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June 14, 2016

Mr. W. Bryan Dempsey, Borough Administrator
Borough of Spring Lake
Fifth & Warren Avenues
Spring Lake, NJ 07762

Re: Roadway Improvement Program
Borough of Spring Lake
Project Status Report
Our File: SL 15-06

Dear Mr. Dempsey:

Our office has met with representatives of the Borough Council, Administration and Public Works Department in an effort to evaluate existing roadway conditions within the Borough of Spring Lake. The result of our efforts is the preparation of a long range roadway improvement program for the Borough, a copy of which is attached. This program prioritizes roadways based upon their immediate need of repair.

This report begins with a review of the roadway priority listing prepared as a part of the Rutgers CAIT study. This study inspected all municipal roadways within the Borough of Spring Lake, which were rated according to an evaluation of various structural concerns. These include the current observed structural condition of the pavement surface; observed structural defects, roadway to drain surface water runoff; the availability of storm drainage structures; and evaluation of condition of concrete curb, gutter or other structures.

This report also provides an overview and tabulation of all capital road program improvements completed within the Borough of Spring Lake over the past ten (10) year period. The roadways are listed, and cross referenced to a master plan map, and includes the type of improvement, cost and funding received. The report also includes roadway improvements completed in the Borough by the County of Monmouth.

As recommended by the Rutgers study, the proposed municipal roadway improvement program has been broken up into separate improvement classifications or categories, which are then prioritized based upon cost and need of improvement.

These categories included in the Rutgers report, and further developed by the needs of the Borough of Spring Lake are as follows:

- Transportation Trust Fund Roadway Improvements
- Monmouth County Paving Program
- Microsurfacing Roadways
- Municipal Capital Improvement Program
- Rutgers Priority Listing (mill and pave roadways)
- Utility Company Roadway Restoration
- Infrared Repair of Utility Service Connections
- Morris Avenue Pedestrian Improvements

The completion of a long range road program within a specific time period will be influenced by several factors, including receipt of funding, particularly from the State Transportation Trust Fund Program, along with the ability of the Borough to budget capital expenditures, and coordination of the infrastructure improvements prior to completion of major roadway restoration.

We will be pleased to discuss this report, and the status of current and proposed projects or funding applications, at a workshop or regular meeting of the governing body.

Please review this report, and advise if you require any additional information at this time.

Very truly yours,

LEON S. AVAKIAN, INC.

Peter R. Avakian, PE
Borough Engineer

encl.

cc: Mayor Jennifer Naughton
Councilman David Frost
Streets and Roads Committee

RUTGERS
Center for Advanced Infrastructure and Transportation

Center for Advanced Infrastructure &Transportation (CAIT)
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Phone: 732-445-0579 Fax: 732-445-3325

PROPOSAL TITLE:

SPRING LAKE BOROUGH PAVEMENT MANAGEMENT SYSTEM 2014

PRINCIPAL INVESTIGATOR:

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SPRING LAKE BOROUGH PROJECT MANAGER:

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SPRING LAKE BOROUGH

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INTRODUCTION

The Borough of Spring Lake, New Jersey is developing an enhanced Pavement Management System (PMS) for their network of streets. The Center for Advanced Infrastructure and Transportation's (CAIT) Pavement Resource Program proposes to assist Spring Lake Borough staff in the development and implementation of the PMS as Subject Matter Experts (SME).

CAIT proposes to provide an integrated team with special expertise in all aspects of pavement management who will partner with Spring Lake Borough to achieve the following objectives:

- *Utilize and build on the borough's PMS experience and database;*
- *Develop a set of data elements that reflect the borough's pavement engineering concerns and priorities;*
- *Perform a visual pavement field data acquisition survey and pavement distress analysis;*
- *Incorporate the preservation and rehabilitation practices and goals of the Borough;*
- *Provide for modeling of alternative actions based on budget constraints and established preservation and rehabilitation strategies;*
- *Generate a multi-year preservation and rehabilitation program for managing the Borough's pavements, utilizing local cost and revenue projections;*
- *Produce user-defined reports and presentation documents for the public and for decision makers that are clear and concise;*
- *Allow future Interface of the PMS with other relational database programs (e.g., GIS, traffic operations, work orders, cost accounting, etc.);*
- *Incorporate Borough staff into the project team and provide system training to Borough personnel to utilize and maintain the PMS;*
- *Provide for archiving construction related information and update of the system based upon work completed.*

Pavement Management is a process that generates information about the present and future condition of the agency's roadway network with which road managers and decision-makers can

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be assured that they are getting the best product for the tax payers' money. As a process, pavement management is comprised of the following steps:

1. ***Network Definition*** - The PMS will allow the Borough to define roadway characteristics necessary to the effective and efficient management of the Borough's road network. The PMS also can incorporate imported data from other relational databases, and it provides for segmentation that allows for correlation with other geo-based information systems.

2. ***Data Acquisition*** - Data may be acquired from existing records and through field inventory. Existing data will be reviewed for both quality and adequacy before importation into the PMS. Data results will become the property of the Borough for continuing use in managing the Borough's road network.

3. ***Condition Assessment & Performance Modeling***- The PMS will incorporate a Pavement Condition Index (PCI) calculation model based on ASTM D6433, "Standard Test Method for Roads and Parking Lots Pavement Condition Index Surveys". Results from this standardized method along with historical information on construction histories will be used to create initial pavement performance models.

4. ***Establish Preservation and Rehabilitation Treatments and Costs*** - The PMS will allow for user-definition of preservation and rehabilitation treatments, performance parameters and treatment triggers and resets; these will incorporate actual cost experience of Spring Lake Borough.

5. ***Impacts Modeling of Preservation and Rehabilitation Strategies*** - Deterioration curves specific to Spring Lake Borough may be developed and incorporated into the PMS for modeling the effects of various M & R strategies on road network conditions.

6. ***Optimization Modeling*** - The PMS provides for optimizing the Borough's M & R program.

7. ***Programming and Budgeting*** - The PMS can generate multi-year plans, programs and budgets for road preservation and rehabilitation; and, it will produce user-defined reports and graphic representations of the management information generated by the system.

8. ***Feedback => Refine Network Definition => Roadway Re-inventory => Condition Assessment => etc.*** - The PMS allows for easy modification and update of the program, allowing continued utilization of the system through successive iterations.

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PROJECT UNDERSTANDING

This project is to provide Spring Lake Borough with a comprehensive pavement management system. We understand the project consists of evaluating approximately 26 centerline miles of streets located in the Borough.

The implementation of the PMS will include reviewing all of the Borough's roads and assessing the condition of the roads. The review of the Borough's roads will include the development and implementation of a pavement condition survey procedure which can be used by Borough staff in the future. The condition survey procedure will be documented.

Another management function of the PMS is to develop and maintain a preservation and rehabilitation work program. The development of a multi-year work program is an exercise in technical requirements and needs which are constrained by budget, public policy and public support. The system combines these elements and analyzes them to develop a recommended work program. The user will define the improvement selection logic including rehabilitation strategies based on local use and costs and decision trees and treatment triggers for each pavement group.

The final decision making process is accomplished through ranking (prioritization) and optimization procedures using a heuristic optimization model.

The model evaluates an entire strategy of rehabilitation and future preservation rather than evaluating only an initial rehabilitation activity. The life cycle analysis is used to compare cost and select optimal solutions to obtain the greatest benefit from several funding scenarios.

Training will be provided to the Borough staff to enable the Borough to operate the PMS during and after the team's services is completed. The training will include data collection, computer operation, data interpretation, and pavement management analysis and program development.

RUTGERS ROADWAY EVALUATION
IN THE
BOROUGH OF SPRING LAKE
MONMOUTH COUNTY, NEW JERSEY

OCI	ROADWAY	ROAD LENGTH (FT)	ROAD WIDTH (FT)
63.46	MERCER AVENUE	1,338	40
63.52	LORRAINE AVENUE	2,217	40
66.09	ELIZABETH COURT	371	30
71.89	FOURTH AVENUE	2,891	30
72.68	TUTTLE AVENUE	3,845	40
73.94	MERCER AVENUE	1,712	40
74.11	MONMOUTH SHIRE LANE	327	35
75.57	EDGEWOOD PLACE	593	25
76.26	GLENWOOD PLACE	445	20
76.28	THIRD AVENUE	1851	40
77.19	VROOM AVENUE	2253	40
77.53	JERSEY LANE	172	35
78.51	PITNEY AVENUE	4276	30
79.78	FIFTH AVENUE	3823	40
81.76	WARREN AVENUE	1374	40
82.10	MORRIS AVENUE	3278	40
84.00	SOUTH BOULEVARD	2199	40
84.13	PASSAIC AVENUE	3547	40
84.44	ST CLAIR AVENUE	3996	40
84.62	JERSEY AVENUE	228	40
84.91	SHORE ROAD	1,179	30
85.28	CHURCH STREET	1,296	30
85.74	PENNSYLVANIA AVENUE	2,348	40
85.75	YORK AVENUE	1,067	40
86.00	HOWELL AVENUE	1,731	40
86.29	EAST LAKE AVENUE	2,159	30
86.50	WASHINGTON AVENUE	3,036	40
86.54	CENTRAL AVENUE	880	35
86.63	PROSPECT AVENUE	1,459	30
87.18	SALEM AVENUE	3,020	40
87.54	SECOND AVENUE	1,463	30
88.11	WORTHINGTON AVENUE	3,712	40
89.29	SUSSEX AVENUE	1,855	40
89.74	THIRD AVENUE	2,028	50
90.34	ESSEX AVENUE	2,284	40

91.45	MONROE AVENUE	2,935	40
91.67	THIRD AVENUE	2,181	30
91.72	FIFTH AVENUE	1,782	30
91.91	SECOND AVENUE	5,627	40
92.00	RED OAK DRIVE	572	30
92.13	REMSEN AVENUE	1,204	40
92.21	SEAWOOD WAY	751	40
92.22	UNION AVENUE	1,102	40
92.49	RAILROAD AVENUE	356	30
92.53	FOURTH AVENUE	4,292	40
93.34	FIRST AVENUE	2,644	40
93.77	FIRST AVENUE	3,784	30
93.82	BRIGHTON AVENUE	3,957	40
94.14	ATLANTIC AVENUE	2,977	40/60
94.43	JERSEY AVENUE	3,364	40
94.90	MONMOUTH AVENUE	2,905	40/50
95.24	BROWN AVENUE	1,065	30
96.37	MADISON AVENUE	2,232	40
96.80	PROSPECT AVENUE	91	40
97.18	ESSEX AVENUE	749	40
97.22	VROOM AVENUE	144	40
97.48	SECOND AVENUE	347	30
98.00	VALENDORA COURT	616	20
99.00	SUSSEX AVENUE	976	40
99.66	SOUTH BOULEVARD	2,569	30
100.00	JERSEY AVENUE	36	
100.00	MAIN STREET	35	
100.00	NORTH BOULEVARD	53	
100.00	NOT EXISTING	333	
100.00	ADRIAN AVENUE	1,236	
100.00	WEST LAKE AVENUE	1,996	
100.00	NEWARK AVENUE	1,339	
100.00	OCEAN ROAD	2,350	
100.00	OCEAN AVENUE	10,648	
100.00	WARREN AVENUE	1,342	
100.00	FIRST AVENUE	3,063	
100.00	THIRD AVENUE	1,717	
100.00	SAINT CATHERINE WAY	127	
100.00	SECOND AVENUE	1,124	

FENAME	GIS_Length	OCI
	0	0
Mercer Ave	1338	63.459999
Lorraine Ave	2217	63.52
Elizabeth Ct	371	66.089996
4th Ave	2891	71.889999
Tuttle Ave	3845	72.68
Mercer Ave	1712	73.940002
Monmouth Shire Ln	327	74.110001
Edgewood Pl	593	75.57
Glenwood Pl	445	76.260002
3rd Ave	1851	76.279999
Vroom Ave	2253	77.190002
Jersey Ln	172	77.529999
Ludlow Ave	4033	77.830002
Pitney Ave	4276	78.510002
5th Ave	3823	79.779999
Warren Ave	1374	81.760002
Morris Ave	3278	82.099998
South Blvd	2199	84
Passaic Ave	3547	84.129997
St Clair Ave	3996	84.440002
Jersey Ave	228	84.620003
Shore Road	1179	84.910004
Church St	1296	85.279999
Pennsylvania Ave	2348	85.739998
York Ave	1067	85.75
Howell Ave	1731	86
E Lake Ave	2159	86.290001
Washington Ave	3036	86.5
Central Ave	880	86.540001
Prospect Ave	1459	86.629997
Salem Ave	3020	87.18
2nd Ave	1463	87.540001
Worthington Ave	3712	88.110001
Sussex Ave	1855	89.290001
3rd Ave	2028	89.739998
Essex Ave	2284	90.339996
Monroe Ave	2935	91.449997
3rd Ave	2181	91.669998
5th Ave	1782	91.720001
2nd Ave	5627	91.910004
Red Oak Dr	572	92
Remsen Ave	1204	92.129997
Seawood Way	751	92.209999
Union Ave	1102	92.220001
Railroad Ave	356	92.489998
4th Ave	4292	92.529999
1st Ave	2644	93.339996
1st Ave	3784	93.769997
Brighton Ave	3957	93.82
Atlantic Ave	2977	94.139999

FENAME	GIS_Length	OCI
Jersey Ave	3364	94.43
Monmouth Ave	2905	94.900002
Brown Ave	1065	95.239998
Madison Ave	2232	96.370003
Prospect Ave	91	96.800003
Essex Ave	749	97.18
Vroom Ave	144	97.220001
2nd St	347	97.480003
Valendora Ct	616	98
Sussex Ave	976	99
South Blvd	2569	99.660004
Jersey Ave	36	100
Main St	35	100
North Blvd	53	100
NOT EXISTING	333	100
Adrian Ave	1236	100
W Lake Ave	1996	100
Newark Ave	1339	100
Ocean Road	2350	100
Ocean Ave	10648	100
Warren Ave	1342	100
1st Ave	3063	100
3rd Ave	1717	100
Saint Catherine Way	127	100
2nd Ave	1124	100