbull, Connecticut from canned software. Information to develop is available, not the software itself. Only asphalt, has 1-100 rating for prioritizing, stores condition survey data. Life cycle-costs. System requirements are Radio Shack II.

PMS - De Leuw Cather & Co., Gaithersburg, MD
User inputs road links and networks, conditions assessment. Among program's key reports: survey of pavement conditions, priority street based on condition distress, proposed improvement strategies, economic analysis, project cost. System requirements are IBM-PC, PC/XT, PC/AT.

PMS-ITRE - The Institute for Transportation Research and Education (an activity of the University of North Carolina), Research Triangle Park, NC
PMS-ITRE is used to enter and analyze data collected through ITRE's Pavement Condition Survey. The program is fully menu-driven and allows the user to change maintenance criteria and costs used in the calculations. Standard reports (such as an alphabetical listing
of streets/street segments, a priority listing of street/street segment improvements and a maintenance needs summary table) may easily be obtained by the user. System requirements are IBM PC compatible, 512K RAM, MS DOS, hard disk preferred.

23. PMS SERIES 10A-10G INFRASTRUCTURE Database MANAGEMENT SERIES - Pavement Management Systems, Inc. Denver, CO
PMS Series 10A - 10G contains the following components: 10A Pavement Inventory Database, 10B-1 Road Needs Study, 10B-2 Minnesota Highway Inventory, 10B-3 Highway User's Tax Fund, 10C Complaint System, 10D Accident Reporting System, 10E Peripheral Concrete System, 10F Maintenance History System, and 10G Bridge Inventory System. System requirements are IBM PC XT/AT or PS/2 compatible, 10-20 MB hard disk, 640K RAM, and dBASE Ill Plus.

24. PMS SERIES 20 ANNUAL MAINTENANCE PROGRAM ANALYSIS - Pavement Management Systems, Inc., Denver, CO
PMS Series 20 uses a comprehensive surface distress inventory to analyze the need for routine maintenance, calculate sectional and system costs, identify maintenance strategies, generate material quantities on a sectional and system basis, and estimate man hours. System requirements are IBM PC XT/AT or PS/2 compatible, 10-20 MB hard disk, 640K RAM, and dBase III plus.

25. PMS SERIES 30 PAVEMENT MANAGEMENT REHABILITATION PROGRAM - Pavement Management Systems, Inc., Denver, CO
PMS Series 30 anticipates needs for future rehabilitation, by using local performance curves. It is based on surface distress, roughness and/or strength surveys. It generates locally identified rehabilitation strategies and costs based on economic analysis. User modifiable and friendly, it also produces one to ten year budget projections. System requirements are IBM PC XT/AT or PS/2 compatible, 10-20 MB HARD DISK, 640K RAM, and dBase III plus.

26. PMS SERIES 40 PAVEMENT MANAGEMENT FULLY OPTIMIZED REHABILITATION PROGRAM - Pavement Management System, Inc., Denver, CO
PMS Series 40 anticipates needs for future rehabilitation, by using marginal analysis to generate to most optimum rehabilitation. It analyzes rehabilitation priorities over a user-specified program period. In addition, it considers the impact of budget levels of performance or quality of the system. Moreover, it generates needs for annual routine maintenance programs, and allows for user modifiable costs and local performance curves. System requirements are IBM PC XT/AT or PS/2 compatible, 10-2 MB hard disk, 640K RAM, and dBase III Plus.

27. PMS SERIES 50 PROJECT LEVEL REHABILITATION ANALYSIS - Pavement Management Systems, Inc., Denver, CO
PMS Series 50 uses comprehensive deflection testing and distress analysis to generate theoretical needs for asphalt overlay thickness at each test station. It is based on specified design life and projected current traffic levels (load factors included). It generates an estimated subgrade modules and CBR or R values, and performs economic analysis on selected rehabilitation strategies. System requirements are IBM PC XT/AT or PS/2 compatible, 10-20 MB hard disk, 640K RAM, and dBase III Plus.

28. PMS SERIES 60 CUSTOMIZED PAVEMENT MANAGEMENT SYSTEM - Pavement Management Systems, Inc., Denver, CO
PMS Series 60 is a totally designed and customized pavement management system. It can include any aspect of the other PMS Series programs, as well as local pavement management needs. It can build upon existing databases and/or systems. System requirements are Can use any agency system in existence or be designed for a new system.

29. REGIONAL HIGHWAY PLANNING - Capital District Transportation Committee, Albany, NY
Projects highway conditions and maintenance costs up to 99 years into future. Takes current highway condition scores and checks them against matrix of repair policies. If repair specified, road, repaired, cost saved. System requirements are IBM-PC, PC/XT, PC/AT.

30. ROAD MANAGER - Christman Associates, Inc., Chester, CT
The Road Manager includes modules for general roadway information, drainage, utility, improvement planning and budgeting, maintaining a repair history, and diagramming roadways. The program allows for custom reports to be generated through a menu driven generator. It allows the user to define index calculations, repair categories, prioritization, budget preparation, and improvement plan. Graphics such as bar charts and line graphs are included. System requirements are IBM PC or PS/2 compatible, PC.MS DOS, 512K RAM, a hard disk, and a 132 Column Printer.

31. RSMMS (Road and Street Maintenance Management System) - Wilbur Smith Associates, BTML Division, Falls Church, VA
The BTML/RSMSS is a road and street maintenance management tool that provides the manager with an inventory of the physical and functional characteristics of each road or street in the transportation network. It allows incorporation of specific performance guidelines which define each projected maintenance activity, applies standardized maintenance procedures; specifies labor, equipment and materials requirements; establishes accepted produceability rates and recommends safety funds based on labor, equipment and materials; and produces reports of work accomplished, accounting for costs and resources used. System requirements are IBM XT/AT compatible, PC/MS DOS 2.0+, 640K RAM, 10 MB hard disk.

32. RSMS (Road Surface Management System) - Technology Transfer Center, University of New Hampshire, Durham, NH
The RSMS is tailored to meet the needs of any city or town. Implementation of the system involves identification of the road network, evaluation of road surface conditions and specification of maintenance practices and associated costs. The program yields multiple reports from which the municipality can select the most appropriate repair strategy. The RSMS uses a laptop computer for all data collection and storage, an electronic digitizing tablet to enter the road surface condition information into the computer and a fifth-wheel odometer to automatically collect mileage information during the road surface condition surveys.

33. STAMPP (Systematic Technique to Analyze and Monitor Pennsylvania Pavements) - Pennsylvania Department of Transportation, Harrisburg, PA
Based on condition survey, assigns treatment based on level of deterioration. Includes Pennsylvania Automated Roadway Information system; traffic, ride quality, and pavement condition; outputs: condition summary report; strategy array matrix. System requirements are IBM PC, PC/XT, PC/AT; 512K RAM.
34. IMS-I - Public Works Software, Inc., Newington, CT
   Infrastructure management system for pavement maintenance. Provides pavement
   inventory, calculates serviceability indices; and extensive reporting and graphics. System
   requirements are IBM PC, PC/XT, PC/AT, 512K RAM.

35. IMS-II - Public Works Software, Inc., Newington, CT
   Automatically determines maintenance strategies. Analyzes life cycle costs of maintenance
   alternatives. Links maintenance alternatives with highest benefit/cost ratio for planning;
   overdue preventive maintenance reports, equipment inventory list, others. System
   requirements are IBM PC, PC/XT, PC/AT; 640K RAM.

36. IMS PAVEMENT MANAGEMENT SYSTEM - Infrastructure Management, Arlington
   Heights, IL
   Eight pavement management modules including inventory, condition, factor, priority (by
   condition and traffic use), rehabilitation (150 strategies), five year cost/benefit ratio, and five
   year programs based on performance, etc. System requirements are IBM-PC, PC/XT,
   PC/AT; 512K RAM.

37. INFRACON - Infrastructure Management Consultants, Inc., Arlington Heights, IL
   PAVER - and Micro PAVER-based applications which integrate data collected with larger
   infrastructure management databases including mapping/CADD module. System
   requirements are IBM-PC, PC/XT, PC/AT; 512K RAM (Ref. B1).

38. MAPCON - McTrans Center, Gainesville, FL
   Includes several pavement-related programs and provides paths to all the individual
   programs, enabling the user to access programs for pavement safety, roughness, structural
   capacity, and to analyze surface conditions. System requirements are IBM-PC, PC/XT,
   PC/AT; 512K RAM; hard disk recommended.

39. PUBLIC WORKS MAINTENANCE MANAGEMENT SYSTEM - Burke & Associates, Inc.
   Aurora, CO
   The Public Works Maintenance Management System generates plans, budgets, work
   orders, and work progress reports for street, park, utility and other maintenance work. The
   program also provides performance and cost information by activity or project, as well as
   detail and summary data by work location (such as street segment or park). Easy-to-follow
   menus enable the user to build the data files and to generate a number of helpful reports.
   The software also features on-line data entry of work reports that can be integrated with
   existing payroll, accounting and pavement management systems. System requirements
   are IBM PC XT/AT/ or PS/2 compatible, PC/MS DOS, 512K RAM, A 10MB hard disk. Also
   requires PC INFO database software from Henco, Inc.

40. ROADWAY MANAGEMENT - Engineering Technology Corp., Rolling Meadows, IL
   Shares pavement management inventory database with Infrastructure Management Series.
   Offers planning and historical data by block or control section. System requirements are
   IBM-PC, PC/XT, PC/AT, 512K RAM, hard disk recommended.

41. STREET INVENTORY SYSTEM - Hoffman Associates, Rockville, MD
   The Street Inventory System is a microcomputer-based system that contains essential
   information about pavement and other physical features located within street rights-of-way.
   The program captures, stores and retrieves information such as pavement type, width,
condition, classification, jurisdiction, traffic volume, drainage systems and sidewalks. The system is available either as a stand-alone product or as a module to other public works maintenance systems developed by the company.

42. ARAI 1 (Automated Road Inventory Applications, Version 1) - MHM Associates, Inc., South Bend, IN
ARAI 1 verifies and creates a road inventory and highway performance database by automatically collecting, compiling, analyzing, and summarizing inventory information covering defined portions of public road system. The program can be used in a mobile computer interfaced with a Distance Measuring Device and collect data for compiling statistics on mileage and surface characteristics of various types of roads, street, structures and other visible fixed points. It can also be used to collect statistics on surface type, width, condition, and type/severity of surface distress. The program can analyze pavement defects and recommend corrective repair strategies. System requirements are IBM PC compatible; 512K RAM, MS-DOS; Hard disk; and 80 column printer.

43. ARAN and PURD - Federal Technical Surveys, Paris, Ontario, Canada
Two devices, ARAN (Automatic Road Analyzer) and PURD (Portable Universal Roughness Device) to collect data; provides summaries of surface distress for pavement sections. Outputs graphs, statistical summaries for each section, life cycle costs. System requirements are IBM-PC, PC/XT, PC/AT, DEC Rainbow; 640 K RAM.

44. ARIA 2 (Automated Road Image Analyzer, Version 2) - MHM Associates, Inc., South Bend, IN
ARIA 2 can sample video log tape or direct video log of road surface distress recording and process video images to determine crack density or other distresses. The use can analyze one frame (unit) or several thousand units along the length of any road. The units sampled and their condition (distress density) is stored in a database with other pertinent information for pavement management purposes. System requirements are IBM PC compatible, 512K RAM, PC/MS 3.0+; Digitizer, VCR; Graphics Card; 80 Column printer.

45. PAS 1 - Pavedex, Inc., Spokane, WA
PAS 1 is a fully automated system that analyzes pavement images, identifies the type of pavement surface deterioration and then quantifies that data. The enhanced images are stored on video tapes and are accessible for data review and condition verification. The image processing software package is compatible with most microcomputer system formats.
APPENDIX B. BRANCH LIST REPORT
**BRANCH LISTING REPORT**

**Agency Name:** SOUTH KINGSTOWN PUBLIC WORKS DEPARTMENT.  
**Agency Number:** 00001  
**Report Date:** FEB/24/1992

**Branch Number:** All  
**Branch Use:** All  
**Number of Sections:** All  
**Branch Area:** All

| BRANCH NUMBER | BRANCH NAME                  | BRANCH USE | BRANCH AREA (SF) | NUMBER OF SECTIONS |
|---------------|------------------------------|------------|------------------|--------------------|
| 10010         | BARBER'S POND ROAD          | ROADWAY    | 34730.00         | 5                  |
| 10015         | BLACKBIRD ROAD              | ROADWAY    | 22968.00         | 1                  |
| 10020         | DUG-WAY-BRIDGE ROAD         | ROADWAY    | 129540.00        | 4                  |
| 10030         | FAIRGROUNDS DRIVE           | ROADWAY    | 57225.00         | 1                  |
| 10040         | GLEN ROCK ROAD              | ROADWAY    | 199600.00        | 3                  |
| 10050         | HUNDRED ACRE POND ROAD      | ROADWAY    | 157254.00        | 3                  |
| 10060         | HUNDRED ACRE POND RD EAST   | OTHER      | 39028.00         | 1                  |
| 10070         | JAMES TRAIL                 | ROADWAY    | 29408.00         | 1                  |
| 10080         | JINGLE VALLEY ROAD          | OTHER      | 0.00             | 0                  |
| 10090         | LAUREL LANE                 | ROADWAY    | 57380.00         | 1                  |
| 10110         | LIBERTY LANE                | ROADWAY    | 133749.00        | 1                  |
| 10115         | OLD USQUEPAUGH ROAD         | ROADWAY    | 13440.00         | 1                  |
| 10120         | QUEEN'S RIVER DRIVE         | ROADWAY    | 34086.00         | 1                  |
| 10130         | SAND TURN ROAD              | ROADWAY    | 120665.00        | 1                  |
| 10140         | WAITES CORNER ROAD          | ROADWAY    | 173925.00        | 6                  |
| 10150         | YAWGOO POND ROAD            | ROADWAY    | 59058.00         | 1                  |
| 20010         | ALVIN ROAD                  | ROADWAY    | 8272.00          | 1                  |
| 20020         | BAYBERRY ROAD               | ROADWAY    | 19700.00         | 1                  |
| 20030         | BERTH AVENUE                | ROADWAY    | 3600.00          | 1                  |
| 20040         | BILLS ROAD                  | ROADWAY    | 34200.00         | 1                  |
| 20050         | BRIAR LANE                  | ROADWAY    | 30082.00         | 1                  |
| 20060         | CAMPUS AVENUE               | ROADWAY    | 25732.00         | 1                  |
| 20070         | CARRIAGE LANE               | ROADWAY    | 12600.00         | 1                  |
| 20080         | CEDAR CIRCLE                | ROADWAY    | 10070.00         | 1                  |
| 20090         | CHAPEL WAY                  | ROADWAY    | 27600.00         | 1                  |
| 20100         | DIANE DRIVE                 | ROADWAY    | 16380.00         | 1                  |
| 20110         | FORTIN ROAD                 | ROADWAY    | 36480.00         | 1                  |
| 20120         | FRANK AVENUE                | ROADWAY    | 26262.00         | 1                  |
| 20130         | FRENCH ROAD                 | ROADWAY    | 9400.00          | 1                  |
| 20140         | OLD NORTHERN ROAD           | ROADWAY    | 181088.00        | 5                  |
| 20150         | OLD ROSE HILL ROAD          | ROADWAY    | 22180.00         | 3                  |
| 20160         | PLAINS ROAD                 | ROADWAY    | 151264.00        | 2                  |
| 20170         | RAILROAD ACCESS ROAD        | ROADWAY    | 36360.00         | 1                  |
| 20180         | UPPER COLLEGE ROAD          | ROADWAY    | 39254.00         | 1                  |
| 20190         | STONY FORT ROAD             | ROADWAY    | 114095.00        | 2                  |
| 20200         | WAITES CORNER ROAD          | ROADWAY    | 40215.00         | 1                  |
| 30010         | ASH STREET                  | OTHER      | 0.00             | 0                  |
| 30020         | BERGOLD AVENUE              | OTHER      | 0.00             | 0                  |
| 30030         | BORDER DRIVE                | ROADWAY    | 16008.00         | 1                  |
| 30040         | COOK AVENUE                 | OTHER      | 0.00             | 0                  |
| 30050         | EDWARDS AVENUE              | OTHER      | 0.00             | 0                  |
| 30060         | GRANT AVENUE                | OTHER      | 0.00             | 0                  |
| 30070         | HABEN AVENUE                | OTHER      | 0.00             | 0                  |
| 30080         | HARCOURT AVENUE             | OTHER      | 0.00             | 0                  |
| 30090         | HOLLAND DRIVE               | ROADWAY    | 18054.00         | 1                  |
| 30100         | HILLSIDE ROAD               | ROADWAY    | 28581.00         | 1                  |
| BRANCH NUMBER | BRANCH NAME                      | BRANCH USE | BRANCH AREA (SF) | NUMBER OF SECTIONS |
|---------------|----------------------------------|------------|------------------|--------------------|
| 30110         | JOHN STREET                      | OTHER      | .00              | 0                  |
| 30115         | KIMBERLY DRIVE                   | ROADWAY    | 29640.00         | 1                  |
| 30120         | KINGSTON AVENUE                 | OTHER      | .00              | 0                  |
| 30130         | LAFAYETT AVENUE                 | OTHER      | .00              | 0                  |
| 30140         | MAPLE STREET                    | OTHER      | .00              | 0                  |
| 30150         | MIDDLEBRIDGE ROAD               | ROADWAY    | 325520.00        | 3                  |
| 30160         | MITCHELL AVENUE                 | ROADWAY    | 29735.00         | 1                  |
| 30170         | NARRAGANSETTI AVENUE            | ROADWAY    | 17250.00         | 1                  |
| 30180         | OAK COURT                        | ROADWAY    | 1596.00          | 1                  |
| 30190         | PECHAM AVENUE                   | ROADWAY    | 4715.00          | 1                  |
| 30200         | PINE COURT                       | ROADWAY    | 4715.00          | 1                  |
| 30210         | POLLOCK AVENUE                  | ROADWAY    | 4715.00          | 1                  |
| 30220         | RADIAL DRIVE                    | ROADWAY    | 4715.00          | 1                  |
| 30230         | RIVER AVENUE                    | ROADWAY    | 4715.00          | 1                  |
| 30240         | RIVERSIDE DRIVE                 | ROADWAY    | 4715.00          | 1                  |
| 30250         | SEAVIEW AVENUE                  | ROADWAY    | 4715.00          | 1                  |
| 30260         | SHADBUSH TRAIL                  | ROADWAY    | 4715.00          | 1                  |
| 30270         | SUMMIT AVENUE                   | ROADWAY    | 13040.00         | 1                  |
| 30280         | TORREY ROAD                      | ROADWAY    | 72150.00         | 1                  |
| 30290         | WAKEFIELD AVENUE                | ROADWAY    | 3900.00          | 1                  |
| 30300         | WAMSLEY LANE                    | ROADWAY    | 3900.00          | 1                  |
| 30310         | WINTMAN DRIVE                   | ROADWAY    | 3900.00          | 1                  |
| 40010         | ANTIQUE ROAD                    | ROADWAY    | 3900.00          | 1                  |
| 40020         | ATLANTIC AVENUE                 | ROADWAY    | 40530.00         | 1                  |
| 40030         | ATLANTIC STREET                 | ROADWAY    | 16236.00         | 1                  |
| 40040         | BARNEY AVENUE                   | ROADWAY    | 16236.00         | 1                  |
| 40050         | BASS ROAD                       | ROADWAY    | 23166.00         | 2                  |
| 40060         | BLACKBERRY HILL DRIVE           | ROADWAY    | 92893.00         | 3                  |
| 40070         | BLISS ROAD                      | ROADWAY    | 24273.00         | 1                  |
| 40080         | BOW STREET                      | ROADWAY    | 24273.00         | 1                  |
| 40090         | BREAKWATER ROAD                 | ROADWAY    | 38157.00         | 2                  |
| 40100         | CARDS POND ROAD                 | ROADWAY    | 139702.00        | 1                  |
| 40110         | CENTRAL STREET                  | ROADWAY    | 9216.00          | 1                  |
| 40120         | CHAPPELL ROAD                   | ROADWAY    | 9216.00          | 1                  |
| 40130         | CODDINGTON WAY                  | ROADWAY    | 9216.00          | 1                  |
| 40140         | COMMUNITY DRIVE                 | ROADWAY    | 9216.00          | 1                  |
| 40150         | COVE STREET                     | ROADWAY    | 7326.00          | 1                  |
| 40160         | DAVIS STREET                    | ROADWAY    | 7326.00          | 1                  |
| 40170         | DORY COURT                      | ROADWAY    | 8802.00          | 1                  |
| 40180         | EMILY LANE                      | ROADWAY    | 8802.00          | 1                  |
| 40190         | GALE DRIVE                      | ROADWAY    | 32184.00         | 1                  |
| 40200         | GOOSEBERRY ROAD                 | ROADWAY    | 113750.00        | 1                  |
| 40210         | HARTFORD AVENUE                 | ROADWAY    | 24800.00         | 1                  |
| 40220         | HEATHER HOLLOW DRIVE            | ROADWAY    | 31044.00         | 1                  |
| 40230         | HILL ROAD                       | ROADWAY    | 8109.00          | 1                  |
| 40240         | HOLDEN ROAD                     | ROADWAY    | 8109.00          | 1                  |
| 40250         | HOWARD CIRCLE                   | ROADWAY    | 20420.00         | 1                  |
| 40260         | HOWARD CIRCLE                   | ROADWAY    | 7722.00          | 1                  |
| 40270         | NULL STREET                     | ROADWAY    | 19656.00         | 1                  |
| 40280         | LAKE AVENUE                     | ROADWAY    | 40000.00         | 1                  |
| 40290         | LEEWARD LANE                    | ROADWAY    | 40000.00         | 1                  |
| 40300         | LOWER FARM ROAD                 | ROADWAY    | 15813.00         | 1                  |
| 40310         | MARINE ROAD                     | ROADWAY    | 15813.00         | 1                  |
| 40320         | MATUNUCK BEACH ROAD             | ROADWAY    | 260303.00        | 3                  |
| BRANCH NUMBER | BRANCH NAME                             | BRANCH USE | BRANCH AREA (SF) | NUMBER OF SECTIONS |
|---------------|-----------------------------------------|------------|------------------|-------------------|
| 40325         | MATUNUCK SCHOOL HOUSE RD.               | ROADWAY    | 123486.00        | 1                 |
| 40330         | MEADOW STREET                           | ROADWAY    | 15113.00         | 1                 |
| 40340         | MILL POND ROAD                          | OTHER      | 0.00             | 0                 |
| 40350         | MITTENDORF ROAD                         | OTHER      | 0.00             | 0                 |
| 40360         | MOONSTONE BEACH ROAD                    | ROADWAY    | 157208.00        | 2                 |
| 40370         | NINIORET AVENUE                         | OTHER      | 0.00             | 0                 |
| 40380         | NORTH WEEDEN ROAD                       | ROADWAY    | 17871.00         | 1                 |
| 40390         | OCEAN AVENUE                            | ROADWAY    | 23466.00         | 1                 |
| 40400         | OLD SUCCOTASH ROAD                      | ROADWAY    | 53438.00         | 2                 |
| 40410         | OLIVER DRIVE                            | ROADWAY    | 6972.00          | 1                 |
| 40420         | OSPREY ROAD                             | ROADWAY    | 86800.00         | 1                 |
| 40430         | PARK AVENUE                             | ROADWAY    | 30996.00         | 1                 |
| 40440         | PARTRIDGE LANE                          | OTHER      | 0.00             | 0                 |
| 40450         | PENINSULA ROAD                          | OTHER      | 0.00             | 0                 |
| 40460         | PERRYWINKLE ROAD                        | ROADWAY    | 10605.00         | 1                 |
| 40470         | POINT AVENUE                            | OTHER      | 0.00             | 0                 |
| 40480         | PORT AVENUE                             | OTHER      | 0.00             | 0                 |
| 40490         | POTTER ROAD                             | OTHER      | 0.00             | 0                 |
| 40500         | PROSPECT ROAD                           | ROADWAY    | 47744.00         | 1                 |
| 40510         | SEABREEZE TERRACE                       | ROADWAY    | 22950.00         | 1                 |
| 40520         | SEBAG COURT                             | OTHER      | 0.00             | 0                 |
| 40530         | SHANNON ROAD                            | OTHER      | 0.00             | 0                 |
| 40540         | SHEDDOW POINT ROAD                      | OTHER      | 0.00             | 0                 |
| 40550         | SHELDRAKE ROAD                          | ROADWAY    | 17024.00         | 1                 |
| 40560         | SHERMAN ROAD                            | ROADWAY    | 17367.00         | 1                 |
| 40570         | SILVA STREET                            | OTHER      | 0.00             | 0                 |
| 40580         | SOUTH WEEDEN ROAD                       | ROADWAY    | 51425.00         | 1                 |
| 40590         | STEEDMAN ROAD                           | OTHER      | 0.00             | 0                 |
| 40600         | Succotash Road                         | OTHER      | 0.00             | 0                 |
| 40610         | SUMMER STREET                           | ROADWAY    | 16320.00         | 1                 |
| 40620         | SYCAMORE LANE                           | OTHER      | 0.00             | 0                 |
| 40630         | TIDAL STREET                            | ROADWAY    | 8775.00          | 1                 |
| 40640         | WAGER LANE                              | ROADWAY    | 5600.00          | 1                 |
| 40650         | WASHINGTON STREET                       | ROADWAY    | 44901.00         | 2                 |
| 40660         | WATER STREET                            | OTHER      | 0.00             | 0                 |
| 40670         | WEST STREET                             | ROADWAY    | 13091.00         | 1                 |
| 40680         | WEST SIDE ROAD                          | ROADWAY    | 5886.00          | 1                 |
| 40690         | WESTCOTE CLOSE                          | OTHER      | 0.00             | 0                 |
| 40700         | WESTCOTE DRIVE                          | OTHER      | 0.00             | 0                 |
| 40710         | WINDSWEPT DRIVE                         | OTHER      | 0.00             | 0                 |
| 40720         | WINDWARD ROAD                           | OTHER      | 0.00             | 0                 |
| 50010         | ASPEN ROAD                              | ROADWAY    | 25231.00         | 1                 |
| 50020         | AUBURN ROAD                             | ROADWAY    | 62866.00         | 2                 |
| 50030         | BALSAM ROAD                             | ROADWAY    | 62223.00         | 1                 |
| 50040         | BAYBERRY AVENUE                         | OTHER      | 0.00             | 0                 |
| 50050         | BEDFORD DRIVE                           | ROADWAY    | 36772.00         | 1                 |
| 50060         | BIRCH ROAD                              | ROADWAY    | 19881.00         | 5                 |
| 50070         | BORDER AVENUE                           | OTHER      | 0.00             | 0                 |
| 50080         | BROWNING STREET                         | ROADWAY    | 32256.00         | 1                 |
| 50090         | CANTERBURY ROAD                         | ROADWAY    | 46900.00         | 1                 |
| 50100         | CARPENTER DRIVE                         | ROADWAY    | 81660.00         | 1                 |
| 50110         | CHARLESTOWN BEACH ROAD                  | OTHER      | 0.00             | 0                 |
| 50120         | COAST GUARD AVENUE                      | ROADWAY    | 7568.00          | 1                 |
BRANCH LISTING REPORT

Agency Name: SOUTH KINGSTOWN PUBLIC WORKS DEPARTMENT.
Agency Number: 00001
Report Date: FEB/24/1992

| BRANCH NUMBER | BRANCH NAME               | BRANCH USE | AREA (SF) | NUMBER OF SECTIONS |
|---------------|---------------------------|------------|-----------|-------------------|
| 50130         | CORY ROAD                 | ROADWAY    | 16800.00  | 1                 |
| 50140         | DARTMOUTH LANE            | ROADWAY    | 6104.00   | 1                 |
| 50150         | EASTERN VIEW AVENUE       | ROADWAY    | 14966.00  | 2                 |
| 50160         | ELM ROAD                  | ROADWAY    | 14292.00  | 1                 |
| 50170         | GREEN HILL AVENUE         | ROADWAY    | 227368.00 | 2                 |
| 50180         | GREEN HILL BEACH ROAD     | ROADWAY    | 52344.00  | 1                 |
| 50190         | HEMLOCK ROAD              | ROADWAY    | 19550.00  | 1                 |
| 50200         | HILL TOP AVENUE           | ROADWAY    | 96124.00  | 1                 |
| 50210         | HOLLY ROAD                | ROADWAY    | 58652.00  | 1                 |
| 50220         | JUNIPER ROAD              | ROADWAY    | 11898.00  | 3                 |
| 50230         | LAND ’N SEA DRIVE         | ROADWAY    | 309000.00 | 2                 |
| 50240         | LAUREL ROAD               | ROADWAY    | 5256.00   | 1                 |
| 50250         | MATUNUCK SCHOOL HOUSE RD. | ROADWAY    | 102938.00 | 1                 |
| 50260         | MAPLE DRIVE               | ROADWAY    | 19220.00  | 1                 |
| 50270         | MAUTUCKET ROAD            | ROADWAY    | 23345.00  | 1                 |
| 50280         | MIDDLE ROAD               | OTHER      | .00       | 0                 |
| 50290         | OAK ROAD                  | ROADWAY    | 24960.00  | 1                 |
| 50300         | OLD SHANNOCK ROAD         | OTHER      | .00       | 0                 |
| 50310         | ROSE BRIAR AVENUE         | ROADWAY    | 14016.00  | 1                 |
| 50320         | SHEPHERD DRIVE            | ROADWAY    | 27896.00  | 1                 |
| 50340         | SPRUCE ROAD               | ROADWAY    | 9656.00   | 2                 |
| 50350         | TUPERO ROAD               | ROADWAY    | 9150.00   | 1                 |
| 50355         | TWIN PENINSULA AVENUE     | ROADWAY    | 262125.00 | 2                 |
| 50370         | WEST VIEW DRIVE           | ROADWAY    | 91000.00  | 1                 |
| 60010         | GRAVELLY HILL ROAD        | ROADWAY    | 39100.00  | 1                 |
| 60020         | LIBERTY LANE              | ROADWAY    | 188820.00 | 2                 |
| 60030         | MOONSTONE BEACH ROAD      | ROADWAY    | 9150.00   | 1                 |
| 60040         | SHANNOCK HILL ROAD        | ROADWAY    | 12825.00  | 1                 |
| 60050         | SHERMAN AVENUE            | ROADWAY    | 28210.00  | 1                 |
| 60060         | WATSON ROAD               | ROADWAY    | 281915.00 | 3                 |
| 60070         | WENDY LANE                | ROADWAY    | 30288.00  | 1                 |
| 60080         | WORDENS POND ROAD         | ROADWAY    | 23230.00  | 1                 |
| 70010         | ANDRE AVENUE              | ROADWAY    | 6534.00   | 1                 |
| 70020         | ARROW HEAD TRAIL          | ROADWAY    | 8740.00   | 1                 |
| 70030         | BARBER LANE               | ROADWAY    | 92630.00  | 1                 |
| 70040         | BEVERLEY LANE             | ROADWAY    | 3360.00   | 1                 |
| 70050         | BIG WATER ROAD            | ROADWAY    | 242811.00 | 1                 |
| 70060         | BISCUIT CITY ROAD         | ROADWAY    | 27792.00  | 1                 |
| 70070         | BOW AND ARROW TRAIL       | ROADWAY    | 41600.00  | 1                 |
| 70080         | BROAD ROCK ROAD           | ROADWAY    | 45690.00  | 1                 |
| 70090         | CHERRY ROAD               | ROADWAY    | 12650.00  | 1                 |
| 70100         | CLAIRE LANE               | ROADWAY    | 361023.00 | 3                 |
| 70110         | CONANT LANE               | ROADWAY    | 41600.00  | 1                 |
| 70120         | CRESTWOOD ROAD            | ROADWAY    | 462504.00 | 1                 |
| 70130         | CURTIS CORNER ROAD        | ROADWAY    | 62266.00  | 1                 |
| 70140         | ENTERPRISE TERRACE        | ROADWAY    | 25750.00  | 1                 |
| 70150         | FOREST PARK COURT         | ROADWAY    | 24504.00  | 1                 |
| 70160         | GRENBRITISH PLACE         | ROADWAY    | 19600.00  | 1                 |
# BRANCH LISTING REPORT

**Agency Name:** SOUTH KINGSTOWN PUBLIC WORKS DEPARTMENT  
**Agency Number:** 00001  
**Report Date:** FEB/24/1992

| BRANCH NUMBER | BRANCH NAME            | BRANCH USE | AREA (SF) | NUMBER OF SECTIONS |
|---------------|------------------------|------------|-----------|--------------------|
| 70210         | HOMESTEAD CIRCLE       | ROADWAY    | 8502.00   | 1                  |
| 70220         | INDIAN READ TRAIL      | ROADWAY    | 13124.00  | 1                  |
| 70230         | INDIAN TRAIL           | ROADWAY    | 31169.00  | 2                  |
| 70240         | INDIAN RUN TRAIL       | OTHER      | .00       | 0                  |
| 70250         | JOHNNY CAKE TRAIL      | ROADWAY    | 15828.00  | 2                  |
| 70260         | LARKIN POND ROAD       | OTHER      | .00       | 0                  |
| 70270         | LEGEND ROCK ROAD       | OTHER      | .00       | 0                  |
| 70280         | LEDGEWOOD ROAD         | ROADWAY    | 15525.00  | 1                  |
| 70290         | LINDEN DRIVE           | ROADWAY    | 60025.00  | 1                  |
| 70300         | LITTLE REST ROAD       | ROADWAY    | 17800.00  | 1                  |
| 70310         | LITTLE WOODS PATH      | OTHER      | .00       | 0                  |
| 70320         | LOCUST DRIVE           | ROADWAY    | 12495.00  | 1                  |
| 70330         | MARK GLEN COURT        | ROADWAY    | 6000.00   | 1                  |
| 70340         | MARION ROAD            | ROADWAY    | 15948.00  | 1                  |
| 70350         | NICHOLS ROAD           | ROADWAY    | 15019.00  | 1                  |
| 70360         | OVERHILL ROAD          | ROADWAY    | 16450.00  | 1                  |
| 70370         | PARKWOOD DRIVE         | ROADWAY    | 42042.00  | 1                  |
| 70380         | PAUL AVENUE            | ROADWAY    | 29375.00  | 1                  |
| 70390         | PEACE PIPE TRAIL       | ROADWAY    | 12579.00  | 2                  |
| 70400         | RED FEATHER TRAIL      | ROADWAY    | 5566.00   | 2                  |
| 70410         | ROLENS DRIVE           | ROADWAY    | 21420.00  | 2                  |
| 70420         | ROLLING ROCK TRAIL     | ROADWAY    | 2895.00   | 1                  |
| 70430         | ROSE HILL ROAD         | ROADWAY    | 163128.00 | 2                  |
| 70435         | SAUGATUCKET ROAD       | ROADWAY    | 323615.00 | 3                  |
| 70440         | SOUTH ROAD             | ROADWAY    | 244392.00 | 2                  |
| 70450         | STONEHENGE ROAD        | ROADWAY    | 40260.00  | 1                  |
| 70460         | SPRINGDALE DRIVE       | ROADWAY    | 44942.00  | 1                  |
| 70470         | SPRING HILL ROAD       | ROADWAY    | 19912.00  | 1                  |
| 70480         | SUNDANCE TRAIL         | ROADWAY    | 3300.00   | 1                  |
| 70490         | TABLE ROCK ROAD        | ROADWAY    | 7074.00   | 1                  |
| 70500         | THISTLEDOWN ROAD       | ROADWAY    | 10716.00  | 1                  |
| 70510         | TOMAHAWK TRAIL         | ROADWAY    | 8208.00   | 1                  |
| 70520         | VENTURA CIRCLE         | ROADWAY    | 10370.00  | 2                  |
| 70530         | KAMPUN TRAIL           | ROADWAY    | 5292.00   | 1                  |
| 70540         | WAYSIDE COURT          | ROADWAY    | 41210.00  | 1                  |
| 70550         | WESTWIND ROAD          | ROADWAY    | 3300.00   | 1                  |
| 70560         | WHITE BIRCH TRAIL      | ROADWAY    | 49272.00  | 2                  |
| 70570         | WHITE FALLS TRAIL      | ROADWAY    | 142440.00 | 3                  |
| 70580         | WHITE HORN DRIVE       | ROADWAY    | 9744.00   | 1                  |
| 80010         | ACORN COURT            | ROADWAY    | 23760.00  | 1                  |
| 80020         | ALLEN AVENUE           | ROADWAY    | 32500.00  | 1                  |
| 80030         | AMOS STREET            | ROADWAY    | 33020.00  | 1                  |
| 80040         | ARBOR WAY              | ROADWAY    | 9384.00   | 1                  |
| 80050         | ARNOLD STREET          | ROADWAY    | 17360.00  | 1                  |
| 80060         | ASA POND ROAD          | ROADWAY    | 22990.00  | 1                  |
| 80070         | AUSTIN STREET          | ROADWAY    | 17766.00  | 1                  |
| 80080         | AUDUBON DRIVE          | ROADWAY    | 4473.00   | 1                  |
| 80090         | BEECH HILL ROAD        | ROADWAY    | 13468.00  | 1                  |
| 80100         | BRIARWOOD DRIVE        | ROADWAY    | 76636.00  | 1                  |
### BRANCH LISTING REPORT

**Agency Name:** SOUTH KINGSTOWN PUBLIC WORKS DEPARTMENT  
**Agency Number:** 00001  
**Report Date:** FEB/24/1992

| BRANCH NUMBER | BRANCH NAME                  | BRANCH USE | BRANCH AREA (SF) | NUMBER OF SECTIONS |
|---------------|------------------------------|------------|------------------|--------------------|
| 80180         | BRODMOOR ROAD                | ROADWAY    | 9300.00          | 1                  |
| 80160         | BROAD ROCK ROAD              | ROADWAY    | 141714.00        | 2                  |
| 80170         | BROOKWOOD ROAD               | ROADWAY    | 37638.00         | 1                  |
| 80180         | BROWN STREET                 | ROADWAY    | 11826.00         | 1                  |
| 80190         | BOXWOOD DRIVE                | ROADWAY    | 6660.00          | 1                  |
| 80200         | CARDINAL LANE                | ROADWAY    | 17640.00         | 1                  |
| 80210         | CASWELL STREET               | ROADWAY    | 8480.00          | 1                  |
| 80220         | CENTRAL AVENUE               | ROADWAY    | 10890.00         | 1                  |
| 80230         | CHARLES STREET               | ROADWAY    | 14612.00         | 1                  |
| 80240         | CHAPPLE STREET               | ROADWAY    | 3708.00          | 1                  |
| 80250         | CHRISTOPHER STREET           | ROADWAY    | 30100.00         | 1                  |
| 80260         | CHERRY LANE                  | ROADWAY    | 13662.00         | 1                  |
| 80270         | CHURCH STREET                | ROADWAY    | 83102.00         | 1                  |
| 80280         | CLEVELAND STREET             | ROADWAY    | 32320.00         | 3                  |
| 80290         | COLUMBIA STREET              | ROADWAY    | 99400.00         | 1                  |
| 80300         | CONDON DRIVE                 | ROADWAY    | 52494.00         | 1                  |
| 80310         | DANE CARLIA STREET           | ROADWAY    | 8512.00          | 1                  |
| 80315         | DAV STREET                   | ROADWAY    | 18512.00         | 1                  |
| 80320         | DENDRON ROAD                 | ROADWAY    | 51974.00         | 2                  |
| 80330         | DEWBERY ROAD                 | ROADWAY    | 6160.00          | 1                  |
| 80340         | DOCKRAY STREET               | ROADWAY    | 42640.00         | 1                  |
| 80350         | DOBSON ROAD                  | ROADWAY    | 10076.00         | 1                  |
| 80360         | DONNA COURT                  | ROADWAY    | 5616.00          | 1                  |
| 80370         | DIXON STREET                 | ROADWAY    | 8942.00          | 1                  |
| 80380         | EAGLE WEST TERRACE           | ROADWAY    | 9175.00          | 1                  |
| 80390         | EDGEWATER ROAD               | ROADWAY    | 21620.00         | 1                  |
| 80400         | ELDRED COURT                 | ROADWAY    | 9008.00          | 1                  |
| 80410         | ELDERBERRY LANE              | ROADWAY    | 24080.00         | 1                  |
| 80420         | ELM STREET                   | ROADWAY    | 10185.00         | 1                  |
| 80430         | EISENHOVER PLACE             | ROADWAY    | 22965.00         | 2                  |
| 80440         | FAGAN COURT                  | ROADWAY    | 6675.00          | 1                  |
| 80450         | FOSTER SHELDON ROAD          | ROADWAY    | 30800.00         | 1                  |
| 80460         | GENTIAN DRIVE                | ROADWAY    | 33124.00         | 1                  |
| 80470         | GEORGE STREET                | ROADWAY    | 6300.00          | 1                  |
| 80480         | GEORGE SCHAEFFER STREET      | ROADWAY    | 29832.00         | 1                  |
| 80490         | GOULD STREET                 | ROADWAY    | 19416.00         | 1                  |
| 80500         | GREEN STREET                 | ROADWAY    | 13794.00         | 1                  |
| 80510         | GREGORY STREET               | ROADWAY    | 10332.00         | 2                  |
| 80520         | GREY BIRCH COURT             | ROADWAY    | 9234.00          | 1                  |
| 80530         | HARRISON AVENUE              | ROADWAY    | 7500.00          | 1                  |
| 80540         | HAZARD AVENUE                | ROADWAY    | 11070.00         | 1                  |
| 80545         | HAZARD STREET                | ROADWAY    | 10824.00         | 1                  |
| 80550         | HENDRICK STREET              | ROADWAY    | 9350.00          | 1                  |
| 80560         | HIGHLAND AVENUE              | ROADWAY    | 49032.00         | 1                  |
| 80570         | HIGHVIEW AVENUE              | ROADWAY    | 6050.00          | 1                  |
| 80580         | HILLCREST AVENUE             | ROADWAY    | 23960.00         | 2                  |
| 80585         | HOLLEY STREET                | ROADWAY    | 46560.00         | 1                  |
| 80590         | HOPE COURT                   | ROADWAY    | 4890.00          | 1                  |
| 80600         | HUNT AVENUE                  | ROADWAY    | 47050.00         | 2                  |
| 80610         | ICEHOUSE ROAD                | ROADWAY    | 9600.00          | 1                  |
| 80620         | INDIAN RUN ROAD              | ROADWAY    | 7486.00          | 1                  |
| 80630         | INKBERRY ROAD                | ROADWAY    | 15120.00         | 1                  |
| 80640         | JOHNSON PLACE                | ROADWAY    | 15210.00         | 1                  |
| BRANCH NUMBER | BRANCH NAME             | BRANCH USE | BRANCH AREA (SF) | NUMBER OF SECTIONS |
|---------------|-------------------------|------------|------------------|--------------------|
| 80650         | HOPKINS LANE            | ROADWAY    | 4667.00          | 1                  |
| 80660         | KENYON AVENUE           | ROADWAY    | 91338.00         | 1                  |
| 80670         | KENWOOD AVENUE          | ROADWAY    | 21125.00         | 1                  |
| 80680         | KIMBALL STREET          | ROADWAY    | 4928.00          | 1                  |
| 80690         | KINGWOOD COURT          | ROADWAY    | 11200.00         | 1                  |
| 80695         | LAKE STREET             | ROADWAY    | 25848.00         | 1                  |
| 80700         | LAKIN STREET            | ROADWAY    | 6175.00          | 1                  |
| 80710         | LIBERTY STREET          | ROADWAY    | 9766.00          | 1                  |
| 80720         | MACARTHUR BOULEVARD     | ROADWAY    | 44620.00         | 1                  |
| 80730         | MEADOW AVENUE           | ROADWAY    | 31510.00         | 3                  |
| 80740         | MECHANIC STREET         | ROADWAY    | 12150.00         | 1                  |
| 80750         | MELBRIDGE DRIVE         | ROADWAY    | 13225.00         | 1                  |
| 80760         | MIDDLE STREET           | OTHER      | .00              | 0                  |
| 80770         | MULBERRY DRIVE          | ROADWAY    | 56000.00         | 1                  |
| 80780         | MARRAGANSETT AVENUE     | ROADWAY    | 35450.00         | 1                  |
| 80790         | NORMANDY ROAD           | ROADWAY    | 24380.00         | 1                  |
| 80800         | NORTH ROAD              | ROADWAY    | 117912.00        | 3                  |
| 80810         | NORTHUP STREET          | ROADWAY    | 11454.00         | 1                  |
| 80820         | NYS STREET              | ROADWAY    | 6780.00          | 1                  |
| 80830         | OAK STREET              | ROADWAY    | 36126.00         | 1                  |
| 80840         | OAK DELL STREET         | ROADWAY    | 34523.00         | 2                  |
| 80850         | OAK HILL ROAD           | ROADWAY    | 22100.00         | 1                  |
| 80860         | OAKWOODS DRIVE          | ROADWAY    | 102419.00        | 1                  |
| 80870         | OLD MOUNTAIN ROAD       | ROADWAY    | 31680.00         | 1                  |
| 80875         | OLD POST ROAD           | ROADWAY    | 46920.00         | 1                  |
| 80880         | ORCHARD AVENUE          | ROADWAY    | 35075.00         | 1                  |
| 80890         | PADDY HILL ROAD         | ROADWAY    | 5180.00          | 1                  |
| 80900         | PERRY AVENUE            | OTHER      | .00              | 0                  |
| 80910         | PERSHING AVENUE         | ROADWAY    | 29650.00         | 2                  |
| 80920         | PINE STREET             | ROADWAY    | 11340.00         | 1                  |
| 80930         | PINE HILL ROAD          | ROADWAY    | 95698.00         | 2                  |
| 80940         | PINE STREET             | ROADWAY    | 10794.00         | 1                  |
| 80950         | PLEASANT STREET         | ROADWAY    | 14612.00         | 3                  |
| 80960         | POND STREET             | ROADWAY    | 139125.00        | 1                  |
| 80970         | PROSPECT AVENUE         | ROADWAY    | 16680.00         | 2                  |
| 80975         | QUAGNUIT DRIVE          | ROADWAY    | 28000.00         | 1                  |
| 80980         | RAILROAD STREET         | ROADWAY    | 25576.00         | 2                  |
| 80990         | RIVER STREET            | ROADWAY    | 36024.00         | 3                  |
| 81000         | RODMAN STREET           | ROADWAY    | 94300.00         | 1                  |
| 81010         | ROBINSON STREET         | ROADWAY    | 36532.00         | 2                  |
| 81020         | ROCKLAND DRIVE          | ROADWAY    | 17420.00         | 1                  |
| 81030         | ROSE CIRCLE             | ROADWAY    | 3335.00          | 1                  |
| 81040         | SALT POND ROAD          | ROADWAY    | 96195.00         | 1                  |
| 81050         | SAMUEL RODMAN STREET    | ROADWAY    | 14202.00         | 1                  |
| 81060         | SCHAFFER STREET         | ROADWAY    | 17625.00         | 1                  |
| 81070         | SCHOOL LANE             | ROADWAY    | 4400.00          | 1                  |
| 81080         | SCHOOL STREET           | ROADWAY    | 41050.00         | 1                  |
| 81090         | SECLUDED DRIVE          | ROADWAY    | 19500.00         | 1                  |
| 81100         | SILVER LAKE AVENUE      | ROADWAY    | 3993.00          | 2                  |
| 81110         | STEEDMAN COURT          | ROADWAY    | 9492.00          | 1                  |
| 81120         | SMITH STREET            | ROADWAY    | 9310.00          | 1                  |
| 81130         | SPENCER COURT           | OTHER      | .00              | 0                  |
| 81140         | STONEWAY ROAD           | ROADWAY    | 53160.00         | 1                  |
## BRANCH LISTING REPORT

**Agency Name:** SOUTH KINGSTOWN PUBLIC WORKS DEPARTMENT  
**Agency Number:** 00001  
**Report Date:** FEB/24/1992

| BRANCH NUMBER | BRANCH NAME                      | BRANCH USE | BRANCH AREA (SF) | NUMBER OF SECTIONS |
|---------------|----------------------------------|------------|------------------|--------------------|
| 81150         | SWEET ALLEN FARM ROAD            | ROADWAY    | 100352.00        | 1                  |
| 81160         | SWEET FERN LANE                  | ROADWAY    | 34800.00         | 1                  |
| 81170         | SUNSET AVENUE                    | ROADWAY    | 14256.00         | 1                  |
| 81190         | SPRUCE COURT                     | ROADWAY    | 10894.00         | 1                  |
| 81200         | STEVEN CIRCLE                    | ROADWAY    | 4340.00          | 1                  |
| 81210         | SPRING STREET                    | ROADWAY    | 25500.00         | 1                  |
| 81220         | TARLETON ROAD                    | ROADWAY    | 9200.00          | 1                  |
| 81230         | TOWN FARM ROAD                   | ROADWAY    | 21087.00         | 1                  |
| 81240         | TUCKER ROAD                      | ROADWAY    | 10879.00         | 1                  |
| 81250         | TUCKERTOWN ROAD                  | ROADWAY    | 218880.00        | 1                  |
| 81260         | UNCLE SAM LANE                   | OTHER      | 0.00             | 0                  |
| 81265         | UPPER TERRACE CIRCLE             | ROADWAY    | 9720.00          | 1                  |
| 81270         | VICTORY STREET                   | ROADWAY    | 18425.00         | 1                  |
| 81280         | WARNER AVENUE                    | ROADWAY    | 15813.00         | 1                  |
| 81290         | WEATHERVANE ROAD                 | ROADWAY    | 109200.00        | 1                  |
| 81300         | WHITFORD STREET                  | ROADWAY    | 39442.00         | 1                  |
| 81310         | WILLARD AVENUE                   | ROADWAY    | 96945.00         | 1                  |
| 81320         | WILSON STREET                    | ROADWAY    | 4590.00          | 1                  |
| 81325         | WINCHESTER DRIVE                 | ROADWAY    | 91200.00         | 1                  |
| 81330         | WINDSOR ROAD                     | ROADWAY    | 7848.00          | 1                  |
| 81340         | WINTER STREET                    | ROADWAY    | 43850.00         | 1                  |
| 81350         | WOOD LANE                        | OTHER      | 0.00             | 0                  |
| 81360         | WOODBINE ROAD                    | ROADWAY    | 46125.00         | 1                  |
| 81370         | WOODMAN'S TRAIL                  | ROADWAY    | 21636.00         | 1                  |
| 81380         | WOODRUFF AVENUE                  | ROADWAY    | 103950.00        | 2                  |
| 81390         | WRIGHT AVENUE                    | ROADWAY    | 20000.00         | 1                  |

**TOTALS**  
**13570793.00**  
**413**
APPENDIX C. PCI REPORTS
| BRANCH NUMBER/USE/ NAME | SECTION | LAST CONSTRUCT DATE | LAST INSPECTION DATE | PCI |
|------------------------|---------|---------------------|----------------------|-----|
| 10010 / ROADWAY        | 001/    | S / AC /            | 1062.00              | Aug/01/1982 Aug/09/1988 100 |
| BARBER'S POND ROAD     |         | CAT: A ZONE: WKNG   | AGE (YRS): 6.0       |
| 10010 / ROADWAY        | 002/    | S / ST /            | 21936.00             | Aug/01/1988 Aug/09/1988 44 |
| BARBER'S POND ROAD     |         | CAT: A ZONE: WKNG   | AGE (YRS): .0        |
| 10010 / ROADWAY        | 003/    | S / ST /            | 1400.00              | Aug/01/1982 Aug/09/1988 71 |
| BARBER'S POND ROAD     |         | CAT: A ZONE: WKNG   | AGE (YRS): 6.0       |
| 10010 / ROADWAY        | 004/    | S / AC /            | 3416.00              | Aug/01/1982 Aug/09/1988 100 |
| BARBER'S POND ROAD     |         | CAT: A ZONE: WKNG   | AGE (YRS): 6.0       |
| 10010 / ROADWAY        | 005/    | S / ST /            | 6916.00              | Aug/01/1982 Aug/09/1988 71 |
| BARBER'S POND ROAD     |         | CAT: A ZONE: WKNG   | AGE (YRS): 6.0       |
| 10015 / ROADWAY        | 001/    | T / ST /            | 22968.00             | Aug/01/1984 Jul/29/1988 89 |
| BLACKBIRD ROAD          |         | CAT: A ZONE: WKNG   | AGE (YRS): 4.0       |
| 10020 / ROADWAY        | 001/    | S / ST /            | 36000.00             | Aug/01/1981 Aug/01/1989 100 |
| DUG-WAY-BRIDGE ROAD    |         | CAT: A ZONE: WKNG   | AGE (YRS): 8.0       |
| 10020 / ROADWAY        | 002/    | S / ST /            | 4400.00              | Aug/01/1981 Aug/01/1989 100 |
| DUG-WAY-BRIDGE ROAD    |         | CAT: A ZONE: WKNG   | AGE (YRS): 8.0       |
| 10020 / ROADWAY        | 003/    | S / ST /            | 88452.00             | Aug/01/1981 Aug/01/1989 100 |
| DUG-WAY-BRIDGE ROAD    |         | CAT: A ZONE: WKNG   | AGE (YRS): 8.0       |
| 10020 / ROADWAY        | 004/    | S / X /             | 688.00               | Aug/01/1981 Aug/01/1989 100 |
| DUG-WAY-BRIDGE ROAD    |         | CAT: A ZONE: WKNG   | AGE (YRS): 8.0       |
| 10030 / ROADWAY        | 001/    | T / ST /            | 57225.00             | Aug/01/1983 Aug/02/1988 71 |
| ESTELLE DRIVE          |         | CAT: A ZONE: WKNG   | AGE (YRS): 5.0       |
| 10040 / ROADWAY        | 001/    | S / ST /            | 60000.00             | Aug/01/1988 Oct/21/1988 84 |
| FAIRGROUNDS ROAD       |         | CAT: A ZONE: WKNG   | AGE (YRS): .2        |
| 10040 / ROADWAY        | 002/    | S / ST /            | 48465.00             | Aug/01/1988 Oct/21/1988 90 |
| FAIRGROUNDS ROAD       |         | CAT: A ZONE: WKNG   | AGE (YRS): .2        |
| BRANCH NUMBER/USE/ NAME | SECTION | LAST CONSTRUCT DATE | LAST INSPECTION DATE | PCI |
|-------------------------|---------|---------------------|----------------------|-----|
| 10040 / ROADWAY         | 003/ S / ST / 83534.00 | AUG/01/1983          | NOV/08/1988          | 83  |
| FAIRGROUNDS ROAD        |         |                     |                      |     |
| 10050 / ROADWAY         | 001/ T / ST / 32357.00 | AUG/01/1981          | AUG/01/1989          | 100 |
| GLEN ROCK ROAD          |         |                     |                      |     |
| 10050 / ROADWAY         | 002/ T / ST / 94297.00 | AUG/01/1981          | AUG/01/1989          | 100 |
| GLEN ROCK ROAD          |         |                     |                      |     |
| 10050 / ROADWAY         | 003/ T / ST / 30600.00 | AUG/01/1981          | AUG/01/1989          | 100 |
| GLEN ROCK ROAD          |         |                     |                      |     |
| 10600 / ROADWAY         | 001/ S / ST / 39028.00 | JAN/01/1981          | AUG/02/1988          | 75  |
| HUNDRED ACRE POND ROAD  |         |                     |                      |     |
| 10800 / ROADWAY         | 001/ T / ST / 29408.00 | JAN/01/1960          | AUG/01/1989          | 100 |
| JAMES TRAIL             |         |                     |                      |     |
| 10100 / ROADWAY         | 001/ T / ST / 57360.00 | AUG/01/1984          | AUG/04/1988          | 75  |
| LAUREL LANE             |         |                     |                      |     |
| 10110 / ROADWAY         | 001/ S / ST / 133749.00 | AUG/01/1988         | NOV/09/1988          | 87  |
| LIBERTY LANE            |         |                     |                      |     |
| 10115 / ROADWAY         | 001/ T / AC / 13440.00 | JUN/01/1989          | JUN/16/1989          | 100 |
| OLD USQUEPAUGH ROAD     |         |                     |                      |     |
| 10120 / ROADWAY         | 001/ T / ST / 34086.00 | JAN/01/1960          | AUG/03/1988          | 82  |
| QUEEN'S RIVER DRIVE     |         |                     |                      |     |
| 10130 / ROADWAY         | 001/ T / ST / 120865.00 | AUG/01/1984          | AUG/05/1988          | 66  |
| SAND TURN ROAD          |         |                     |                      |     |
| 10140 / ROADWAY         | 001/ S / ST / 29175.00 | AUG/01/1985          | AUG/11/1988          | 76  |
| WAITES CORNER ROAD      |         |                     |                      |     |
| 10140 / ROADWAY         | 002/ S / AC / 2852.00  | AUG/01/1985          | AUG/11/1988          | 100 |
| WAITES CORNER ROAD      |         |                     |                      |     |
| 10140 / ROADWAY         | 003/ S / ST / 86760.00 | AUG/01/1985          | AUG/11/1988          | 84  |
| WAITES CORNER ROAD      |         |                     |                      |     |
| 10140 / ROADWAY         | 004/ S / AC / 984.00   | AUG/01/1985          | AUG/11/1988          | 100 |
| WAITES CORNER ROAD      |         |                     |                      |     |
| 10140 / ROADWAY         | 005/ S / AC / 1200.00  | AUG/01/1985          | AUG/11/1988          | 100 |
| WAITES CORNER ROAD      |         |                     |                      |     |
| 10140 / ROADWAY         | 006/ S / ST / 52954.00 | AUG/01/1985          | AUG/11/1988          | 66  |
| WAITES CORNER ROAD      |         |                     |                      |     |
| 10150 / ROADWAY         | 001/ T / ST / 59058.00 | AUG/01/1984          | AUG/05/1988          | 86  |
| YAWGOO POND ROAD        |         |                     |                      |     |
| BRANCH NUMBER/USE/ NAME | SECTION | LAST CONSTRUCT DATE | LAST INSPECTION DATE | PCI |
|------------------------|---------|---------------------|----------------------|-----|
| 20010 / ROADWAY        | 001/ T / ST / 8272.00 | AUG/01/1980 | SEP/14/1988 | 0   |
| ALTIN ROAD             | CAT: B | ZONE: URI | AGE (YRS): 8.1 |     |
| 20020 / ROADWAY        | 001/ S / ST / 19700.00 | AUG/01/1986 | JUL/18/1989 | 96  |
| BAYBERRY ROAD          | CAT: A | ZONE: URI | AGE (YRS): 3.0 |     |
| 20050 / ROADWAY        | 001/ T / ST / 3600.00 | AUG/01/1988 | SEP/14/1988 | 33  |
| BERTH AVENUE           | CAT: B | ZONE: URI | AGE (YRS): .1 |     |
| 20060 / ROADWAY        | 001/ T / ST / 34200.00 | AUG/01/1983 | JUN/01/1988 | 30  |
| BILLS ROAD             | CAT: B | ZONE: URI | AGE (YRS): 4.8 |     |
| 20070 / ROADWAY        | 001/ T / ST / 30082.00 | AUG/01/1986 | JUN/10/1988 | 90  |
| BRIAR LANE             | CAT: B | ZONE: URI | AGE (YRS): 1.9 |     |
| 20090 / ROADWAY        | 001/ T / ST / 25732.00 | AUG/01/1986 | JUN/15/1988 | 80  |
| CAMPUS AVENUE          | CAT: B | ZONE: URI | AGE (YRS): 1.9 |     |
| 20100 / ROADWAY        | 001/ T / AC / 12600.00 | AUG/01/1988 | AUG/01/1988 | 100 |
| CARRIAGE LANE          | CAT: B | ZONE: URI | AGE (YRS): .0 |     |
| 20110 / ROADWAY        | 001/ T / ST / 10070.00 | AUG/01/1986 | AUG/22/1988 | 94  |
| CEDAR CIRCLE           | CAT: A | ZONE: URI | AGE (YRS): 2.1 |     |
| 20120 / ROADWAY        | 001/ T / ST / 27600.00 | AUG/01/1982 | JUN/08/1988 | 71  |
| CHAPEL WAY             | CAT: B | ZONE: URI | AGE (YRS): 5.9 |     |
| 20130 / ROADWAY        | 001/ T / AC / 16380.00 | AUG/01/1980 | SEP/14/1988 | 24  |
| DIANE DRIVE            | CAT: B | ZONE: URI | AGE (YRS): 8.1 |     |
| 20160 / ROADWAY        | 001/ T / ST / 36480.00 | AUG/01/1986 | JUN/08/1988 | 54  |
| FORTIN ROAD            | CAT: B | ZONE: URI | AGE (YRS): 1.9 |     |
| 20170 / ROADWAY        | 001/ T / ST / 26262.00 | AUG/01/1980 | SEP/19/1988 | 11  |
| FRANK AVENUE           | CAT: B | ZONE: URI | AGE (YRS): 8.1 |     |
| 20180 / ROADWAY        | 001/ T / ST / 9400.00 | AUG/01/1981 | JUL/18/1989 | 63  |
| FRENCH ROAD            | CAT: A | ZONE: URI | AGE (YRS): 8.0 |     |
| 20220 / ROADWAY        | 001/ P / AC / 22296.00 | AUG/01/1983 | AUG/22/1988 | 100 |
| OLD NORTH ROAD         | CAT: A | ZONE: URI | AGE (YRS): 5.1 |     |
| 20220 / ROADWAY        | 002/ P / AC / 13896.00 | AUG/01/1983 | AUG/22/1988 | 78  |
| OLD NORTH ROAD         | CAT: A | ZONE: URI | AGE (YRS): 5.1 |     |
| 20220 / ROADWAY        | 003/ P / AC / 23232.00 | AUG/01/1983 | AUG/22/1988 | 100 |
| OLD NORTH ROAD         | CAT: A | ZONE: URI | AGE (YRS): 5.1 |     |
| 20220 / ROADWAY        | 004/ P / AC / 21696.00 | AUG/01/1983 | AUG/22/1988 | 100 |
| OLD NORTH ROAD         | CAT: A | ZONE: URI | AGE (YRS): 5.1 |     |
| 20220 / ROADWAY        | 005/ P / ST / 99968.00 | AUG/01/1983 | AUG/22/1988 | 72  |
| BRANCH NUMBER/USE/ NAME | SECTION | LAST CONSTRUCT DATE | LAST INSPECTION DATE | PCI |
|------------------------|---------|---------------------|----------------------|-----|
| OLD NORTH ROAD         |         |                     |                      |     |
| 20230 / ROADWAY        | 001/ T / AC / 2232.00 | AUG/01/1985 | JUN/17/1989 | 100 |
| OLD ROSE HILL ROAD    | 002/ T / AC / 18105.00 | AUG/01/1985 | JUN/17/1989 | 59  |
| OLD ROSE HILL ROAD    | 003/ T / AC / 1843.00 | AUG/01/1985 | JUN/17/1989 | 100 |
| PLAINS ROAD            | 001/ P / ST / 125320.00 | AUG/01/1982 | JUN/24/1988 | 62  |
| PLAINS ROAD            | 002/ P / ST / 25844.00 | AUG/01/1982 | JUN/29/1988 | 43  |
| RAILROAD ACCESS ROAD  | 001/ T / AC / 36360.00 | JUL/01/1960 | JUN/16/1989 | 3   |
| UPPER COLLEGE ROAD    | 001/ T / AC / 39254.00 | AUG/01/1960 | JUN/17/1989 | 68  |
| STONY FORT ROAD       | 001/ T / AC / 2295.00 | AUG/01/1985 | JUN/17/1989 | 100 |
| STONY FORT ROAD       | 002/ T / ST / 111800.00 | AUG/01/1985 | JUN/17/1989 | 75  |
| WAITES CORNER ROAD    | 001/ T / ST / 40215.00 | AUG/01/1988 | SEP/15/1988 | 51  |
| BORDER DRIVE          | 001/ T / AC / 16008.00 | AUG/01/1979 | APR/08/1989 | 78  |
| HOLLAND DRIVE         | 001/ T / ST / 18054.00 | AUG/01/1982 | APR/25/1989 | 67  |
| HILLSIDE ROAD         | 001/ S / ST / 31303.00 | AUG/01/1982 | APR/25/1989 | 86  |
| KIMBERLY DRIVE        | 001/ T / AC / 30875.00 | AUG/01/1979 | APR/08/1989 | 71  |
| MIDDLEBRIDGE ROAD     | 001/ F / X / 2910.00 | AUG/01/1983 | AUG/01/1983 | 100 |
| MIDDLEBRIDGE ROAD     | 002/ P / ST / 249240.00 | AUG/01/1983 | APR/20/1989 | 65  |
| MIDDLEBRIDGE ROAD     | 003/ P / ST / 73370.00 | AUG/01/1983 | MAY/23/1989 | 73  |
| BRANCH NUMBER/USE/ NAME | SECTION | NUM/RANK/SURF/AREA (SF) | LAST CONSTRUCT DATE | LAST INSPECTION DATE | PCI |
|-------------------------|---------|-------------------------|---------------------|----------------------|-----|
| 30170 / ROADWAY        | T / AC  | 29735.00                | AUG/01/1982         | APR/13/1989          | 35  |
| NARRAGANSETT AVENUE    |         |                         |                     |                      |     |
| 30190 / ROADWAY        | T / AC  | 17250.00                | AUG/01/1974         | APR/08/1989          | 83  |
| PECKHAM AVENUE         |         |                         |                     |                      |     |
| 30200 / ROADWAY        | T / AC  | 1596.00                 | AUG/01/1965         | APR/01/1989          | 41  |
| PINE COURT              |         |                         |                     |                      |     |
| 30220 / ROADWAY        | T / ST  | 4715.00                 | AUG/01/1983         | MAR/31/1989          | 79  |
| RADIAL DRIVE           |         |                         |                     |                      |     |
| 30240 / ROADWAY        | T / ST  | 48346.00                | AUG/01/1983         | APR/01/1989          | 75  |
| RIVERSIDE DRIVE        |         |                         |                     |                      |     |
| 30250 / ROADWAY        | T / ST  | 17424.00                | AUG/01/1982         | APR/08/1989          | 36  |
| SEAVIEW AVENUE         |         |                         |                     |                      |     |
| 30250 / ROADWAY        | T / ST  | 3640.00                 | AUG/01/1982         | APR/08/1989          | 100 |
| SEAVIEW AVENUE         |         |                         |                     |                      |     |
| 30260 / ROADWAY        | T / ST  | 5424.00                 | AUG/01/1983         | MAR/31/1989          | 81  |
| SHADBUSH TRAIL         |         |                         |                     |                      |     |
| 30270 / ROADWAY        | T / ST  | 13040.00                | AUG/01/1982         | APR/08/1989          | 86  |
| SUMMIT AVENUE          |         |                         |                     |                      |     |
| 30280 / ROADWAY        | P / AC  | 72150.00                | AUG/01/1987         | APR/13/1989          | 83  |
| TORREY ROAD             |         |                         |                     |                      |     |
| 30300 / ROADWAY        | T / AC  | 3900.00                 | AUG/01/1965         | APR/13/1989          | 39  |
| WALMSLEY LANE          |         |                         |                     |                      |     |
| 40020 / ROADWAY        | T / ST  | 40530.00                | AUG/01/1985         | DEC/15/1988          | 52  |
| ATLANTIC AVENUE        |         |                         |                     |                      |     |
| 40030 / ROADWAY        | T / ST  | 16236.00                | AUG/01/1983         | MAY/22/1989          | 86  |
| ATLANTIC STREET        |         |                         |                     |                      |     |
| 40050 / ROADWAY        | T / ST  | 16350.00                | AUG/01/1984         | DEC/27/1988          | 57  |
| BASS ROAD               |         |                         |                     |                      |     |
| 40050 / ROADWAY        | T / ST  | 6816.00                 | AUG/01/1984         | DEC/27/1988          | 100 |
| BASS ROAD               |         |                         |                     |                      |     |
| 40060 / ROADWAY        | S / ST  | 39817.00                | AUG/01/1984         | DEC/12/1988          | 72  |
| BLACKBERRY HILL DRIVE  |         |                         |                     |                      |     |
| 40060 / ROADWAY        | S / ST  | 21196.00                | AUG/01/1984         | DEC/22/1988          | 70  |
| BLACKBERRY HILL DRIVE  |         |                         |                     |                      |     |
| 40060 / ROADWAY        | S / AC  | 32567.00                | AUG/01/1987         | DEC/22/1988          | 100 |
| BLACKBERRY HILL DRIVE  |         |                         |                     |                      |     |

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|-------------------------|---------|---------------------|----------------------|-----|
|                         | NUM/RANK/SURF/AREA(SF) |                     |                      |     |
| 40070 / ROADWAY        | 001/ T / ST / 24273.00  | AUG/01/1983         | MAY/22/1989         | 69  |
| BLISS ROAD             | CAT: A ZONE: MTNK AGE (YRS): 5.8 |
| 40090 / ROADWAY        | 001/ S / ST / 25350.00  | AUG/01/1984         | DEC/22/1988         | 48  |
| BREAKWATER ROAD        | CAT: A ZONE: MTNK AGE (YRS): 4.4 |
| 40090 / ROADWAY        | 002/ S / ST / 12320.00  | AUG/01/1984         | DEC/22/1988         | 77  |
| BREAKWATER ROAD        | CAT: A ZONE: MTNK AGE (YRS): 4.4 |
| 40100 / ROADWAY        | 001/ S / ST / 139702.00 | AUG/01/1982         | DEC/27/1988         | 33  |
| CARDS POND ROAD        | CAT: A ZONE: MTNK AGE (YRS): |
| 40100 / ROADWAY        | 001/ T / ST / 9216.00   | AUG/01/1985         | DEC/15/1988         | 17  |
| CENTRAL STREET         | CAT: A ZONE: MTNK AGE (YRS): 3.4 |
| 40150 / ROADWAY        | 001/ T / ST / 7326.00   | AUG/01/1985         | DEC/15/1988         | 88  |
| COVE STREET            | CAT: A ZONE: MTNK AGE (YRS): 3.4 |
| 40170 / ROADWAY        | 001/ T / AC / 8802.00   | AUG/01/1965         | MAY/23/1989         | 63  |
| DORY COURT             | CAT: A ZONE: MTNK AGE (YRS): 23.8 |
| 40190 / ROADWAY        | 001/ T / AC / 32184.00  | AUG/01/1965         | MAY/23/1989         | 93  |
| GALE DRIVE             | CAT: A ZONE: MTNK AGE (YRS): 23.8 |
| 40200 / ROADWAY        | 001/ P / ST / 113750.00 | AUG/01/1983         | MAY/22/1989         | 51  |
| GOOSEBERRY ROAD        | CAT: A ZONE: MTNK AGE (YRS): 5.8 |
| 40210 / ROADWAY        | 001/ T / ST / 24800.00  | AUG/01/1983         | MAY/22/1989         | 44  |
| HARTFORD AVENUE        | CAT: A ZONE: MTNK AGE (YRS): 5.8 |
| 40220 / ROADWAY        | 001/ T / ST / 31044.00  | AUG/01/1983         | JUN/10/1989         | 61  |
| HEATHER HOLLOW DRIVE   | CAT: A ZONE: MTNK AGE (YRS): 5.9 |
| 40230 / ROADWAY        | 001/ T / ST / 8109.00   | AUG/01/1965         | MAY/22/1989         | 1   |
| HILL ROAD              | CAT: A ZONE: MTNK AGE (YRS): 23.8 |
| 40240 / ROADWAY        | 001/ T / ST / 20420.00  | AUG/01/1983         | DEC/15/1988         | 74  |
| HOLDEN ROAD            | CAT: A ZONE: MTNK AGE (YRS): 5.4 |
| 40250 / ROADWAY        | 001/ T / AC / 7722.00   | AUG/01/1980         | DEC/15/1988         | 98  |
| HOWARD CIRCLE          | CAT: A ZONE: MTNK AGE (YRS): 8.4 |
| 40260 / ROADWAY        | 001/ T / ST / 19656.00  | AUG/01/1983         | MAY/22/1989         | 65  |
| BULL STREET            | CAT: A ZONE: MTNK AGE (YRS): 5.8 |
| 40280 / ROADWAY        | 001/ T / ST / 40000.00  | AUG/01/1985         | DEC/05/1988         | 69  |
| LAKE AVENUE            | CAT: A ZONE: MTNK AGE (YRS): 3.3 |
| 40300 / ROADWAY        | 001/ S / ST / 15813.00  | AUG/01/1984         | DEC/15/1988         | 50  |
| LOWER FARM ROAD        | CAT: A ZONE: MTNK AGE (YRS): 4.4 |
| 40320 / ROADWAY        | 001/ P / AC / 137900.00 | AUG/01/1984         | JUN/06/1989         | 66  |

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| BRANCH NUMBER/USE/ NAME | SECTION NUM/RANK/SURF/AREA(SF) | LAST CONSTRUCT DATE | LAST INSPECTION DATE | PCI |
|-------------------------|---------------------------------|---------------------|----------------------|-----|
| MATUNUCK BEACH ROAD     | 40320 / ROADWAY 002 / P / AC / 53433.00 AUG/01/1984 JUN/20/1989 | 11 |
| MATUNUCK BEACH ROAD     | 40320 / ROADWAY 003 / P / AC / 68970.00 AUG/01/1984 JUN/20/1989 | 83 |
| MATUNUCK BEACH ROAD     | 40325 / ROADWAY 001 / S / ST / 123486.00 AUG/01/1982 AUG/01/1989 | 100 |
| MATUNUCK SCHOOL HOUSE RD. | 40330 / ROADWAY 001 / T / ST / 15113.00 AUG/01/1983 MAY/22/1989 | 79 |
| MOONSTONE BEACH ROAD    | 40360 / ROADWAY 001 / S / ST / 128976.00 AUG/01/1982 JUN/19/1989 | 39 |
| MOONSTONE BEACH ROAD    | 40360 / ROADWAY 002 / S / ST / 38980.00 AUG/01/1982 JUN/20/1989 | 58 |
| NORTH WEEDEN ROAD       | 40380 / ROADWAY 001 / T / ST / 17871.00 AUG/01/1984 DEC/22/1988 | 68 |
| OCEAN AVENUE            | 40390 / ROADWAY 001 / T / AC / 23446.00 AUG/01/1985 JUN/08/1989 | 66 |
| OLD SUCCOTASH ROAD      | 40400 / ROADWAY 001 / T / ST / 17138.00 AUG/01/1982 FEB/01/1989 | 59 |
| OLD SUCCOTASH ROAD      | 40400 / ROADWAY 002 / T / ST / 36300.00 AUG/01/1982 FEB/01/1989 | 60 |
| OLIVER DRIVE            | 40410 / ROADWAY 001 / T / ST / 6972.00 AUG/01/1985 DEC/27/1988 | 62 |
| OSPREY ROAD             | 40420 / ROADWAY 001 / S / AC / 86800.00 OCT/01/1979 DEC/15/1988 | 76 |
| PARK AVENUE             | 40430 / ROADWAY 001 / S / ST / 30996.00 AUG/01/1985 DEC/08/1988 | 77 |
| PERRYWINKLE ROAD        | 40460 / ROADWAY 001 / T / ST / 10605.00 AUG/01/1983 MAY/22/1989 | 83 |
| PROSPECT ROAD           | 40500 / ROADWAY 001 / T / ST / 47744.00 AUG/01/1983 JUN/10/1989 | 56 |
| SEABREEZE TERRACE       | 40510 / ROADWAY 001 / T / ST / 22950.00 AUG/01/1985 DEC/27/1988 | 58 |
| SHELLDRAKE ROAD         | 40550 / ROADWAY 001 / S / ST / 476672.00 AUG/01/1984 DEC/12/1988 | 53 |
| BRANCH NUMBER/USE/ NAME | SECTION | LAST CONSTRUCT DATE | LAST INSPECTION PCI | PCI |
|-------------------------|---------|---------------------|---------------------|-----|
| 40560 / ROADWAY         | 001/ T / ST / 17367.00 | AUG/01/1984 | MAY/22/1989 | 77 |
| SHERMAN ROAD            |         |                     |                     |     |
| 40580 / ROADWAY         | 001/ T / ST / 51425.00 | AUG/01/1984 | DEC/22/1988 | 61 |
| SOUTH WEEDEN ROAD       |         |                     |                     |     |
| 40610 / ROADWAY         | 001/ T / ST / 16320.00 | AUG/01/1965 | MAY/22/1989 | 59 |
| SUMMER STREET           |         |                     |                     |     |
| 40630 / ROADWAY         | 001/ T / AC / 8775.00 | AUG/01/1965 | MAY/23/1989 | 82 |
| TIDAL STREET            |         |                     |                     |     |
| 40640 / ROADWAY         | 001/ S / AC / 5600.00 | OCT/01/1979 | DEC/15/1988 | 100|
| WAGER LANE              |         |                     |                     |     |
| 40650 / ROADWAY         | 001/ T / ST / 26439.00 | AUG/01/1985 | NOV/23/1988 | 91 |
| WASHINGTON STREET       |         |                     |                     |     |
| 40650 / ROADWAY         | 002/ T / ST / 17934.00 | AUG/01/1985 | NOV/23/1988 | 85 |
| WASHINGTON STREET       |         |                     |                     |     |
| 40670 / ROADWAY         | 001/ T / ST / 13091.00 | AUG/01/1983 | MAY/22/1989 | 58 |
| WEST STREET             |         |                     |                     |     |
| 40680 / ROADWAY         | 001/ T / ST / 5886.00 | AUG/01/1982 | MAY/23/1989 | 32 |
| WEST SIDE ROAD          |         |                     |                     |     |
| 50010 / ROADWAY         | 001/ T / ST / 25231.00 | AUG/01/1965 | MAY/13/1989 | 91 |
| ASPEN ROAD              |         |                     |                     |     |
| 50020 / ROADWAY         | 001/ T / ST / 32760.00 | AUG/01/1965 | MAY/13/1989 | 81 |
| AUBURN ROAD             |         |                     |                     |     |
| 50020 / ROADWAY         | 002/ T / ST / 10108.00 | AUG/01/1965 | MAY/13/1989 | 76 |
| AUBURN ROAD             |         |                     |                     |     |
| 50030 / ROADWAY         | 001/ T / ST / 62223.00 | JUL/01/1974 | MAY/23/1989 | 72 |
| BALSAM ROAD             |         |                     |                     |     |
| 50050 / ROADWAY         | 001/ T / ST / 36772.00 | AUG/11/1965 | MAY/13/1989 | 76 |
| BEDFORD DRIVE           |         |                     |                     |     |
| 50060 / ROADWAY         | 001/ T / ST / 4086.00 | AUG/01/1978 | MAY/23/1989 | 57 |
| BIRCH ROAD              |         |                     |                     |     |
| 50060 / ROADWAY         | 002/ T / ST / 3705.00 | AUG/01/1978 | MAY/23/1989 | 56 |
| BIRCH ROAD              |         |                     |                     |     |
| 50060 / ROADWAY         | 003/ T / ST / 4683.00 | AUG/01/1978 | MAY/23/1989 | 10 |
| BIRCH ROAD              |         |                     |                     |     |
| 50060 / ROADWAY         | 004/ T / ST / 4122.00 | AUG/01/1978 | MAY/23/1989 | 9  |
| BIRCH ROAD              |         |                     |                     |     |
| BRANCH NUMBER/USE/ NAME | SECTION NUM/RANK/SURF/AREA (SP) | LAST CONSTRUCT DATE | LAST INSPECTION DATE | PCI |
|-------------------------|---------------------------------|---------------------|----------------------|-----|
| 50060 / ROADWAY         | 005/ T / ST / 3285.00 AUG/01/1978 MAY/23/1989 57 |                    |                      |     |
| BIRCH ROAD              | CAT: A ZONE: GRNH AGE (YRS): 10.8 |                    |                      |     |
| 50080 / ROADWAY         | 001/ T / ST / 32256.00 AUG/01/1984 MAY/14/1989 46 |                    |                      |     |
| BROWNING STREET         | CAT: A ZONE: GRNH AGE (YRS): 4.8 |                    |                      |     |
| 50090 / ROADWAY         | 001/ T / ST / 46900.00 AUG/01/1965 MAY/13/1989 64 |                    |                      |     |
| CANTERBURY ROAD         | CAT: A ZONE: GRNH AGE (YRS): 23.8 |                    |                      |     |
| 50100 / ROADWAY         | 001/ T / ST / 81660.00 AUG/01/1984 MAY/14/1989 68 |                    |                      |     |
| CARPENTER DRIVE         | CAT: A ZONE: GRNH AGE (YRS): 4.8 |                    |                      |     |
| 50120 / ROADWAY         | 001/ T / ST / 7568.00 AUG/01/1984 MAY/14/1989 78 |                    |                      |     |
| COAST GUARD AVENUE      | CAT: A ZONE: GRNH AGE (YRS): 4.8 |                    |                      |     |
| 50130 / ROADWAY         | 001/ T / AC / 16800.00 AUG/01/1988 FEB/07/1989 100 |                    |                      |     |
| COREY ROAD              | CAT: A ZONE: GRNH AGE (YRS): 4.5 |                    |                      |     |
| 50140 / ROADWAY         | 001/ T / ST / 6104.00 AUG/01/1965 MAY/13/1989 62 |                    |                      |     |
| DARTMOUTH LANE          | CAT: A ZONE: GRNH AGE (YRS): 23.8 |                    |                      |     |
| 50160 / ROADWAY         | 001/ T / AC / 9080.00 SEP/01/1970 MAY/25/1989 40 |                    |                      |     |
| ELM ROAD                | CAT: A ZONE: GRNH AGE (YRS): 18.7 |                    |                      |     |
| 50160 / ROADWAY         | 002/ T / AC / 5886.00 SEP/01/1970 MAY/25/1989 40 |                    |                      |     |
| ELM ROAD                | CAT: A ZONE: GRNH AGE (YRS): 18.7 |                    |                      |     |
| 50170 / ROADWAY         | 001/ T / ST / 14292.00 OCT/01/1970 MAY/14/1989 60 |                    |                      |     |
| GREEN HILL AVENUE       | CAT: A ZONE: GRNH AGE (YRS): 18.6 |                    |                      |     |
| 50180 / ROADWAY         | 001/ P / ST / 126720.00 AUG/01/1978 MAY/25/1989 58 |                    |                      |     |
| GREEN HILL BEACH ROAD   | CAT: A ZONE: GRNH AGE (YRS): 10.6 |                    |                      |     |
| 50180 / ROADWAY         | 002/ P / ST / 100648.00 AUG/01/1978 MAY/25/1989 67 |                    |                      |     |
| GREEN HILL BEACH ROAD   | CAT: A ZONE: GRNH AGE (YRS): 10.6 |                    |                      |     |
| 50190 / ROADWAY         | 001/ T / ST / 52344.00 JUL/01/1974 MAY/25/1989 55 |                    |                      |     |
| HEMLOCK ROAD            | CAT: A ZONE: GRNH AGE (YRS): 14.9 |                    |                      |     |
| 50200 / ROADWAY         | 001/ T / ST / 19550.00 AUG/01/1984 MAY/14/1989 66 |                    |                      |     |
| HILL TOP AVENUE         | CAT: A ZONE: GRNH AGE (YRS): 4.8 |                    |                      |     |
| 50210 / ROADWAY         | 001/ T / AC / 21160.00 JUL/01/1971 MAY/23/1989 8 |                    |                      |     |
| HOLLY ROAD              | CAT: A ZONE: GRNH AGE (YRS): 17.9 |                    |                      |     |
| 50210 / ROADWAY         | 002/ T / AC / 8340.00 JUL/01/1971 MAY/23/1989 94 |                    |                      |     |
| HOLLY ROAD              | CAT: A ZONE: GRNH AGE (YRS): 17.9 |                    |                      |     |
| 50210 / ROADWAY         | 003/ T / AC / 66624.00 JUL/01/1971 MAY/23/1989 57 |                    |                      |     |
| HOLLY ROAD              | CAT: A ZONE: GRNH AGE (YRS): 17.9 |                    |                      |     |
| 50220 / ROADWAY         | 001/ T / ST / 58652.00 AUG/01/1974 MAY/23/1989 64 |                    |                      |     |
| BRANCH NUMBER/USE/ NAME | SECTION | LAST CONSTRUCT DATE | LAST INSPECTION DATE | PCI |
|-------------------------|---------|---------------------|----------------------|-----|
| JUNIPER ROAD            | 001/ T / ST / 3450.00 OCT/01/1970 MAY/23/1989 | 39 |
| 50240 / ROADWAY          | 002/ T / AC / 4880.00 OCT/01/1970 MAY/23/1989 | 42 |
| LAUREL ROAD              | 003/ T / AC / 3568.00 OCT/01/1970 MAY/23/1989 | 36 |
| 50250 / ROADWAY          | 001/ P / ST / 94600.00 AUG/01/1982 AUG/01/1989 | 100 |
| MATTUCKET ROAD           | 001/ T / ST / 19220.00 AUG/01/1974 MAY/23/1989 | 17 |
| 50260 / ROADWAY          | 001/ T / ST / 5256.00 FEB/01/1971 MAY/14/1989 | 78 |
| OAK ROAD                 | 001/ T / ST / 19220.00 AUG/01/1974 MAY/23/1989 | 17 |
| 50310 / ROADWAY          | 001/ T / AC / 23345.00 AUG/01/1982 MAY/14/1989 | 62 |
| SHERIFF DRIVE            | 001/ T / AC / 24960.00 AUG/01/1965 MAY/13/1989 | 93 |
| 50340 / ROADWAY          | 001/ T / ST / 14016.00 AUG/01/1986 MAY/13/1989 | 67 |
| 50350 / ROADWAY          | 001/ T / ST / 27896.00 AUG/01/1986 MAY/13/1989 | 85 |
| TUPPELO ROAD             | 001/ T / ST / 6996.00 AUG/01/1984 MAY/14/1989 | 67 |
| 50355 / ROADWAY          | 001/ T / AC / 2660.00 AUG/01/1984 MAY/14/1989 | 0 |
| TWIN PENINSULA AVENUE    | 001/ T / ST / 23400.00 JUL/01/1976 DEC/06/1988 | 60 |
| 60010 / ROADWAY          | 001/ T / AC / 23345.00 MAY/14/1989 | 62 |
| GRAVELLY HILL ROAD       | 002/ S / ST / 238725.00 AUG/01/1988 SEP/22/1988 | 68 |
| BRANCH NUMBER/USE/NRANK/SURF/AREA(SF) | SECTION | LAST CONSTRUCT INSPECTION DATE | LAST PCI DATE |
|-------------------------------------|---------|-------------------------------|---------------|
| 60030 / ROADWAY MOONSTONE BEACH ROAD | 001/ T / ST 39100.00 | AUG/01/1982 | NOV/29/1988 42 |
| 60040 / ROADWAY SHANNOCK HILL ROAD | 001/ S / ST 158820.00 | JUL/01/1976 | DEC/06/1988 53 |
| 60050 / ROADWAY SHERMAN AVENUE | 001/ T / AC 9150.00 | SEP/01/1971 | SEP/22/1988 42 |
| 60060 / ROADWAY WATSON ROAD | 001/ T / ST 12825.00 | AUG/01/1984 | SEP/20/1988 61 |
| 60070 / ROADWAY WENDY LANE | 001/ T / AC 28210.00 | AUG/01/1980 | DEC/08/1988 90 |
| 60080 / ROADWAY WORDENS POND ROAD | 001/ P / ST 4400.00 | AUG/01/1986 | NOV/15/1988 50 |
| 70010 / ROADWAY ANDRE AVENUE | 001/ T / AC 30288.00 | AUG/01/1986 | JAN/27/1989 100 |
| 70020 / ROADWAY ARROW HEAD TRAIL | 001/ T / ST 23230.00 | AUG/01/1983 | MAY/25/1989 49 |
| 70030 / ROADWAY BARBER LANE | 001/ T / ST 6534.00 | AUG/01/1985 | MAR/03/1989 95 |
| 70040 / ROADWAY BEVERLEY LANE | 001/ T / ST 8740.00 | AUG/01/1985 | MAR/02/1989 70 |
| 70060 / ROADWAY BISCUIT CITY ROAD | 001/ S / ST 92620.00 | AUG/01/1984 | NOV/23/1988 75 |
| 70070 / ROADWAY BOW AND ARROW TRAIL | 001/ T / ST 3360.00 | AUG/01/1973 | MAY/23/1989 12 |
| 70080 / ROADWAY BROAD ROCK ROAD | 001/ P / ST 242811.00 | AUG/01/1985 | JUN/22/1989 16 |
| 70090 / ROADWAY CHERRY ROAD | 001/ T / ST 27792.00 | AUG/01/1985 | MAY/06/1989 96 |
| 70100 / ROADWAY CLARK LANE | 001/ T / ST 24219.00 | AUG/01/1985 | MAY/06/1989 65 |
| 70110 / ROADWAY CONANT LANE | 001/ T / ST 45690.00 | AUG/01/1985 | MAY/06/1989 94 |
| BRANCH NUMBER/USE/ NAME | SECTION NUM/RANK/SURF/AREA(SF) | LAST CONSTRUCT DATE | LAST INSPECTION DATE | PCI |
|-------------------------|-------------------------------|---------------------|---------------------|-----|
| 70120 / ROADWAY         | 001/ T / ST / 12650.00        | AUG/01/1984         | DEC/29/1988         | 88  |
| CRESTWOOD ROAD          | CAT: B ZONE: PCDL AGE (YRS): 4.4 |
| 70125 / ROADWAY         | 001/ P / ST / 217100.00       | OCT/01/1979         | JUN/20/1989         | 90  |
| CURTIS CORNER ROAD      | CAT: A ZONE: PCDL AGE (YRS): 9.7 |
| 70125 / ROADWAY         | 002/ P / AC / 45604.00        | OCT/01/1979         | JUN/21/1989         | 21  |
| CURTIS CORNER ROAD      | CAT: B ZONE: PCDL AGE (YRS): 9.7 |
| 70125 / ROADWAY         | 003/ P / ST / 117460.00       | OCT/01/1979         | JUN/21/1989         | 92  |
| CURTIS CORNER ROAD      | CAT: B ZONE: PCDL AGE (YRS): 9.7 |
| 70130 / ROADWAY         | 001/ T / AC / 41600.00        | AUG/01/1965         | JUN/10/1989         | 99  |
| ENTERPRISE TERRACE      | CAT: B ZONE: PCDL AGE (YRS): 23.9 |
| 70150 / ROADWAY         | 001/ T / ST / 6266.00         | AUG/01/1985         | MAY/06/1989         | 86  |
| GREENBRIAR PLACE        | CAT: B ZONE: PCDL AGE (YRS): 3.8 |
| 70160 / ROADWAY         | 001/ S / AC / 62504.00        | AUG/01/1986         | JAN/27/1989         | 98  |
| GREENWOOD DRIVE         | CAT: B ZONE: PCDL AGE (YRS): 2.5 |
| 70180 / ROADWAY         | 001/ T / ST / 25750.00        | AUG/01/1984         | NOV/23/1988         | 57  |
| HELME ROAD              | CAT: B ZONE: PCDL AGE (YRS): 4.3 |
| 70190 / ROADWAY         | 001/ T / AC / 24504.00        | AUG/01/1965         | JUN/10/1989         | 89  |
| HERITAGE DRIVE          | CAT: B ZONE: PCDL AGE (YRS): 23.9 |
| 70200 / ROADWAY         | 001/ T / ST / 19600.00        | AUG/01/1984         | DEC/29/1988         | 74  |
| HIGGINS DRIVE           | CAT: B ZONE: PCDL AGE (YRS): 4.4 |
| 70210 / ROADWAY         | 001/ T / AC / 8502.00         | AUG/01/1965         | JUN/10/1989         | 83  |
| HOMESTEAD CIRCLE        | CAT: B ZONE: PCDL AGE (YRS): 23.9 |
| 70220 / ROADWAY         | 001/ T / ST / 13124.00        | AUG/01/1981         | MAY/23/1989         | 9   |
| INDIAN HEAD TRAIL       | CAT: B ZONE: PCDL AGE (YRS): 7.8 |
| 70230 / ROADWAY         | 001/ T / ST / 4598.00         | AUG/01/1983         | MAY/25/1989         | 0   |
| INDIAN TRAIL            | CAT: B ZONE: PCDL AGE (YRS): 5.8 |
| 70230 / ROADWAY         | 002/ T / ST / 26571.00        | AUG/01/1983         | MAY/25/1989         | 15  |
| INDIAN TRAIL            | CAT: B ZONE: PCDL AGE (YRS): 5.8 |
| 70250 / ROADWAY         | 001/ T / ST / 2688.00         | AUG/01/1983         | MAY/25/1989         | 57  |
| JOHNNY CAKE TRAIL       | CAT: B ZONE: PCDL AGE (YRS): 5.8 |
| 70250 / ROADWAY         | 002/ T / ST / 13140.00        | AUG/01/1983         | MAY/25/1989         | 70  |
| JOHNNY CAKE TRAIL       | CAT: B ZONE: PCDL AGE (YRS): 5.8 |
| 70280 / ROADWAY         | 001/ T / ST / 15525.00        | AUG/01/1984         | DEC/29/1988         | 38  |
| LEDGEWOOD ROAD          | CAT: B ZONE: PCDL AGE (YRS): 4.4 |
| 70290 / ROADWAY         | 001/ T / ST / 60025.00        | AUG/01/1985         | MAY/06/1989         | 69  |
| BRANCH NUMBER/USE/ NAME | SECTION | LAST CONSTRUCT DATE | LAST INSPECTION DATE | PCI |
|-------------------------|---------|---------------------|----------------------|-----|
| LINDEN DRIVE            | CAT: B  | ZONE: PCDL          | AGE (YRS): 3.8       |     |
| 70300 / ROADWAY         | 001/ S / ST / 17800.00 | AUG/01/1982 | JAN/20/1989 | 47  |
| LITTLE REST ROAD        | CAT: B  | ZONE: PCDL          | AGE (YRS): 6.5       |     |
| 70320 / ROADWAY         | 001/ T / ST / 12495.00 | AUG/01/1985 | MAY/06/1989 | 76  |
| LOCUST DRIVE            | CAT: B  | ZONE: PCDL          | AGE (YRS): 3.8       |     |
| 70330 / ROADWAY         | 001/ T / ST / 6000.00 | AUG/01/1982 | JAN/20/1989 | 33  |
| MARK GLEN COURT         | CAT: B  | ZONE: PCDL          | AGE (YRS): 6.5       |     |
| 70340 / ROADWAY         | 001/ T / ST / 15948.00 | AUG/01/1982 | JAN/20/1989 | 17  |
| MARION ROAD             | CAT: B  | ZONE: PCDL          | AGE (YRS): 6.5       |     |
| 70350 / ROADWAY         | 001/ T / ST / 15019.00 | AUG/01/1984 | JUN/11/1989 | 65  |
| NICHOLS ROAD            | CAT: B  | ZONE: PCDL          | AGE (YRS): 4.9       |     |
| 70360 / ROADWAY         | 001/ T / AC / 16450.00 | AUG/01/1986 | JAN/27/1989 | 96  |
| OVERHILL ROAD           | CAT: B  | ZONE: PCDL          | AGE (YRS): 2.5       |     |
| 70370 / ROADWAY         | 001/ T / ST / 42042.00 | AUG/01/1981 | JAN/20/1989 | 6   |
| PARKWOOD DRIVE          | CAT: B  | ZONE: PCDL          | AGE (YRS): 7.5       |     |
| 70380 / ROADWAY         | 001/ T / AC / 29375.00 | AUG/01/1986 | JAN/27/1989 | 100 |
| PAUL AVENUE             | CAT: B  | ZONE: PCDL          | AGE (YRS): 2.5       |     |
| 70390 / ROADWAY         | 001/ T / ST / 4851.00 | AUG/01/1978 | MAY/23/1989 | 42  |
| PEACE PIPE TRAIL        | CAT: B  | ZONE: PCDL          | AGE (YRS): 10.8      |     |
| 70390 / ROADWAY         | 002/ T / ST / 7728.00 | AUG/01/1978 | MAY/25/1989 | 16  |
| PEACE PIPE TRAIL        | CAT: B  | ZONE: PCDL          | AGE (YRS): 10.8      |     |
| 70400 / ROADWAY         | 001/ T / ST / 2827.00 | AUG/01/1973 | MAY/23/1989 | 75  |
| RED FEATHER TRAIL       | CAT: B  | ZONE: PCDL          | AGE (YRS): 15.8      |     |
| 70400 / ROADWAY         | 002/ T / ST / 2739.00 | AUG/01/1973 | MAY/23/1989 | 0   |
| RED FEATHER TRAIL       | CAT: B  | ZONE: PCDL          | AGE (YRS): 15.8      |     |
| 70410 / ROADWAY         | 001/ T / AC / 2070.00 | AUG/01/1965 | JUN/03/1989 | 43  |
| ROLENS DRIVE            | CAT: B  | ZONE: PCDL          | AGE (YRS): 23.8      |     |
| 70410 / ROADWAY         | 002/ T / AAC / 19350.00 | JUN/01/1989 | JUN/03/1989 | 100 |
| ROLENS DRIVE            | CAT: B  | ZONE: PCDL          | AGE (YRS): 0         |     |
| 70420 / ROADWAY         | 001/ T / ST / 2895.00 | AUG/01/1982 | MAY/25/1989 | 76  |
| ROLLING ROCK TRAIL      | CAT: B  | ZONE: PCDL          | AGE (YRS): 6.8       |     |
| 70430 / ROADWAY         | 001/ P / AC / 75768.00 | AUG/01/1965 | JUN/17/1989 | 79  |
| ROSE HILL ROAD          | CAT: B  | ZONE: PCDL          | AGE (YRS): 23.9      |     |
| 70430 / ROADWAY         | 002/ P / ST / 87360.00 | AUG/01/1965 | JUN/17/1989 | 70  |
| BRANCH NUMBER/USE/ NAME | SECTION | NUM/RANK/SURF/AREA(SF) | LAST CONSTRUCT/ INSPECTION DATE | PCI |
|-------------------------|---------|------------------------|-------------------------------|-----|
| 70435 / ROADWAY         | 001/ P / AC / 160000.00 | JUN/01/1989 JUN/22/1989 | 100 |
| SAUGATUCKET ROAD        |         |                        |                               |     |
| 70435 / ROADWAY         | 002/ P / AC / 49750.00  | AUG/01/1980 JUN/22/1989   | 93  |
| SAUGATUCKET ROAD        |         |                        |                               |     |
| 70435 / ROADWAY         | 003/ P / AC / 116350.00 | AUG/01/1980 JUN/22/1989   | 93  |
| SAUGATUCKET ROAD        |         |                        |                               |     |
| 70440 / ROADWAY         | 001/ P / ST / 89544.00  | AUG/01/1985 MAY/25/1989   | 68  |
| SOUTH ROAD              |         |                        |                               |     |
| 70440 / ROADWAY         | 002/ P / AC / 154848.00 | AUG/01/1985 MAY/25/1989   | 47  |
| SOUTH ROAD              |         |                        |                               |     |
| 70450 / ROADWAY         | 001/ T / ST / 40260.00  | AUG/01/1984 JUN/11/1989   | 74  |
| STONEHENGE ROAD         |         |                        |                               |     |
| 70460 / ROADWAY         | 001/ T / ST / 44942.00  | AUG/01/1984 DEC/29/1988   | 43  |
| SPRINGDALE DRIVE        |         |                        |                               |     |
| 70470 / ROADWAY         | 001/ T / ST / 19912.00  | AUG/01/1984 JUN/11/1989   | 42  |
| SPRING HILL ROAD        |         |                        |                               |     |
| 70500 / ROADWAY         | 001/ T / ST / 7074.00   | AUG/01/1982 JUN/03/1989   | 77  |
| THISTLEDOWN ROAD        |         |                        |                               |     |
| 70510 / ROADWAY         | 001/ T / ST / 10716.00  | AUG/01/1981 MAY/23/1989   | 10  |
| TOMAHAWK TRAIL          |         |                        |                               |     |
| 70520 / ROADWAY         | 001/ T / AC / 8208.00   | AUG/01/1965 JUN/10/1989   | 100 |
| VENTURA CIRCLE          |         |                        |                               |     |
| 70530 / ROADWAY         | 001/ T / ST / 3740.00   | AUG/01/1983 MAY/25/1989   | 45  |
| WAMPUM TRAIL            |         |                        |                               |     |
| 70530 / ROADWAY         | 002/ T / ST / 6630.00   | AUG/01/1983 MAY/25/1989   | 73  |
| WAMPUM TRAIL            |         |                        |                               |     |
| 70540 / ROADWAY         | 001/ T / AAC / 5292.00  | AUG/01/1977 JUN/03/1989   | 77  |
| WAYSIDE COURT           |         |                        |                               |     |
| 70550 / ROADWAY         | 001/ T / AC / 41210.00  | AUG/01/1965 JUN/03/1989   | 100 |
| WESTWIND ROAD           |         |                        |                               |     |
| 70560 / ROADWAY         | 001/ T / ST / 3300.00   | AUG/01/1982 MAY/25/1989   | 72  |
| WHITE BIRCH TRAIL       |         |                        |                               |     |
| 70580 / ROADWAY         | 001/ T / ST / 38170.00  | AUG/01/1984 MAY/06/1989   | 55  |
| WHITE HORN DRIVE        |         |                        |                               |     |
| 70580 / ROADWAY         | 002/ T / ST / 11102.00  | AUG/01/1984 MAY/06/1989   | 100 |
| WHITE HORN DRIVE        |         |                        |                               |     |
| BRANCH NUMBER/USE/ NAME | SECTION NUM/RANK/SURF/AREA (SF) | LAST CONSTRUCT DATE | LAST INSPECTION DATE | PCI |
|------------------------|---------------------------------|---------------------|----------------------|-----|
| 80010 / ROADWAY ACORN COURT | 001 T / AC / 10080.00 AUG/01/1987 | FEB/07/1989  | 100 |
| 80020 / ROADWAY ALLEN AVENUE | 001 P / ST / 37283.00 OCT/01/1979 | JUN/21/1989  | 67 |
| 80020 / ROADWAY ALLEN AVENUE | 003 P / ST / 94416.00 OCT/01/1979 | JUN/21/1989  | 75 |
| 80030 / ROADWAY MOS STREET | 001 T / AC / 9744.00 AUG/01/1980 | JUN/10/1989  | 33 |
| 80040 / ROADWAY ARBOR WAY | 001 S / AC / 23760.00 JUL/01/1974 | JAN/17/1989  | 82 |
| 80060 / ROADWAY ASA POND ROAD | 001 T / ST / 32500.00 AUG/01/1986 | JAN/19/1989  | 80 |
| 80070 / ROADWAY AUSTIN STREET | 001 S / AAC / 33020.00 AUG/01/1977 | JAN/20/1989  | 72 |
| 80080 / ROADWAY AUDUBON DRIVE | 001 T / AAC / 9284.00 AUG/01/1977 | FEB/01/1989  | 49 |
| 80090 / ROADWAY BEECH HILL ROAD | 001 T / AC / 17360.00 JUL/01/1974 | JAN/01/1989  | 57 |
| 80100 / ROADWAY BELMONT AVENUE | 001 S / ST / 22990.00 AUG/01/1987 | DEC/27/1988  | 69 |
| 80110 / ROADWAY BENEFIT ROAD | 001 T / ST / 17766.00 AUG/01/1981 | JUN/06/1989  | 69 |
| 80120 / ROADWAY BLANCHARD PLACE | 001 T / AC / 4473.00 AUG/01/1971 | AUG/01/1989  | 100 |
| 80130 / ROADWAY BRANCH STREET | 001 T / AAC / 13468.00 AUG/01/1977 | MAY/30/1989  | 24 |
| 80140 / ROADWAY BRIARWOOD DRIVE | 001 T / AC / 76636.00 AUG/01/1985 | JAN/19/1989  | 97 |
| 80150 / ROADWAY BROADMOOR ROAD | 001 T / ST / 9300.00 AUG/01/1988 | JAN/31/1989  | 77 |
| 80160 / ROADWAY BROAD ROCK ROAD | 001 S / AC / 96112.00 AUG/01/1985 | JAN/19/1989  | 77 |
| 80160 / ROADWAY BROAD ROCK ROAD | 002 S / ST / 85602.00 AUG/01/1985 | JAN/19/1989  | 74 |
| 80170 / ROADWAY | 001 T / ST / 37638.00 AUG/01/1988 | NOV/23/1988  | 85 |
| BRANCH NUMBER/USE/ NAME | SECTION | LAST CONSTRUCT DATE | LAST INSPECTION DATE | PCI |
|------------------------|---------|---------------------|----------------------|-----|
|                        | NUM/RANK/SURF/AREA(SF) |                     |                      |     |
| BROOKWOOD ROAD         | CAT: A  | ZONE: WKFL          | AGE (YRS): .3        |     |
| 80180 / ROADWAY        | 001 / T / ST / 11826.00 | AUG/01/1980         | MAY/30/1989          | 34  |
| BROWN STREET           | CAT: B  | ZONE: WKFL          | AGE (YRS): 8.8       |     |
| 80190 / ROADWAY        | 001 / T / AC / 6860.00  | AUG/01/1986         | JAN/17/1989          | 56  |
| BOXWOOD DRIVE          | CAT: B  | ZONE: WKFL          | AGE (YRS): 2.5       |     |
| 80200 / ROADWAY        | 001 / T / AC / 17640.00 | AUG/01/1985         | JAN/19/1989          | 71  |
| CARDINAL LANE          | CAT: B  | ZONE: WKFL          | AGE (YRS): 3.5       |     |
| 80210 / ROADWAY        | 001 / T / AAC / 8480.00 | AUG/01/1977         | AUG/01/1989          | 100 |
| CASWELL STREET         | CAT: B  | ZONE: WKFL          | AGE (YRS): 12.0      |     |
| 80220 / ROADWAY        | 001 / T / AAC / 10890.00 | AUG/01/1977         | AUG/01/1989          | 100 |
| CENTRAL AVENUE         | CAT: B  | ZONE: WKFL          | AGE (YRS): 12.0      |     |
| 80230 / ROADWAY        | 001 / T / AAC / 14612.00 | AUG/01/1977         | AUG/01/1989          | 100 |
| CHARLES STREET         | CAT: B  | ZONE: WKFL          | AGE (YRS): 12.0      |     |
| 80240 / ROADWAY        | 001 / T / AC / 3708.00 | AUG/01/1972         | AUG/01/1989          | 100 |
| CHAPPELL STREET        | CAT: B  | ZONE: WKFL          | AGE (YRS): 17.0      |     |
| 80250 / ROADWAY        | 001 / S / ST / 30100.00 | AUG/01/1988         | JAN/31/1989          | 95  |
| CHRISTOPHER STREET     | CAT: B  | ZONE: WKFL          | AGE (YRS): .5        |     |
| 80260 / ROADWAY        | 001 / T / AAC / 13662.00 | AUG/01/1977         | AUG/01/1989          | 100 |
| CHERRY LANE            | CAT: B  | ZONE: WKFL          | AGE (YRS): 12.0      |     |
| 80270 / ROADWAY        | 001 / P / AC / 41250.00 | AUG/01/1979         | MAY/30/1989          | 50  |
| CHURCH STREET          | CAT: B  | ZONE: WKFL          | AGE (YRS): 9.8       |     |
| 80270 / ROADWAY        | 002 / P / AC / 16443.00 | AUG/01/1979         | JUN/13/1989          | 60  |
| CHURCH STREET          | CAT: B  | ZONE: WKFL          | AGE (YRS): 9.9       |     |
| 80270 / ROADWAY        | 003 / P / ST / 8184.00 | AUG/01/1979         | JUN/13/1989          | 13  |
| CHURCH STREET          | CAT: B  | ZONE: WKFL          | AGE (YRS): 9.9       |     |
| 80270 / ROADWAY        | 004 / P / AC / 17225.00 | AUG/01/1979         | JUN/13/1989          | 56  |
| CHURCH STREET          | CAT: B  | ZONE: WKFL          | AGE (YRS): 9.9       |     |
| 80280 / ROADWAY        | 001 / T / AAC / 9555.00 | AUG/01/1977         | AUG/01/1989          | 100 |
| CLEVELAND STREET       | CAT: B  | ZONE: WKFL          | AGE (YRS): 12.0      |     |
| 80280 / ROADWAY        | 002 / T / AAC / 5640.00 | AUG/01/1977         | AUG/01/1989          | 100 |
| CLEVELAND STREET       | CAT: B  | ZONE: WKFL          | AGE (YRS): 12.0      |     |
| 80280 / ROADWAY        | 003 / T / AAC / 17125.00 | AUG/01/1977         | AUG/01/1989          | 100 |
| CLEVELAND STREET       | CAT: B  | ZONE: WKFL          | AGE (YRS): 12.0      |     |
| 80290 / ROADWAY        | 001 / P / ST / 99400.00 | AUG/01/1977         | JUN/21/1989          | 83  |
| COLUMBIA STREET        | CAT: B  | ZONE: WKFL          | AGE (YRS): 11.9      |     |
| BRANCH NUMBER/USE/ NAME | SECTION NUM/RANK/SURF/AREA(SF) | LAST CONSTRUCT DATE | LAST INSPECTION DATE | PCI |
|-------------------------|--------------------------------|---------------------|----------------------|-----|
| 80300 / ROADWAY         | 001/ T / ST / 52494.00 AUG/01/1986 | NOV/29/1988 86     |                      |     |
| CONGDON DRIVE           | 001/ T / AC / 8512.00 AUG/01/1965 | AUG/01/1989 100    |                      |     |
| DALE CARLIA STREET      | 001/ T / ST / 19866.00 AUG/01/1969 | APR/07/1989 29     |                      |     |
| DAM STREET              | 001/ T / AC / 7512.00 AUG/01/1984 | JAN/18/1989 37     |                      |     |
| DENDRON ROAD            | 002/ T / AC / 44462.00 AUG/01/1984 | JAN/18/1989 80     |                      |     |
| DEWBERRY ROAD           | 001/ T / AC / 6160.00 AUG/01/1986 | JAN/19/1989 82     |                      |     |
| DOCKRAY STREET          | 001/ T / ST / 42640.00 AUG/01/1982 | JAN/30/1989 83     |                      |     |
| DOBSON ROAD             | 001/ T / AAC / 10076.00 AUG/01/1965 | AUG/01/1989 100    |                      |     |
| DONNA COURT             | 001/ T / ST / 5616.00 AUG/01/1986 | JUN/06/1989 79     |                      |     |
| DIXON STREET            | 001/ T / ST / 8942.00 AUG/01/1977 | JUN/01/1989 0      |                      |     |
| EAGLE NEST TERRACE      | 001/ T / AC / 9175.00 AUG/01/1979 | JAN/18/1989 64     |                      |     |
| EDGeweater ROAD         | 001/ T / ST / 21620.00 AUG/01/1965 | AUG/01/1989 100    |                      |     |
| ELDRED COURT            | 001/ T / ST / 9008.00 AUG/01/1977 | AUG/01/1989 100    |                      |     |
| ELDRED BERRY LANE       | 001/ T / AC / 24080.00 AUG/01/1989 | JUN/08/1989 100    |                      |     |
| ELM STREET              | 001/ T / AAC / 10185.00 AUG/01/1977 | AUG/01/1989 100    |                      |     |
| EISENHAUER PLACE        | 001/ T / AC / 11063.00 AUG/01/1979 | FEB/01/1989 47     |                      |     |
| EISENHAUER PLACE        | 002/ T / ST / 11902.00 AUG/01/1979 | FEB/01/1989 8      |                      |     |
| FAGAN COURT             | 001/ T / ST / 6675.00 AUG/01/1982 | JUN/16/1989 40     |                      |     |
| FAGER COURT             | 001/ T / AC / 10185.00 AUG/01/1977 | AUG/01/1989 100    |                      |     |
| BRANCH NUMBER/USE/ NAME | SECTION NUM/RANK/SURF/AREA(SF) | LAST CONSTRUCT DATE | LAST INSPECTION DATE | PCI |
|-------------------------|---------------------------------|---------------------|----------------------|-----|
| 80450 / ROADWAY         | 001/ T / AC / 30800.00          | AUG/01/1988         | JUN/08/1989          | 100 |
| FOSTER SHELDON ROAD     | CAT: B ZONE: WKFL AGE (YRS): .9 |                     |                      |     |
| 80460 / ROADWAY         | 001/ T / AC / 33124.00          | AUG/01/1986         | JAN/19/1989          | 100 |
| GENTIAN DRIVE           | CAT: B ZONE: WKFL AGE (YRS): 2.5|                     |                      |     |
| 80470 / ROADWAY         | 001/ T / AC / 6300.00           | AUG/01/1978         | DEC/29/1988          | 59  |
| GEORGE STREET           | CAT: B ZONE: WKFL AGE (YRS): 10.4|                     |                      |     |
| 80480 / ROADWAY         | 001/ T / ST / 29832.00          | NOV/01/1980         | JUN/01/1989          | 15  |
| GEORGE SCHAEFFER STREET | CAT: B ZONE: WKFL AGE (YRS): 8.6|                     |                      |     |
| 80490 / ROADWAY         | 001/ T / AAC / 19416.00         | AUG/01/1977         | DEC/30/1988          | 47  |
| GOULD STREET            | CAT: B ZONE: WKFL AGE (YRS): 11.4|                     |                      |     |
| 80500 / ROADWAY         | 001/ T / AAC / 13794.00         | AUG/01/1977         | JUN/16/1989          | 5   |
| GREEN STREET            | CAT: B ZONE: WKFL AGE (YRS): 11.9|                     |                      |     |
| 80510 / ROADWAY         | 001/ S / AAC / 6951.00          | AUG/01/1977         | DEC/27/1988          | 97  |
| GREGORY STREET          | CAT: B ZONE: WKFL AGE (YRS): 11.4|                     |                      |     |
| 80510 / ROADWAY         | 002/ S / AAC / 3381.00          | AUG/01/1977         | DEC/27/1988          | 38  |
| GREGORY STREET          | CAT: B ZONE: WKFL AGE (YRS): 11.4|                     |                      |     |
| 80520 / ROADWAY         | 001/ T / AC / 9234.00           | AUG/01/1978         | JAN/17/1989          | 49  |
| GREY BIRCH COURT        | CAT: B ZONE: WKFL AGE (YRS): 10.5|                     |                      |     |
| 80530 / ROADWAY         | 001/ T / AAC / 7500.00          | AUG/01/1977         | JAN/20/1989          | 62  |
| HARRISON AVENUE         | CAT: B ZONE: WKFL AGE (YRS): 11.5|                     |                      |     |
| 80540 / ROADWAY         | 001/ T / AAC / 11070.00         | AUG/01/1977         | AUG/01/1989          | 100 |
| HAZARD AVENUE           | CAT: B ZONE: WKFL AGE (YRS): 12.0|                     |                      |     |
| 80545 / ROADWAY         | 001/ T / AC / 10624.00          | AUG/01/1971         | AUG/01/1989          | 100 |
| HAZARD STREET           | CAT: B ZONE: WKFL AGE (YRS): 18.0|                     |                      |     |
| 80550 / ROADWAY         | 001/ T / AC / 9350.00           | AUG/01/1971         | AUG/01/1989          | 100 |
| HENDRICK STREET         | CAT: B ZONE: WKFL AGE (YRS): 18.0|                     |                      |     |
| 80560 / ROADWAY         | 001/ S / ST / 49032.00          | AUG/01/1987         | DEC/27/1988          | 93  |
| HIGHLAND AVENUE         | CAT: B ZONE: WKFL AGE (YRS): 1.4 |                     |                      |     |
| 80570 / ROADWAY         | 001/ T / AC / 6050.00           | JUN/01/1970         | JUN/16/1989          | 44  |
| HIGHVIEW AVENUE         | CAT: B ZONE: WKFL AGE (YRS): 19.0|                     |                      |     |
| 80580 / ROADWAY         | 001/ T / AC / 21160.00          | AUG/01/1980         | AUG/01/1989          | 100 |
| HILLCREST AVENUE        | CAT: B ZONE: WKFL AGE (YRS): 9.0 |                     |                      |     |
| 80580 / ROADWAY         | 002/ T / AC / 2800.00           | AUG/01/1980         | MAY/19/1989          | 56  |
| HILLCREST AVENUE        | CAT: B ZONE: WKFL AGE (YRS): 8.8 |                     |                      |     |
| 80585 / ROADWAY         | 001/ S / AC / 46560.00          | APR/01/1978         | AUG/01/1989          | 100 |
| BRANCH NAME | SECTION NUM/RANK/SURF/AREA(SF) | LAST CONSTRUCT DATE | LAST INSPECTION DATE | PCI |
|-------------|-------------------------------|---------------------|----------------------|-----|
| HOLLEY STREET | 80590 / ROADWAY 001/AC | 001/T/ST | 4890.00 | AUG/01/1973 | AUG/01/1989 | 100 |
| HOPE COURT | 80600 / ROADWAY 001/AC | 001/T/ST | 33475.00 | OCT/01/1979 | DEC/30/1988 | 72 |
| HUNT AVENUE | 80610 / ROADWAY 001/AC | 001/T/ST | 13575.00 | OCT/01/1979 | DEC/30/1988 | 62 |
| ICEHOUSE ROAD | 80620 / ROADWAY 001/AC | 001/T/ST | 7486.00 | AUG/01/1987 | JAN/18/1989 | 100 |
| INDIAN RUN ROAD | 80630 / ROADWAY 001/AC | 001/T/ST | 15120.00 | MAY/01/1989 | JUN/08/1989 | 100 |
| JOHNSON PLACE | 80640 / ROADWAY 001/AC | 001/T/ST | 15210.00 | AUG/01/1977 | JUN/06/1989 | 86 |
| HOPKINS LANE | 80650 / ROADWAY 001/AC | 001/T/ST | 9600.00 | AUG/01/1987 | JAN/18/1989 | 100 |
| KENYON AVENUE | 80660 / ROADWAY 001/AC | 001/T/ST | 91338.00 | AUG/01/1982 | JAN/11/1989 | 71 |
| KEMWOOD AVENUE | 80670 / ROADWAY 001/AC | 001/T/ST | 21125.00 | AUG/01/1987 | DEC/27/1988 | 99 |
| KIMBALL STREET | 80680 / ROADWAY 001/AC | 001/T/ST | 4928.00 | AUG/01/1980 | JUN/08/1989 | 3 |
| KINGSWOOD COURT | 80690 / ROADWAY 001/AC | 001/T/ST | 11200.00 | AUG/01/1988 | MAY/31/1989 | 100 |
| LAKE STREET | 80695 / ROADWAY 001/AC | 001/T/ST | 25848.00 | AUG/01/1977 | AUG/01/1989 | 100 |
| LARKIN STREET | 80700 / ROADWAY 001/AC | 001/T/ST | 6175.00 | AUG/01/1978 | JUN/16/1989 | 20 |
| LIBERTY STREET | 80710 / ROADWAY 001/AC | 001/T/ST | 9766.00 | AUG/01/1982 | JAN/11/1989 | 3 |
| MACARTHUR BOULEVARD | 80720 / ROADWAY 001/AC | 001/T/ST | 44620.00 | AUG/01/1979 | FEB/01/1989 | 68 |
| MEADOW AVENUE | 80730 / ROADWAY 001/AC | 001/T/ST | 7682.00 | AUG/01/1980 | AUG/01/1989 | 100 |
| BRANCH NUMBER/USE/ NAME | SECTION | LATEST CONSTRUCT DATE | LATEST INSPECTION DATE | PCI |
|-------------------------|---------|-----------------------|------------------------|-----|
| 80730 / ROADWAY MEADOW AVENUE | 002 / T / AC | 07/22/1980 | 05/04/1989 | 100 |
| 80730 / ROADWAY MEADOW AVENUE | 003 / T / AC | 07/22/1980 | 05/04/1989 | 100 |
| 80740 / ROADWAY MECHANIC STREET | 001 / T / AAC | 07/22/1980 | 05/04/1989 | 100 |
| 80750 / ROADWAY MECHANIC STREET | 001 / T / AC | 07/22/1980 | 05/04/1989 | 100 |
| 80770 / ROADWAY MULBERRY DRIVE | 001 / T / AC | 07/22/1980 | 05/04/1989 | 100 |
| 80780 / ROADWAY NARRAGANSETT AVENUE | 001 / T / AC | 07/22/1980 | 05/04/1989 | 100 |
| 80790 / ROADWAY NORMANDY STREET | 002 / T / ST | 07/22/1980 | 05/04/1989 | 100 |
| 80800 / ROADWAY NORTH ROAD | 002 / P / AAC | 07/22/1980 | 05/04/1989 | 100 |
| 80800 / ROADWAY NORTH ROAD | 003 / P / AAC | 07/22/1980 | 05/04/1989 | 100 |
| 80810 / ROADWAY NORTHUP STREET | 001 / T / AAC | 07/22/1980 | 05/04/1989 | 100 |
| 80820 / ROADWAY NYE STREET | 001 / T / ST | 07/22/1980 | 05/04/1989 | 100 |
| 80830 / ROADWAY OAK STREET | 001 / T / AAC | 07/22/1980 | 05/04/1989 | 100 |
| 80840 / ROADWAY OAK DELL STREET | 001 / T / AC | 07/22/1980 | 05/04/1989 | 100 |
| 80840 / ROADWAY OAK DELL STREET | 002 / T / AC | 07/22/1980 | 05/04/1989 | 100 |
| 80850 / ROADWAY OAK HILL ROAD | 001 / S / AC | 07/22/1980 | 05/04/1989 | 100 |
| 80860 / ROADWAY OAKWOODS DRIVE | 001 / S / AC | 07/22/1980 | 05/04/1989 | 100 |
| 80870 / ROADWAY OLD MOUNTAIN ROAD | 001 / T / AC | 07/22/1980 | 05/04/1989 | 100 |
| BRANCH NUMBER/USE/ NAME | SECTION | LAST CONSTRUCT DATE | LAST INSPECTION DATE | PCI |
|-------------------------|---------|---------------------|----------------------|-----|
| 80875 / ROADWAY OLD POST ROAD | 001/ T / AC / 46860.00 | AUG/01/1988 | JUN/15/1989 | 91 |
| | | CAT: B | ZONE: WKFL | AGE (YRS): 0.9 |
| 80880 / ROADWAY ORCHARD AVENUE | 001/ T / AC / 35075.00 | AUG/01/1980 | AUG/01/1989 | 100 |
| | | CAT: B | ZONE: WKFL | AGE (YRS): 9.0 |
| 80890 / ROADWAY PADDY HILL ROAD | 001/ T / AC / 5180.00 | JUN/01/1989 | JUN/20/1989 | 100 |
| | | CAT: B | ZONE: WKFL | AGE (YRS): 1.1 |
| 80910 / ROADWAY PERSHING AVENUE | 001/ S / ST / 9648.00 | AUG/01/1979 | FEB/01/1989 | 77 |
| | | CAT: B | ZONE: WKFL | AGE (YRS): 9.5 |
| 80910 / ROADWAY PERSHING AVENUE | 002/ S / AC / 20384.00 | AUG/01/1979 | FEB/01/1989 | 47 |
| | | CAT: B | ZONE: WKFL | AGE (YRS): 9.5 |
| 80920 / ROADWAY PINE STREET | 001/ T / AAC / 11340.00 | AUG/01/1977 | AUG/01/1989 | 100 |
| | | CAT: B | ZONE: WKFL | AGE (YRS): 12.0 |
| 80930 / ROADWAY PINE HILL ROAD | 001/ T / ST / 78702.00 | AUG/01/1982 | JUN/06/1989 | 79 |
| | | CAT: B | ZONE: WKFL | AGE (YRS): 6.8 |
| 80930 / ROADWAY PINE HILL ROAD | 002/ T / AC / 16996.00 | AUG/01/1982 | JUN/06/1989 | 97 |
| | | CAT: B | ZONE: WKFL | AGE (YRS): 6.8 |
| 80940 / ROADWAY PIKE STREET | 001/ S / AC / 10794.00 | AUG/01/1977 | DEC/30/1988 | 0 |
| | | CAT: B | ZONE: WKFL | AGE (YRS): 11.4 |
| 80950 / ROADWAY PLEASANT STREET | 001/ T / AC / 1080.00 | AUG/01/1980 | AUG/01/1980 | 100 |
| | | CAT: B | ZONE: WKFL | AGE (YRS): 0.0 |
| 80950 / ROADWAY PLEASANT STREET | 002/ T / ST / 5100.00 | AUG/01/1980 | AUG/01/1989 | 100 |
| | | CAT: B | ZONE: WKFL | AGE (YRS): 9.0 |
| 80950 / ROADWAY PLEASANT STREET | 003/ T / AC / 8432.00 | AUG/01/1980 | AUG/01/1989 | 100 |
| | | CAT: B | ZONE: WKFL | AGE (YRS): 9.0 |
| 80960 / ROADWAY POND STREET | 001/ P / ST / 139125.00 | AUG/01/1986 | MAY/19/1989 | 74 |
| | | CAT: B | ZONE: WKFL | AGE (YRS): 2.8 |
| 80970 / ROADWAY PROSPECT AVENUE | 001/ T / AC / 9252.00 | AUG/01/1979 | AUG/01/1989 | 100 |
| | | CAT: B | ZONE: WKFL | AGE (YRS): 10.0 |
| 80970 / ROADWAY PROSPECT AVENUE | 002/ T / AC / 6400.00 | AUG/01/1979 | AUG/01/1989 | 100 |
| | | CAT: B | ZONE: WKFL | AGE (YRS): 10.0 |
| 80975 / ROADWAY QUAGNUT DRIVE | 001/ T / ST / 28000.00 | AUG/01/1986 | JAN/30/1989 | 80 |
| | | CAT: B | ZONE: WKFL | AGE (YRS): 2.5 |
| 80980 / ROADWAY RAILROAD STREET | 001/ T / ST / 11725.00 | AUG/01/1979 | JUN/03/1989 | 24 |
| | | CAT: B | ZONE: WKFL | AGE (YRS): 9.8 |
| 80980 / ROADWAY | 002/ T / AC / 13851.00 | AUG/01/1979 | JUN/03/1989 | 57 |
| BRANCH NUMBER/USE/ NAME | SECTION NUM/RANK/SURF/AREA (SF) | LAST CONSTRUCT DATE | LAST INSPECTION DATE | PCI |
|------------------------|---------------------------------|---------------------|----------------------|-----|
| RAILROAD STREET        | CAT: B ZONE: WKFL AGE (YRS): 9.8 |                     |                      |     |
| 80990 / ROADWAY        | 001/ P / AAC / 8184.00 AUG/01/1977 JUN/10/1989 72 |                     |                      |     |
| RIVER STREET           | CAT: B ZONE: WKFL AGE (YRS): 11.9 |                     |                      |     |
| 80990 / ROADWAY        | 002/ P / AAC / 11328.00 AUG/01/1977 JUN/10/1989 97 |                     |                      |     |
| RIVER STREET           | CAT: B ZONE: WKFL AGE (YRS): 11.9 |                     |                      |     |
| 80990 / ROADWAY        | 003/ P / AAC / 16512.00 AUG/01/1977 JUN/10/1989 99 |                     |                      |     |
| RIVER STREET           | CAT: B ZONE: WKFL AGE (YRS): 11.9 |                     |                      |     |
| 81000 / ROADWAY        | 001/ P / AAC / 94300.00 AUG/01/1984 JAN/20/1989 64 |                     |                      |     |
| RODMAN STREET          | CAT: B ZONE: WKFL AGE (YRS): 4.5 |                     |                      |     |
| 81010 / ROADWAY        | 001/ P / AC / 20020.00 AUG/01/1985 AUG/01/1989 100 |                     |                      |     |
| ROBINSON STREET        | CAT: B ZONE: WKFL AGE (YRS): 4.0 |                     |                      |     |
| 81010 / ROADWAY        | 002/ P / AC / 16512.00 AUG/01/1980 AUG/01/1989 100 |                     |                      |     |
| ROBINSON STREET        | CAT: B ZONE: WKFL AGE (YRS): 9.0 |                     |                      |     |
| 81020 / ROADWAY        | 001/ T / AC / 17820.00 AUG/01/1965 JUN/01/1989 99 |                     |                      |     |
| ROCKLAND DRIVE         | CAT: B ZONE: WKFL AGE (YRS): 23.8 |                     |                      |     |
| 81030 / ROADWAY        | 001/ T / AAC / 3335.00 AUG/01/1977 JUN/08/1989 53 |                     |                      |     |
| ROSE CIRCLE            | CAT: B ZONE: WKFL AGE (YRS): 11.9 |                     |                      |     |
| 81040 / ROADWAY        | 001/ P / ST / 96195.00 AUG/01/1987 FEB/01/1989 51 |                     |                      |     |
| SALT POND ROAD         | CAT: B ZONE: WKFL AGE (YRS): 1.5 |                     |                      |     |
| 81050 / ROADWAY        | 001/ T / ST / 14202.00 AUG/01/1985 JUN/01/1989 82 |                     |                      |     |
| SAMUEL RODMAN STREET   | CAT: B ZONE: WKFL AGE (YRS): 3.8 |                     |                      |     |
| 81060 / ROADWAY        | 001/ T / ST / 17625.00 AUG/01/1977 JAN/18/1989 60 |                     |                      |     |
| SCHAFFER STREET        | CAT: B ZONE: WKFL AGE (YRS): 11.5 |                     |                      |     |
| 81070 / ROADWAY        | 001/ T / AAC / 4400.00 AUG/01/1977 DEC/30/1988 87 |                     |                      |     |
| SCHOOL LANE            | CAT: B ZONE: WKFL AGE (YRS): 11.4 |                     |                      |     |
| 81080 / ROADWAY        | 001/ T / AAC / 41050.00 AUG/01/1965 AUG/01/1989 100 |                     |                      |     |
| SCHOOL STREET          | CAT: B ZONE: WKFL AGE (YRS): 24.0 |                     |                      |     |
| 81090 / ROADWAY        | 001/ T / AC / 19500.00 AUG/01/1985 JAN/19/1989 100 |                     |                      |     |
| SECLUDED DRIVE         | CAT: B ZONE: WKFL AGE (YRS): 3.5 |                     |                      |     |
| 81100 / ROADWAY        | 001/ S / ST / 41640.00 AUG/01/1980 JAN/31/1989 93 |                     |                      |     |
| SILVER LAKE AVENUE     | CAT: B ZONE: WKFL AGE (YRS): 8.5 |                     |                      |     |
| 81100 / ROADWAY        | 002/ S / ST / 24838.00 AUG/01/1980 JAN/31/1989 95 |                     |                      |     |
| SILVER LAKE AVENUE     | CAT: B ZONE: WKFL AGE (YRS): 8.5 |                     |                      |     |
| 81110 / ROADWAY        | 001/ T / ST / 9492.00 JUN/01/1969 JAN/20/1989 23 |                     |                      |     |
| STEDMAN COURT           | CAT: B ZONE: WKFL AGE (YRS): 19.6 |                     |                      |     |
| BRANCH NUMBER/USE/ NAME | SECTION | NUM/RANK/SURF/AREA(SF) | LAST CONSTRUCT DATE | LAST INSPECTION DATE | PCI |
|-------------------------|---------|------------------------|---------------------|----------------------|-----|
| 81120 / ROADWAY         | 001/ T / ST / 9310.00 | AUG/01/1982 | DEC/29/1988 | 0 |
| SMITH STREET            | CAT: B | ZONE: WKFL | AGE (YRS): 6.4 | |
| 81140 / ROADWAY         | 001/ T / ST / 53160.00 | AUG/01/1986 | JUN/06/1989 | 80 |
| STONEWAVE ROAD          | CAT: B | ZONE: WKFL | AGE (YRS): 2.8 | |
| 81150 / ROADWAY         | 001/ T / AC / 100352.00 | AUG/01/1988 | JUN/08/1989 | 100 |
| SWEET ALLEN FARM ROAD   | CAT: B | ZONE: WKFL | AGE (YRS): .9 | |
| 81160 / ROADWAY         | 001/ T / ST / 34800.00 | AUG/01/1988 | JAN/27/1989 | 97 |
| SWEET FERN LANE         | CAT: B | ZONE: WKFL | AGE (YRS): .5 | |
| 81170 / ROADWAY         | 001/ T / AAC / 14256.00 | AUG/01/1977 | AUG/01/1989 | 100 |
| SUNSET AVENUE           | CAT: B | ZONE: WKFL | AGE (YRS): 12.0 | |
| 81190 / ROADWAY         | 001/ T / AAC / 10894.00 | AUG/01/1978 | JAN/17/1989 | 75 |
| SPRUCE COURT            | CAT: B | ZONE: WKFL | AGE (YRS): 10.5 | |
| 81200 / ROADWAY         | 001/ T / AAC / 4340.00 | AUG/01/1977 | MAY/30/1989 | 47 |
| STEVEN circle           | CAT: B | ZONE: WKFL | AGE (YRS): 11.8 | |
| 81210 / ROADWAY         | 001/ T / AAC / 26500.00 | AUG/01/1977 | JUN/13/1989 | 38 |
| SPRING STREET           | CAT: B | ZONE: WKFL | AGE (YRS): 11.9 | |
| 81220 / ROADWAY         | 001/ T / ST / 9200.00 | AUG/01/1988 | JAN/31/1989 | 97 |
| TARLETON ROAD           | CAT: B | ZONE: WKFL | AGE (YRS): .5 | |
| 81230 / ROADWAY         | 001/ T / ST / 21087.00 | AUG/01/1982 | JUN/16/1989 | 55 |
| TOWN FARM ROAD          | CAT: B | ZONE: WKFL | AGE (YRS): 6.9 | |
| 81240 / ROADWAY         | 001/ T / ST / 10879.00 | AUG/01/1982 | DEC/30/1988 | 11 |
| TUCKER ROAD             | CAT: B | ZONE: WKFL | AGE (YRS): 6.4 | |
| 81250 / ROADWAY         | 001/ P / ST / 218880.00 | AUG/01/1987 | NOV/10/1988 | 78 |
| TUCKERTOWN ROAD         | CAT: A | ZONE: WKFL | AGE (YRS): 1.3 | |
| 81265 / ROADWAY         | 001/ T / AC / 9720.00 | AUG/01/1977 | JAN/18/1989 | 74 |
| UPPER TERRACE CIRCLE    | CAT: B | ZONE: WKFL | AGE (YRS): 11.5 | |
| 81270 / ROADWAY         | 001/ T / ST / 18425.00 | AUG/01/1982 | JAN/11/1989 | 7 |
| VICTORY STREET          | CAT: B | ZONE: WKFL | AGE (YRS): 6.4 | |
| 81280 / ROADWAY         | 001/ T / AAC / 15813.00 | AUG/01/1977 | JAN/31/1989 | 64 |
| WARNER AVENUE           | CAT: B | ZONE: WKFL | AGE (YRS): 11.5 | |
| 81290 / ROADWAY         | 001/ T / AC / 109200.00 | AUG/01/1988 | JUN/08/1989 | 100 |
| WEATHERVANE ROAD        | CAT: B | ZONE: WKFL | AGE (YRS): .9 | |
| 81300 / ROADWAY         | 001/ S / AAC / 39442.00 | AUG/01/1977 | DEC/29/1988 | 58 |
| WHITFORD STREET         | CAT: B | ZONE: WKFL | AGE (YRS): 11.4 | |
| 81310 / ROADWAY         | 001/ P / ST / 96945.00 | AUG/01/1985 | DEC/27/1988 | 83 |
| WILLARD AVENUE          | CAT: B | ZONE: WKFL | AGE (YRS): 3.4 | |
| BRANCH NUMBER/USE/NAME | SECTION NUM/RANK/SURF/AREA(SF) | LAST CONSTRUCT DATE | LAST INSPECTION DATE | PCI |
|-----------------------|--------------------------------|---------------------|----------------------|-----|
| 81320 / ROADWAY WILSON STREET | 001/ T / AC / 4590.00 | AUG/01/1965 | AUG/01/1989 | 100 |
|                        | CAT: B ZONE: WKFL AGE (YRS): 24.0 | | | |
| 81325 / ROADWAY WINCHESTER DRIVE | 001/ T / ST / 91200.00 | AUG/01/1986 | JAN/30/1989 | 75 |
|                        | CAT: B ZONE: WKFL AGE (YRS): 2.5 | | | |
| 81330 / ROADWAY WINDSOR ROAD | 001/ T / AAC / 7848.00 | AUG/01/1977 | AUG/01/1989 | 100 |
|                        | CAT: B ZONE: WKFL AGE (YRS): 12.0 | | | |
| 81340 / ROADWAY WINTER STREET | 001/ S / ST / 43850.00 | AUG/01/1987 | DEC/27/1988 | 95 |
|                        | CAT: B ZONE: WKFL AGE (YRS): 1.4 | | | |
| 81360 / ROADWAY WOODBINE ROAD | 001/ T / ST / 44280.00 | AUG/01/1982 | MAY/12/1989 | 68 |
|                        | CAT: B ZONE: WKFL AGE (YRS): 6.8 | | | |
| 81370 / ROADWAY WOODMAN'S TRAIL | 001/ T / ST / 21636.00 | AUG/01/1982 | JUN/05/1989 | 67 |
|                        | CAT: B ZONE: WKFL AGE (YRS): 6.8 | | | |
| 81380 / ROADWAY WOODRUFF AVENUE | 001/ P / ST / 79170.00 | AUG/01/1979 | JUN/21/1989 | 74 |
|                        | CAT: B ZONE: WKFL AGE (YRS): 9.9 | | | |
| 81380 / ROADWAY WOODRUFF AVENUE | 002/ P / AC / 24780.00 | AUG/01/1979 | JUN/21/1989 | 100 |
|                        | CAT: B ZONE: WKFL AGE (YRS): 9.9 | | | |
| 81390 / ROADWAY WRIGHT AVENUE | 001/ S / ST / 20000.00 | AUG/01/1987 | DEC/27/1988 | 84 |
|                        | CAT: B ZONE: WKFL AGE (YRS): 1.4 | | | |
PCI FREQUENCY REPORT

Agency Name: SOUTH KINGSTOWN PUBLIC WORKS DEPARTMENT.
Agency Number: 00001
Report Date: MAY/02/1991

Branch Use: All
Pavement Rank: All
Surface Type: All
Zone: WRDP
Section Category: All
Last Construction Date: All
PCI: All

TABLE OF PCI FREQUENCY REPORT

YEAR: JUN 1991

| CONDITION       | PCI RANGE | NO. OF SECTIONS | % OF SECTIONS | TOTAL AREA  | % OF AREA |
|-----------------|-----------|-----------------|---------------|-------------|-----------|
| FAILED          | 0 - 10    | 0               | .00           | .00         | .00       |
| VERY POOR       | 11 - 25   | 1               | 9.09          | 39100.00    | 4.43      |
| POOR            | 26 - 40   | 2               | 18.18         | 21975.00    | 2.49      |
| FAIR            | 41 - 55   | 3               | 27.27         | 324495.00   | 36.74     |
| GOOD            | 56 - 70   | 1               | 9.09          | 91000.00    | 10.30     |
| VERY GOOD       | 71 - 85   | 3               | 27.27         | 378365.00   | 42.84     |
| EXCELLENT       | 86 - 100  | 1               | 9.09          | 28210.00    | 3.19      |

TOTAL NUMBER OF SECTIONS: 11
AVERAGE PCI: 56
TOTAL SECTION AREA: 883145.00
NUMBER OF MISSING VALUES: 0
PCI FREQUENCY REPORT

Agency Name: SOUTH KINGSTOWN PUBLIC WORKS DEPARTMENT.
Agency Number: 00001
Report Date: MAY/02/1991

Branch Use: All
Pavement Rank: All
Surface Type: All
Zone: GRNH
Section Category: All
Last Construction Date: All
PCI: All

TABLE OF PCI FREQUENCY REPORT
YEAR: JUN 1991

| CONDITION    | PCI RANGE | NO. OF SECTIONS | % OF SECTIONS | TOTAL AREA | % OF AREA |
|--------------|-----------|-----------------|---------------|------------|-----------|
| FAILED       | 0 - 10    | 5               | 12.20         | 51845.00   | 3.68      |
| VERY POOR    | 11 - 25   | 1               | 2.44          | 32256.00   | 2.29      |
| POOR         | 26 - 40   | 5               | 12.20         | 26864.00   | 1.91      |
| FAIR         | 41 - 55   | 11              | 26.83         | 402321.00  | 28.58     |
| GOOD         | 56 - 70   | 8               | 39.51         | 399325.00  | 28.37     |
| VERY GOOD    | 71 - 85   | 5               | 12.20         | 112792.00  | 8.01      |
| EXCELLENT    | 86 - 100  | 6               | 14.63         | 382331.00  | 27.16     |

TOTAL NUMBER OF SECTIONS: 41
AVERAGE PCI: 53
TOTAL SECTION AREA: 1407744.00
NUMBER OF MISSING VALUES: 0
PCI FREQUENCY REPORT

Agency Name: SOUTH KINGSTOWN PUBLIC WORKS DEPARTMENT.
Agency Number: 00001

Branch Use: All
Pavement Rank: All
Surface Type: All
Zone: MDBR
Section Category: All
Last Construction Date: All
PCI: All

Report Date: MAY/02/1991

TABLE OF PCI FREQUENCY REPORT

YEAR: JUN 1991

| CONDITION    | PCI RANGE | NO. OF SECTIONS | % OF SECTIONS | TOTAL AREA | % OF AREA |
|--------------|-----------|-----------------|---------------|------------|-----------|
| FAILED       | 0 - 10    | 0               | .00           | .00        | .00       |
| VERY POOR    | 11 - 25   | 2               | 11.11         | 47159.00   | 7.38      |
| POOR         | 26 - 40   | 2               | 11.11         | 5496.00    | .86       |
| FAIR         | 41 - 55   | 1               | 5.56          | 249240.00  | 39.01     |
| GOOD         | 56 - 70   | 5               | 27.78         | 242795.00  | 38.00     |
| VERY GOOD    | 71 - 85   | 7               | 38.89         | 90650.00   | 14.19     |
| EXCELLENT    | 86 - 100  | 1               | 5.56          | 3640.00    | .57       |

TOTAL NUMBER OF SECTIONS: 18
AVERAGE PCI: 61
TOTAL SECTION AREA: 638980.00
NUMBER OF MISSING VALUES: 0
**PCI FREQUENCY REPORT**

Agency Name: SOUTH KINGSTOWN PUBLIC WORKS DEPARTMENT.  
Agency Number: 00001  
Report Date: MAY/02/1991

Branch Use: All  
Pavement Rank: All  
Surface Type: All  
Zone: MTNK  
Section Category: All  
Last Construction Date: All  
PCI: All

**TABLE OF PCI FREQUENCY REPORT**

YEAR: JUN 1991

| CONDITION       | PCI RANGE | NO. OF SECTIONS | % OF SECTIONS | TOTAL AREA | % OF AREA |
|-----------------|-----------|-----------------|---------------|------------|-----------|
| FAILED          | 0 - 10    | 4               | 7.84          | 210460.00  | 9.48      |
| VERY POOR       | 11 - 25   | 6               | 11.76         | 241355.00  | 10.87     |
| POOR            | 26 - 40   | 6               | 11.76         | 688119.00  | 30.98     |
| FAIR            | 41 - 55   | 12              | 23.53         | 437240.00  | 19.68     |
| GOOD            | 56 - 70   | 9               | 17.65         | 264241.00  | 11.90     |
| VERY GOOD       | 71 - 85   | 8               | 15.69         | 171398.00  | 7.72      |
| EXCELLENT       | 86 - 100  | 6               | 11.76         | 208375.00  | 9.38      |

TOTAL NUMBER OF SECTIONS: 51  
AVERAGE PCI: 52  
TOTAL SECTION AREA: 2221188.00  
NUMBER OF MISSING VALUES: 0
PCI FREQUENCY REPORT

Agency Name: SOUTH KINGSTOWN PUBLIC WORKS DEPARTMENT.
Agency Number: 00001
Report Date: MAY/02/1991

Branch Use: All
Pavement Rank: All
Surface Type: All
Zone: PCDL
Section Category: All
Last Construction Date: All
PCI: All

TABLE OF PCI FREQUENCY REPORT
YEAR: JUN 1991

| PCI CONDITION | PCI RANGE | NO. OF SECTIONS | % OF SECTIONS | TOTAL AREA | % OF AREA |
|---------------|-----------|-----------------|---------------|------------|-----------|
| FAILED        | 0 - 10    | 16              | 25.81         | 538532.00  | 22.76     |
| VERY POOR     | 11 - 25   | 3               | 4.84          | 178500.00  | 7.54      |
| POOR          | 26 - 40   | 6               | 9.68          | 111871.00  | 4.73      |
| FAIR          | 41 - 55   | 6               | 9.68          | 200235.00  | 8.46      |
| GOOD          | 56 - 70   | 9               | 14.52         | 278300.00  | 11.76     |
| VERY GOOD     | 71 - 85   | 6               | 9.68          | 111305.00  | 4.70      |
| EXCELLENT     | 86 - 100  | 16              | 25.81         | 947725.00  | 40.05     |

TOTAL NUMBER OF SECTIONS: 62
AVERAGE PCI: 50
TOTAL SECTION AREA: 2366468.00
NUMBER OF MISSING VALUES: 0
PCI FREQUENCY REPORT

Agency Name: SOUTH KINGSTOWN PUBLIC WORKS DEPARTMENT.
Agency Number: 00001  Report Date: MAY/02/1991

Branch Use : All
Pavement Rank : All
Surface Type : All
Zone : URI
Section Category : All
Last Construction Date: All
PCI : All

TABLE OF PCI FREQUENCY REPORT
YEARS: JUN 1991

| CONDITION      | PCI RANGE | NO. OF SECTIONS | % OF SECTIONS | TOTAL AREA      | % OF AREA |
|----------------|-----------|-----------------|---------------|----------------|-----------|
| FAILED         | 0 - 10    | 6               | 22.22         | 157954.00      | 18.74     |
| VERY POOR      | 11 - 25   | 2               | 7.41          | 29444.00       | 3.49      |
| POOR           | 26 - 40   | 1               | 3.70          | 18105.00       | 2.15      |
| FAIR           | 41 - 55   | 4               | 14.81         | 200667.00      | 23.81     |
| GOOD           | 56 - 70   | 5               | 18.52         | 292518.00      | 34.70     |
| VERY GOOD      | 71 - 85   | 2               | 7.41          | 40152.00       | 4.76      |
| EXCELLENT      | 86 - 100  | 7               | 25.93         | 104051.00      | 12.34     |

TOTAL NUMBER OF SECTIONS: 27
AVERAGE PCI : 51
TOTAL SECTION AREA : 842891.00
NUMBER OF MISSING VALUES: 0
PCI FREQUENCY REPORT

Agency Name: SOUTH KINGSTOWN PUBLIC WORKS DEPARTMENT
Agency Number: 00001
Report Date: MAY/02/1991

Branch Use: All
Pavement Rank: All
Surface Type: All
Zone: WKFL
Section Category: All
Last Construction Date: All
PCI: All

**TABLE OF PCI FREQUENCY REPORT**

**YEAR: JUN 1991**

| CONDITION    | PCI RANGE | NO. OF SECTIONS | % OF SECTIONS | TOTAL AREA  | % OF AREA |
|--------------|-----------|-----------------|---------------|-------------|-----------|
| FAILED       | 0 - 10    | 18              | 10.65         | 313047.00   | 7.02      |
| VERY POOR    | 11 - 25   | 12              | 7.10          | 156693.00   | 3.52      |
| POOR         | 26 - 40   | 11              | 6.51          | 395780.00   | 8.88      |
| FAIR         | 41 - 55   | 21              | 12.43         | 584494.00   | 13.12     |
| GOOD         | 56 - 70   | 26              | 16.57         | 1172057.00  | 26.30     |
| VERY GOOD    | 71 - 85   | 14              | 8.28          | 515268.00   | 11.56     |
| EXCELLENT    | 86 - 100  | 65              | 38.46         | 1318928.00  | 29.60     |

TOTAL NUMBER OF SECTIONS: 169
AVERAGE PCI: 63
TOTAL SECTION AREA: 4456267.00
NUMBER OF MISSING VALUES: 0
**PCI FREQUENCY REPORT**

Agency Name: SOUTH KINGSTOWN PUBLIC WORKS DEPARTMENT.  
Agency Number: 00001  
Report Date: MAY/02/1991

| Branch Use | Pavement Rank | Surface Type | Zone | Section Category | Last Construction Date | PCI |
|------------|---------------|--------------|------|------------------|------------------------|-----|
| All        | All           | All          | WKNG | All               | All                    | All |

**TABLE OF PCI FREQUENCY REPORT**

**YEAR: JUN 1991**

| CONDITION       | PCI RANGE | NO. OF SECTIONS | % OF SECTIONS | TOTAL AREA  | % OF AREA  |
|-----------------|-----------|-----------------|---------------|-------------|------------|
| FAILED          | 0 - 10    | 0               | .00           | .00         | .00        |
| VERY POOR       | 11 - 25   | 0               | .00           | .00         | .00        |
| POOR            | 26 - 40   | 2               | 6.45          | 74890.00    | 5.97       |
| FAIR            | 41 - 55   | 3               | 9.68          | 207265.00   | 16.52      |
| GOOD            | 56 - 70   | 5               | 16.13         | 191484.00   | 15.26      |
| VERY GOOD       | 71 - 85   | 7               | 22.58         | 441860.00   | 35.22      |
| EXCELLENT       | 86 - 100  | 14              | 45.16         | 339156.00   | 27.03      |

TOTAL NUMBER OF SECTIONS: 31  
AVERAGE PCI: 77  
TOTAL SECTION AREA: 1254655.00  
NUMBER OF MISSING VALUES: 0
APPENDIX D. MACRO USED IN CREATING PLOTS
SML FOR PAVEMENT CONDITION INDEX PLOT

&REM ******************************************
&REM STEP 1 -- SETTING UP ENVIRONMENT VARIABLES
&REM ******************************************

& ECHO & ON
& disp 4
@ color
& kill PCIPLT
& map PCIPLT
& mbegin
& & setvar 31 11
& & setvar 32 17
& PAGESIZE %31 %32
& & CALCVAR 11 %31 * 0.07
& & CALCVAR 12 %32 * 0.07
& & CALCVAR 13 %31 * 0.727
& & CALCVAR 14 %32 * 0.935
& & MAPLIMI TS %11 %12 %13 %14
& & MAPPOSITION CEN CEN

& WAPF PMSRDS
& LINESET line
& arcs stds zones
& arcs pmsrds
& res pmsrds arcs branum gt 10000 and branum ne 99999
& arcline pmsrds lasepci pci.lut
& ANNOTTEXT PMSRDS

& LABEL BOX

&REM ******************************************
&REM PLOTTING MAP BOX AND CREDITORS
&REM ******************************************

& & CALCVAR 11 %31 * .05
& & CALCVAR 12 %32 * .05
& & CALCVAR 13 %31 * .95
& & CALCVAR 14 %32 * .95
& LINESIZE .02
& BOX %11 %12 %13 %14
& & CALCVAR 11 %31 * .055
& & CALCVAR 12 %32 * .055
& & CALCVAR 13 %31 * .945
& & CALCVAR 14 %32 * .945
& LINESIZE 0
& BOX %11 %12 %13 %14
& & CALCVAR 11 %31 * .745
& & CALCVAR 12 %32 * .055
& & CALCVAR 13 %32 * .945
& LINE %11 %12 %11 %13
& & CALCVAR 13 %31 * .945
& & CALCVAR 14 %32 * .80
& & CALCVAR 15 %32 * .30
& & CALCVAR 18 (%13 - %11) / 25
& LINE %11 %14 %13 %14
& LINE %11 %15 %13 %15
SML FOR PAVEMENT CONDITION INDEX PLOT CONTINUED

&CALCVAR 16 %31 * .755
&CALCVAR 17 %32 * .30
&CALCVAR 18 ( %13 - %11 ) / 48
&CALCVAR 19 %15 / 32
  TEXTSIZE %19 %18
  TEXTFONT 1
  TEXTQUALITY PROPORTIONAL
&CALCVAR 20 %15 / 28
&CALCVAR 21 %17 - %20
  MOVE %16 %21
  TEXTFILE A: CREDIT

&REM ************************
&REM PLOTTING MAP TITLE AND FOOTNOTES
&REM ************************

&OPEN TITLE1.TXT
&READ 33
&READ 33

&LENGTH 34 "%33-
&CALCVAR 36 %31 = 0.05
&CALCVAR 35 %31 = 0.140 / ( %34 + %36 )
&CALCVAR 37 %35 = 2.2
&CALCVAR 38 %35 = .75
  TEXTSIZE %37 %38
&CALCVAR 11 %31 = 0.805
&CALCVAR 12 %32 = 0.90
  MOVE %11 %12
  TEXT ' %33'

&READ 33
&READ 33

&LENGTH 34 "%33-
&CALCVAR 35 %31 = 0.140 / ( %34 + %36 )
&CALCVAR 37 %35 = 1.8
&CALCVAR 38 %35 = .75
  TEXTSIZE %37 %38
&CALCVAR 12 %32 = 0.86
  MOVE %11 %12
  TEXT ' %33'

&READ 33
&READ 33

&LENGTH 34 "%33-
&CALCVAR 35 %31 = 0.140 / ( %34 + %36 )
&CALCVAR 37 %35 = 1.8
&CALCVAR 38 %35 = .75
  TEXTSIZE %37 %38
&CALCVAR 12 %32 = 0.82
  MOVE %11 %12
  TEXT ' %33'

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SML FOR PAVEMENT CONDITION INDEX PLOT CONTINUED

&READ 33
&READ 33
&CLOSE

&LENGTH 34 "$33"
&CALCVAR 35 $31 * 0.140 / ( $34 + $36 )
&CALCVAR 37 $35 * 1.1
&CALCVAR 38 $35 * .6
TEXTSIZE $37 $38
&CALCVAR 16 $31 * .81
&CALCVAR 21 $32 * .07
TEXTSIZE $19 $18
MOVE $16 $21
TEXT ' $33'

&SYS "TM /LOG /L >TM.TMP"
&OPEN TM.TMP
&READ 33
&READ 33
&CLOSE

&LENGTH 34 "$33"
&CALCVAR 35 $31 * 0.140 / ( $34 + $36 )
&CALCVAR 37 $35 * 1.1
&CALCVAR 38 $35 * .6
TEXTSIZE $37 $38
&CALCVAR 16 $31 * .80
&CALCVAR 21 $32 * .09
MOVE $16 $21
TEXT ' $33'

&REM **********************
&REM PLOTTING MAP LEGEND
&REM **********************

&CALCVAR 33 $31 * 0.15 * .08
TEXTSIZE $33
TEXTFONT 9
&CALCVAR 34 $31 * 0.815
&CALCVAR 35 $32 * 0.74
MOVE $34 $35
TEXT 'LEGEND'

&CALCVAR 34 $31 * 0.016
&CALCVAR 35 $32 * 0.010
KEYBOX $34 $35
&CALCVAR 34 $31 * 0.02
&CALCVAR 35 $32 * 0.02
KEYSEPARATION $34 $35
&CALCVAR 34 $31 * 0.815
&CALCVAR 35 $32 * 0.70
KEYPOSITION $34 $35
&CALCVAR 33 $31 * 0.08 * .06
&CALCVAR 34 $33 * 0.5
TEXTSIZE $33 $34
KEYLINE laspcai.KEY

MEND
CLEARSEL

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### PCI Lookup Table

| COLUMN | ITEM NAME | WIDTH | TYPE | N.DEC |
|--------|-----------|-------|------|-------|
| 1      | LASPCI    | 10    | N    | 0     |
| 11     | SYMBOL    | 4     | N    | 0     |

### LASPCI Symbol

$RECNO | LASPCI | SYMBOL |
-------|--------|--------|
1      | 0      | 0      |
2      | 10     | 2      |
3      | 25     | 7      |
4      | 40     | 3      |
5      | 55     | 5      |
6      | 70     | 6      |
7      | 85     | 4      |
8      | 100    | 8      |

### Surface Type Lookup Table

| COLUMN | ITEM NAME | WIDTH | TYPE | N.DEC |
|--------|-----------|-------|------|-------|
| 1      | SURTYP    | 4     | C    | 0     |
| 5      | SYMBOL    | 3     | N    | 0     |

### SURFYP Symbol

$RECNO | SURTYP | SYMBOL |
-------|--------|--------|
1      | AC     | 2      |
2      | ST     | 4      |
3      | X      | 0      |

### Age Lookup Table

| COLUMN | ITEM NAME | WIDTH | TYPE | N.DEC |
|--------|-----------|-------|------|-------|
| 1      | AGE       | 5     | N    | 0     |
| 6      | SYMBOL    | 3     | N    | 0     |

### AGE Symbol

$RECNO | AGE | SYMBOL |
-------|-----|--------|
1      | 0   | 0      |
2      | 5   | 4      |
3      | 10  | 3      |
4      | 15  | 5      |
5      | 100 | 2      |
KEYFILE (LASPCI.KEY) FOR PCI COMPARISON

.2 FAILED
.7 VERY POOR
.3 POOR
.5 FAIR
.6 GOOD
.4 V.GOOD
.3 EXCELLENT

KEYFILE (MAINT.KEY) FOR M & R ACTIONS

.4 ROUTINE MAINTENANCE
.3 SURFACE TREATMENT
.5 MAJOR REPAIRS
.2 OVERALL CONSTRUCTION

KEYFILE (PAVEAGE.KEY) FOR PAVEMENT AGE

.4 0-5 YEARS
.3 6-10 YEARS
.5 11-15 YEARS
.2 > 16 YEARS

KEYFILE (SURFACE.KEY) FOR SURFACE TYPES

.2 AC
.4 ST
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