ROAD SURFACE MANAGEMENT SYSTEM PLAN

Town of Hollis, New Hampshire

January, 2010

NASHUA REGIONAL PLANNING COMMISSION

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1.0 INTRODUCTION

As part of the ongoing planning assistance to cities and towns within its membership district, the Nashua Regional Planning Commission (NRPC) has conducted a study to provide support for road surface assessment and pavement management to the Town of Hollis. This study was conducted using the Road Surface Management System (RSMS) software, which was developed by the Department of Civil Engineering at the University of New Hampshire, to assist municipalities in roadway surface management and maintenance.

The software was developed as a tool to assist in carrying out the following:

a. DEVELOPING AN INVENTORY

Many municipalities simply need to know what the physical plant consists of in terms of pavement structure and location.

b. PRIORITIZING MAINTENANCE NEEDS

Municipallities have adopted pavement management systems to provide an objective way of prioritizing maintenance needs when existing resources are insufficient to meet all needs.

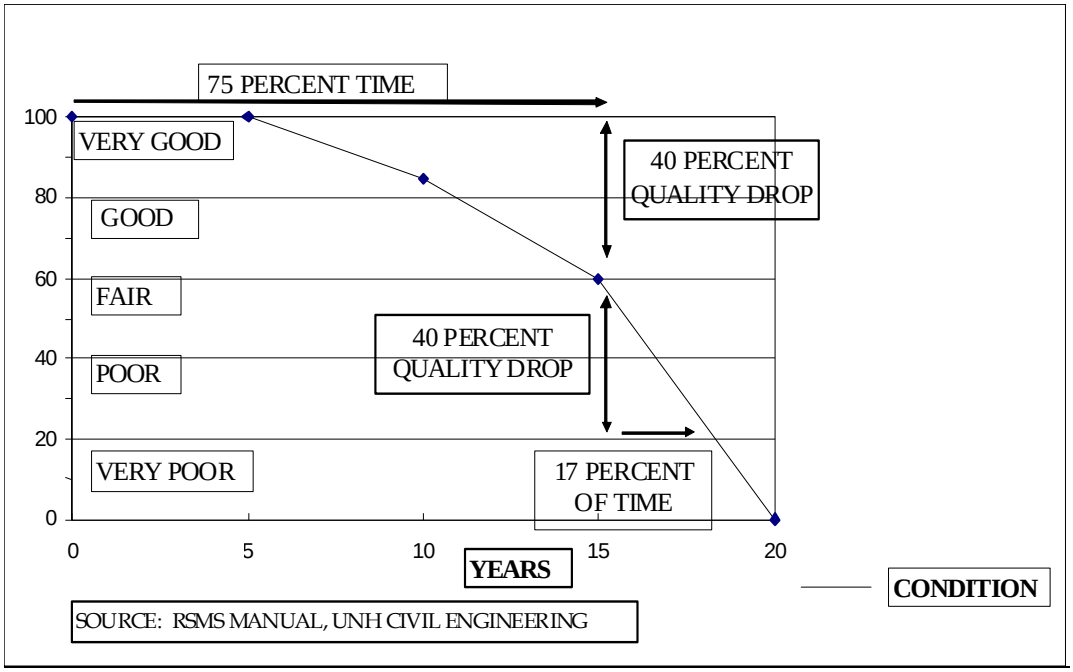
c. JUSTIFYING MAINTENANCE BUDGET INCREASES

Municipalities have found it very helpful to have an objective means of portraying maintenance needs to elected officials and voters, and to be able to forecast the consequences of deferred maintenance both in terms of future costs and future pavement conditions.

d. MAKING EFFICIENT USE OF THE TOWN'S HIGHWAY BUDGET

It has been well documented that for about 75 percent of a pavement's life, its serviceability and its cost of maintenance is less than one-fifth of 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. The "art" of good maintenance management is in knowing when a pavement has reached that critical 75 percent point. Each pavement deteriorates differently depending upon climate, type and volume of traffic, drainage, and many other variables, and often if a pavement is allowed to deteriorate to a point of serious visible distress, it is beyond the critical cost point. A pavement maintenance management system helps a Road Agent track this kind of deterioration for many sections of pavement. Further, after critical pavements have been identified, the pavement management system will help the Road Agent select cost effective maintenance strategies based on the rate of deterioration, its load carrying ability, its skid resistance, and the expected life of a particular maintenance strategy. Figure 1 (below) shows how the need for maintenance and repair is affected over time. The cost for maintenance and repair of roads which are repaired within the first 75 percent of the service life (within the 40 percent quality drop, fair to very good) is one-fourth to one-fifth the cost of maintenance and repair of roads that have deteriorated beyond the 75 percent mark. As shown in Figure 1, roads deteriorate at a faster rate beyond 75 percent of the service life. Roads experience a 40 percent drop in quality after 75 percent of the service life has passed; however, roads experience an additional 40 percent drop in quality soon after passing the 75 percent mark.

FIGURE 1: PAVEMENT DETERIORATION



2.0 INVENTORY INFORMATION

The Hollis Road Agent supplied information on roads maintained by the Town of Hollis. Roadway inventory data for the Town was compiled based on field observations by NRPC staff.
The roads were divided into segments between intersections. If in between intersections there were major differences in the surface conditions or widths of the road segment, the road segment was divided at the change in pavement. The Town-maintained roads in this report consist of paved roads (asphalt) and unpaved (gravel/dirt) roads. Class VI roads (non-maintained roads subject to gates and bars) and private roads were not included in this report.

RSMS divides surface types into seven main categories:

1. Unimproved — Unimproved surfaces such as woods or farm roads.
2. Graded — Graded road with a mixture of soil types.
3. Gravel — Graded gravel road.
4. Surface Treatment — Surface treated road; typically a chip seal, fog seal, sand seal, etc.
5. Miscellaneous Asphalt — Typically bituminous pavement, 1 to 3 inches in depth.
6. Reinforced concrete.
7. Miscellaneous — Anything else not specified above.

Information compiled in the road inventory includes road name, "from" and "to" streets to show beginning and end points, surface type, segment length and other information. Appendix A at the end of this report lists the roads and road segments included in this report. The road lengths in Appendix A were determined using GIS mapping technology.

3.0 THE ROADWAY SURFACE CONDITION SURVEY

Field surveys were performed by NRPC staff based upon the techniques and criteria described in the RSMS software manual. NRPC staff conducted windshield surveys in Hollis during the summer of 2009. The data on the condition of the surface of roads was documented on field sheets according to the methods described in the RSMS manual. Sample field sheets are provided in Appendix B of this report.

According to the RSMS manual, roadway surface distresses can be described based on seven category types for paved roads and seven category types for unpaved roads. The types of distresses are as follows:

a. FLEXIBLE PAVEMENT

- Alligator Cracking
- Longitudinal/Transverse Cracking
- Patching/Potholes
- Edge Cracking
- Drainage
- Roughness
- Rutting

b. UNSURFACED ROAD

- Improper Cross Section
- Roadside Drainage
- Corrugations
- Dust
- Potholes
- Rutting
- Loose Aggregate

The road surface conditions were recorded based on the severity of each distress, which refers to the degree of the category type, and the extent of each distress, which refers to the frequency of the occurrence or the amount of the road surface subjected to a particular distress. An explanation of types of surface distress is included in Appendix C of this report.

4.0 REPAIR AND MAINTENANCE STRATEGIES

RSMS software allows the user to design the decision making process within the software operations. The software contains defaults that assign one of seven general repair strategies to each of the surface distresses. The general repair strategies for paved and unpaved roads are as follows:

a. PAVED ROADS:

1. None/Deferred Maintenance
2. Crack Sealing
3. Patching Potholes
4. Surface Coats
5. Overlays
6. Reconstruction (Rebuild/Replace)
7. Drainage work

b. UNPAVED ROADS:

1. None/Deferred Maintenance
2. Dust Control and Stabilization
3. Roadside Drainage
4. Patch/Spot Additional Material
5. Reshape, Add Minor Material
6. Grade, Add Major Material

The default repair strategy assignments contained in RSMS, which were developed by the New Hampshire Department of Transportation, were used for the analyses in this report. The default assignments are shown below.

A detailed description of the repair and maintenance categories, which RSMS matches to road segments based on the condition surveys and the repair assignments, is provided in Appendix D of this report.

ROAD SURFACE MANAGEMENT SYSTEM - ASSIGN <u>PAVED</u> ROAD REPAIRS

– SURFACE DISTRESSES –

ALLIGATOR CRACKING				*LONG/TRANS CRACKING*				*EDGE CRACKING*			
NONE 1	**EXTENT**			NONE 1	**EXTENT**			NONE 1	**EXTENT**		
	L	M	H		L	M	H		L	M	H
S Low	11	14	14	**S** LOW	11	11	14	**S** LOW	12	12	14
E				**E**				**E**			
V MOD	12	15	16	**V** MOD	12	14	14	**V** MOD	12	15	15
E				**E**				**E**			
R HIGH	12	15	16	**R** HIGH	12	15	15	**R** HIGH	12	15	16
E				**E**				**E**			

– BASE PROBLEMS –

PATCHING POTHOLES		*ROUGHNESS*		*RUTTING*		*DRAINAGE*	
EXTENT		**CONDITION**		**CONDITION**		**CONDITION**	
NONE	11	GOOD	11	NONE	11	GOOD	21
LOW	13	FAIR	11	0-1″	11	FAIR	22
MOD	13	POOR	15	>1″	15	POOR	23
HIGH	16						

REPAIR: *11=No Maintenance, 12=Crack Seal,13=Patch, 14=Surface Coat, 15=Overlay,* ***16=Rebuild, 21=Drainage Good, 22=Drainage Fair, 23=Drainage Poor***

ROAD SURFACE MANAGEMENT SYSTEM - ASSIGN <u>UNPAVED</u> ROAD REPAIRS

– SURFACE DISTRESSES –

RUTTING				*LOOSE AGGREGATE*				*CORRUGATIONS*			
NONE 1	**EXTENT**			NONE 1	**EXTENT**			NONE 1	**EXTENT**		
	L	M	H		L	M	H		L	M	H
S Low	3	3	4	**S** LOW	3	3	3	**S** LOW	3	3	3
E				**E**				**E**			
V MOD	3	4	4	**V** MOD	3	3	3	**V** MOD	3	4	4
E				**E**				**E**			
R HIGH	4	4	4	**R** HIGH	3	4	4	**R** HIGH	4	4	4
E				**E**				**E**			

POTHOLES				*CROSS SECTION*		*DRAINAGE*		*DUST CONTROL*	
NONE 1	**EXTENT**			**CONDITION**		**CONDITION**		**CONDITION**	
	L	M	H	GOOD	1	GOOD	21	LIGHT	6
S Low	2	2	3	FAIR	3	FAIR	22	MEDIUM	7
E				POOR	4	POOR	23	HEAVY	8
V MOD	2	4	4						
E									
R HIGH	4	4	4						
E									

REPAIR: ***1=No Maintenance, 2=Patch/Spot Material, 3=Reshape Minor Material, 4=Grade Major Material, 6=Dust Control Light, 7=Dust Control Medium, 8=Dust Control Heavy, 21=Drainaige Good, 22=Drainage Fair, 23=Drainage Poor***

5.0 PRIORITY REPAIR RANKING AND RECOMMENDED REPAIR STRATEGIES

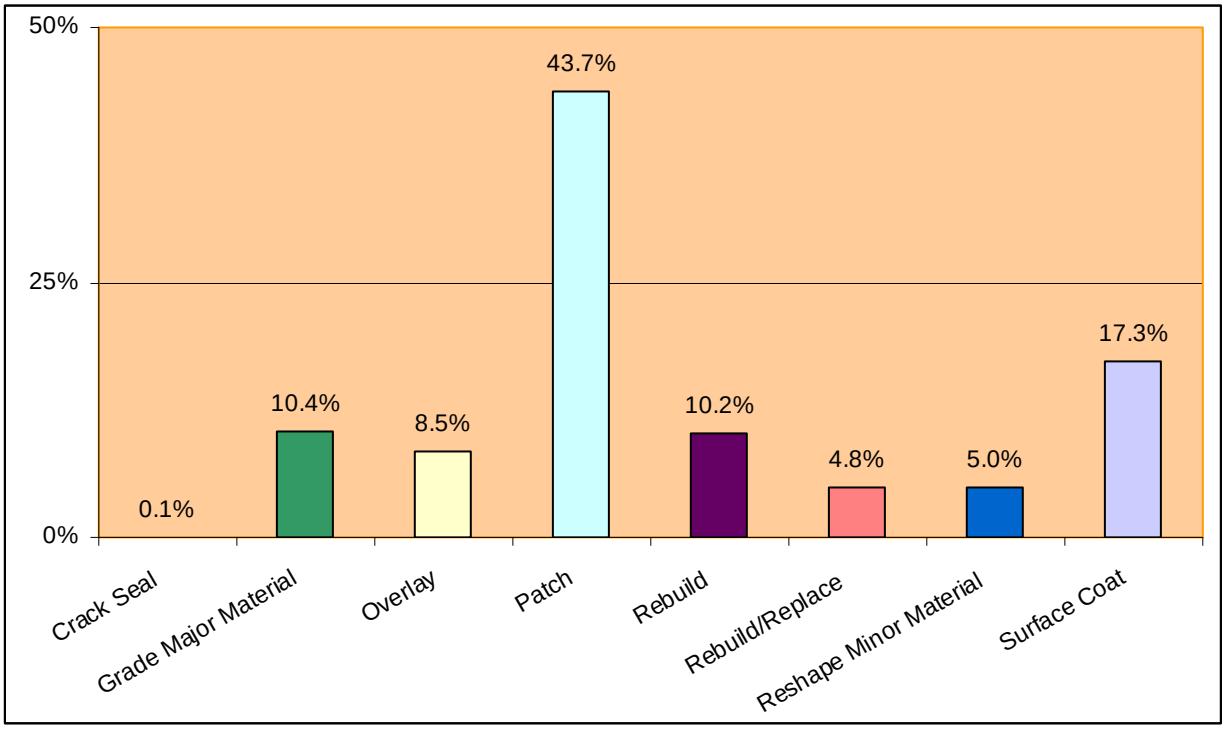
RSMS allows the user to create an overall summary of the recommended repair strategies.

Appendix E lists the results of the prioritization of road segments in need of repair. The road segments are listed in order of highest need of improvement first. The RSMS software calculates a value for each road segment based on a priority setting formula. The roads that have the highest calculated value are considered to be of the highest priority. Roads that have the same value are considered to be of equal priority.

Appendix E also depicts the results of the assignment of general repair strategies to road segments. The repair strategies for each segment are based on data that was gathered in the field during the summer of 2009. Once the field data is entered into the RSMS software, the software assigns a repair strategy to each road segment based on the highest severity and extent given for any of the distresses. Appendix E shows specific repairs within the general repair strategy categories.

Figure 2 (below) shows the percent of road network length for each repair strategy for roads in Hollis. The figure shows that patching is recommended for about 44% of the road network, surface coating (17%), grading (10%), reshaping (5%), rebuild (10%) and rebuild/replace (5%).

FIGURE 2
PERCENT OF ROAD NETWORK LENGTH BY REPAIR STRATEGY



6.0 SUMMARY OF RECOMMENDED REPAIRS

The main goal of this road surface management system report is to provide the information that is required to determine how to cost effectively maintain the Hollis road network. With this goal in mind, the following information has been provided:

- Road Inventory; Appendix A includes a list of all the roads that were inventoried in Hollis and includes the road name, road segment (from/to), length of segment and pavement width;
- Repair strategies; Appendix E includes a list of the appropriate repair strategies required to improve each road segment based on the particular type or types of surface distress that are present;
- Prioritized Repair Strategies; Appendix E also lists all road segments in order based upon the calculated priority ranking. In other words, the road segment that should be repaired first is listed first and the road that should be fixed last is listed last.

This report provides the Town of Hollis with the basic information that is necessary to begin an RSMS program. The database that has been created from the information that was gathered in the field has been provided to the Hollis Road Agent. The database can be used to further refine this report. For example, the database can be combined with current road construction costs to develop a budget for maintaining and repairing town roads.

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APPENDIX A

ROADS INVENTORIED

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Road Name	From Street	To Street	Length (feet)	Pavement Width (feet)
Alsun Dr	S. Merrimack Rd.	End	4,167	22
Ames Rd	Witches Spring	NH 122	798	22.5
Apple Ln	Wood Ln.	End	2,059	20
Arbor Ln	NH 122	Cul-de-sac	3,393	24
Baldwin Ln	NH 122	End	2,304	24
Barton Rd	Jambard Rd.	End	922	20
Baxter Rd	Wheeler Rd	#38 Baxter/ Begin Pavement	1,916	24
Baxter Rd	#38 Baxter Rd/begin Pavement	end/cul de sac	1,925	24
Bell Ln	Dow Rd.	End	1,013	16
Black Oak Dr	N, Pepperell Rd.	End	3,007	24
Blood Rd	Southgate Rd.	Dow Rd.	1,391	22
Blood Rd	NH 122	Southgate Rd.	3,403	22
Brown Ln	Ridge Rd.	End	3,191	14
Buttonwood Dr	S. Merrimack Rd. North	Meadow Dr	1,090	20
Buttonwood Dr	Meadow Dr	S. Merrimack Rd. South	2,442	20
Cameron Dr	Wheeler Rd.	End	3,095	24
Cavalier Ct	Jeff Smith Dr	End	995	22
Cavalier Ct	NH 122	Jeff Smith Dr	350	22
Clinton Dr	Runnells Bridge	end/cul de sasc	1,680	24
Colburn Ln	Plain Rd.	NH 122	2,896	25
Crestwood Dr	Springvale Dr	Flint Pond Dr.	3,248	24
Crestwood Dr	Broad St.	Springvale Dr	1,365	24
Dalkeith Rd	Jewett Ln.	End	1,793	22
Deacon Ln	Pavement change @ Stream Crossing	end/cul de sac	3,958	24
Deacon Ln	Rocky Pond Rd	Change in Pavement @ stream crossing	1,252	24
Deer Run Rd	N. Pepperell Rd.	End	2,164	24
Dow Rd	State Line	Blood Rd.	1,607	16
Dow Rd	Blood Rd.	Twiss Ln.	334	20
Dow Rd	Twiss Ln.	Jewett Ln.	4,047	22
Dow Rd	Jewett Ln.	Bell Ln.	381	22
Dow Rd	Bell Ln.	Eastern Ln.	1,415	22
Dow Rd	Eastern Ln.	Depot Rd.	2,151	22
Drury Ln	NH 122	End	1,198	28
Eastman Ln	Dow Rd.	End	2,000	24
Emerson Ln	Witches Spring	Witches Spring	2,218	18
Farley Rd	Swallow Dr.	Town Line	1,955	22
Farley Rd	S. Merrimack Rd.	Nevins Rd.	5,730	22
Farley Rd	Nevins Rd.	Swallow Dr.	1,809	22
Farley Rd	Wheeler Rd.	Pine Hill Rd.	3,365	22
Farley Rd	Town Line	Wheeler Rd.	845	22
Farm Pond Ln	Meadow Dr.	End	691	20
Federal Hill Rd	Hayden Rd	Town Line	5,511	14
Federal Hill Rd	Plain Rd	Hayden Rd	1,719	14
Federal Hill Rd	Winding Valley	Wood Ln.	532	18
Federal Hill Rd	Wood Ln	Silver Hill Park	1,427	20
Federal Hill Rd	NH 122	Winding Valley	1,229	22
Fieldstone Dr	Depot Rd.	End	1,755	22
Flagg Rd	Ridge Rd	N. Pepperell Rd	2,307	12
Fletcher Ln	S. Merrimack Rd.	Witches Spring Rd.	2,194	14
Flint Pond Dr	Crestwood Dr	End	278	20
Flint Pond Dr	Broad St.	Crestwood Dr	3,601	20

Road Name	From Street	To Street	Length (feet)	Pavement Width (feet)
Forrence Dr	Nevins Rd.	End	1,595	20
Foxden Rd	Laurel Hill Rd.	End	1,266	24
French Mill Rd	Sherwood Dr.	Wright Rd.	624	22
French Mill Rd	Depot Rd.	Sherwood Dr.	251	22
French Mill Rd	Wright Rd.	Rideout Rd.	2,428	22
Gilson Rd	Old Runnels Bridge Rd	Town Line	629	20
Glenice Dr	Ash St.	End	664	22
Hannah Dr	Rideout Rd	pavement change/ beginning of cul de sac	1,791	24
Hannah Dr	beginning of cul de sac	end of cul de sac	2,215	24
Hardy Ln	Wheeler Rd.	End	1,165	18
Hayden Rd	Shedd Ln.	NH 122	1,134	22
Hayden Rd	Adams Rd.	Shedd Ln	348	22
Hayden Rd	Mill Rd.	Adams Rd.	2,210	22
Hayden Rd	Federal Hill Rd.	Mill Rd.	1,710	22
Hayden Rd	Rocky Pond Rd.	Forest View Rd.	3,597	22
Hickory Ln	Meadow Dr.	End	519	20
Hideaway Ln	Maple Knoll Dr.	Broad St.	3,806	22
Hills Farm Ln	Pine Hill Rd.	End	708	20
Hillside Dr	pavement change/cul de sac	end of cul de sac	1,176	22
Hillside Dr	Rideout Rd	pavement change/ beginning of cul de sac	1,017	22
Howe Ln	Shipley Dr	Nashua Town Line	310	22
Howe Ln	Mendelssohn Dr	Shipley Dr	635	22
Howe Ln	Pine Hill Rd.	Mendelssohn Dr	3,838	22
Irene Dr	Worcester Rd	end/cul de sac	4,890	22
Iron Works Ln	State Line	end/cul de sac	1,174	20
Iron Works Ln	W. Hollis Rd	State Line	1,018	20
Jambard Rd	Barton Rd	End/cul de sac	1,527	20
Jambard Rd	Jewett Ln	Barton Rd	811	20
Jeff Smith Dr	Love Ln.	Cavalier Ct.	585	22
Jewett Ln	Jambard Rd	Depot Rd	1,354	22
Jewett Ln	dalkeith Rd	Jambard Rd	2,702	22
Jewett Ln	Dow Rd	Dalkeith Rd	945	22
Juniper Ln	Maple Knoll Dr.	Van Dyke Rd.	708	18
Laurel Hill Rd	Foxden Rd.	Town Line	2,791	24
Laurel Hill Rd	NH 122	Foxden Rd.	772	24
Lawrence Ln	W. Hollis Rd	Worcester Rd	2,273	12
Long Hill Rd	Parkhurst Rd	Tyng Hill Rd.	2,417	20
Long Hill Rd	Tyng Hill Rd.	End	1,699	20
Long Hill Rd	NH 122	Parkhurst Rd	2,067	20
Louise Dr	#29 Louise Dr (Pavement change)	Nahsua T/L	1,737	24
Louise Dr	Ranger Rd	Pavement change (@29 Louise Ln)	1,435	18
Love Ln	Jeff Smith Rd	Pavement change near #34 Love Ln	1,263	20
Love Ln	#34 Love Ln	end of pavement	994	20
Love Ln	NH122	Jeff Smith Rd	472	20
Lovejoy Ln	Richardson Rd	end/cul de sac	1,501	20
Lund Ln	NH 122	End	658	16
Lynne Dr	Twiss Ln	end/cul de sac	1,800	16
Maple Knoll Dr	Hideaway Ln	end	264	18
Maple Knoll Dr	Juniper Ln	Hideaway Ln.	463	18

Road Name	From Street	To Street	Length (feet)	Pavement Width (feet)
Maple Knoll Dr	Broad St.	Juniper Ln.	782	18
Marion Dr	S. Merrimack Rd.	End	1,180	20
Marion Dr	S. Merrimack Rd.	End	527	20
Marion Dr	S. Merrimack Rd.	End	701	20
Meadow Dr	Oakwood Ln	Buttonwood Dr.	1,685	20
Meadow Dr	Hickory Ln	Oakwood Ln	2,000	20
Meadow Dr	Pond Farm Ln	Hickory Ln	301	20
Meadow Dr	S. Merrimack Rd.	Farm Pond Ln	458	20
Mendelssohn Dr	Howe Ln.	End	2,598	20
Merrill Ln	NH 122	Depot Rd.	1,821	20
Mill Rd	Hayden Rd	Plain Rd	2,237	14
Milton Pl	Wright Rd.	End	3,168	20
Mooar Hill Rd	East End	Truell Rd.	459	20
Mooar Hill Rd	Sargent Rd.	Cul-de-sac	1,841	24
Mooar Hill Rd	Truell Rd.	Sargent Rd.	1,588	22
Muzzey Rd	NH 122	End	673	22
N Pepperell Rd	Black Oak Rd.	Pepperell Rd.	4,340	16
N Pepperell Rd	Flagg Rd.	Black Oak Rd.	813	16
N Pepperell Rd	Worcester Rd.	Flagg Rd.	1,848	16
N Pepperell Rd	State Line	Worcester Rd.	1,552	16
Nartoff Rd	Pine Hill Rd.	Pine Hill Rd.	6,295	22
Nartoff Rd	Pine Hill Rd	Public Rd	1,392	14
Nartoff Rd	Public Rd	Broad St	4,025	14
Nevins Rd	Forrence Rd	Farley Rd.	443	22
Nevins Rd	S. Merrimack Rd.	Forrence Dr.	3,148	22
Nutting Ln	Broad St.	End	703	20
Oakwood Ln	Meadow Dr.	End	782	20
Old Runnells Brg	Gilson Rd	Runnells Bridge	810	22
Old Runnells Brg	Runnells Bridge	Gilson Rd	1,698	22
Orchard Dr	Depot Rd	cul de sac	2,392	20
Parker Ln	Rideout Ln.	Broad St.	1,480	22
Patch Rd	NH 122 North	End	2,030	24
Pierce Ln	Pine Hill Rd.	Winchester Dr.	1,199	20
Pierce Ln	Winchester Dr.	Wheeler Rd.	1,940	20
Pine Hill Rd	Nartoff Rd.	Howe Ln.	5,101	24
Pine Hill Rd	Howe Ln./Ranger Rd.	Nartoff North	1,145	24
Pine Hill Rd	Nartoff South	Pierce Rd.	3,135	26
Pine Hill Rd	Pierce Rd.	Hills Farm Ln.	802	24
Pine Hill Rd	Hills Farm Ln.	Broad St.	5,612	26
Pine Hill Rd	Nartoff Rd. North	Nartoff Rd. South	479	26
Pine Hill Rd	Nashua Town Line	Hollis Town Line	1,640	27
Pine Hill Rd	Farley Rd.	Nartoff Rd.	720	24
Plain Rd	Coburn Rd.	NH 122	480	22
Plain Rd	Mill Rd.	Coburn Rd.	997	22
Plain Rd	# 49 Plain Rd	Mill Rd	1,026	22
Plain Rd	Federal Hill Rd	Change in Pavement (@ 49 Plain Rd)	856	22
Powers Rd	Rideout Rd.	End	3,483	24
Ranger Rd	Pine Hill Rd.	Louise Dr	3,249	18
Ranger Rd	Louise Dr	Broad St.	2,205	18
Richardson Rd	Depot Rd.	Van Dyke Rd.	1,996	14
Richardson Rd	Van Dyke Rd.	Depot Rd.	4,050	14

Road Name	From Street	To Street	Length (feet)	Pavement Width (feet)
Rideout Rd	Hillside Dr.	French Mill Rd. (change in pavement)	2,077	22
Rideout Rd	French Mill Rd. (change in pavement)	Depot Rd.	2,684	22
Rideout Rd	Broad St.	Parker Ln.	992	22
Rideout Rd	Parker Ln.	Powers Rd.	314	22
Rideout Rd	Powers Rd.	Snow Ln.	172	22
Rideout Rd	Snow Ln.	Hannah Dr.	1,474	22
Rideout Rd	Hannah Dr.	Sumner Ln.	523	22
Rideout Rd	Sumner Ln.	Hillside Dr. (change in pavement)	1,488	22
Ridge Rd	Brown Rd	Flagg Rd	6,371	20
Ridge Rd	Worcester Rd	State Line	2,543	12
Ridge Rd	Flagg Rd.	Worcester Rd.	540	18
Ridge Rd	NH 122	Brown Rd.	3,933	20
Rocky Pond Rd	Wood Ln.	Hayden Rd.	6,258	22
Rocky Pond Rd	Hayden Rd.	Town Line	4,071	14
Rocky Pond Rd	Willoughby Ln.	Wood Ln.	1,682	24
Rocky Pond Rd	Deacon Ln.	Willoughby Ln.	294	24
Rocky Pond Rd	Hampshire 130	Deacon Ln.	1,683	24
S Merrimack Rd	Nevins Rd.	Farley Rd.	3,617	22
S Merrimack Rd	Wheat Ln	Silver Lake Rd	573	22
S Merrimack Rd	Witches Spring Rd.	Buttonwood Dr. (N)	848	22
S Merrimack Rd	Buttonwood Dr. (N)	Buttonwood Dr. (S)	887	22
S Merrimack Rd	Buttonwood Dr. (S)	Fletcher Ln.	267	22
S Merrimack Rd	Fletcher Ln.	Alsun Dr.	700	24
S Merrimack Rd	Alsun Dr.	Meadow Dr.	657	22
S Merrimack Rd	Town Line	Witches Spring	1,739	24
S Merrimack Rd	Meadow Dr.	Marion Dr.	1,118	22
S Merrimack Rd	Marion Dr.	Nevins Rd.	2,409	24
S. Merrimack Rd	35 S. Merrimack Rd	Wheat Ln	1,371	22
Sargent Rd	Mooar Hill Rd.	Cul-de-sac	2,219	24
Shattuck Ln	Wheeler Rd.	End	2,638	12
Shedd Ln	Hayden Rd.	Cul-de-sac	1,600	22
Sherwood Dr	Depot Rd.	French Mill Rd.	2,985	20
Shipley Dr	Howe Ln.	End	2,124	22
Snow Ln	Rideout Rd.	End	1,355	10
Southgate Rd	Blood Rd.	End	1,823	22
Spaulding Ln	NH 122	NH 122	2,389	22
Springvale Dr	Crestwood Dr.	End	1,328	24
Sumner Ln	Rideout Rd.	End	2,283	22
Swallow Dr	Farley Dr.	End	2,269	12
Toddy Brook Rd	NH 122	End	1,071	18
Truell Rd	NH 122	Mooad Rd.	4,408	24
Twiss Ln	Lynne Dr	Depot Rd	2,892	20
Twiss Ln	Dow Rd	Lynne Dr	2,638	20
Tyng Hill Rd	Wheeler Rd.	Long Hill Rd.	2,143	20
Van Dyke Rd	Juniper Ln	Richardson Rd	3,415	14
Van Dyke Rd	Broad St.	Juniper Ln. (dirt start)	1,007	18
Wheeler Rd	Shattuck Ln.	Farley Rd.	2,913	24
Wheeler Rd	Hardy Ln.	Shattuck Ln.	2,887	24
Wheeler Rd	Pierce Ln.	Hardy Ln.	2,495	24
Wheeler Rd	Baxter Rd.	Pierce Ln.	3,585	24
Wheeler Rd	Cameron Dr.	Baxter Dr.	98	24

Road Name	From Street	To Street	Length (feet)	Pavement Width (feet)
Wheeler Rd	Tyng Hill Rd.	Cameron Dr.	1,390	22
Winchester Dr	Pierce Ln.	End	1,622	22
Winding Valley Rd	Federal Hill Rd.	End	1,656	20
Witches Spring Rd	Emerson Lane	Ames Rd.	5,266	22
Witches Spring Rd	S. Merrimack Rd.	Fletcher Ln.	2,741	22
Witches Spring Rd	Fletcher Ln.	Emerson Ln.	201	22
Witches Spring Rd	Ames Rd.	NH 122	1,620	22.5
Wood Ln	Apple Ln	Pavement Begin	1,807	22
Wood Ln	Rocky Pond Rd	Apple Ln	341	22
Wood Ln	Federal Hill Rd	end of Pavement	243	22
Worcester Rd	Ridge Rd	Irene Dr	4,394	20
Worcester Rd	N. Pepperell Rd	Ridge Rd	1,628	20
Worcester Rd	Irene Dr	Lawrence Ln	977	20
Worcester Rd	Lawrence Ln	W. Hollis Rd	1,893	18
Worcester Rd	NH 122	N. Pepperell Rd	4,229	20
Wright Rd	Depot Rd	French Mill	1,036	22
Wright Rd	French Mill	Milton Place	522	22

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APPENDIX B

SAMPLE FIELD SHEETS

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Date: ------/-----/------

RSMS Inventory Sheet

Road Name:	RIN:
Sequence No.:	RD Section:
From Street:	Maintenance Div:
To Street:	Jurisdiction: **C**ounty **M**unicipality **N**ot Maintained **P**rivate **S**tate

No. Lanes	Federal Class
Lane Width / Shoulder Width	Traffic: 1-Low 2-Low-Med 3-Med 4-Med-High 5-High
Surface 1 Unpaved 2-Asphalt 3-Other	Importance 1-Low 2-Low-Med 3-Med 4-Med-High 5-High

Shoulder: 1-Natural 2-gravel 3-paved asphalt
4-Curbed asphalt 5-Curbed Concrete
6-Curbed Granite 7-Paved Concrete 8-Other _____

Us **Metric**

Mile Post	Speed Limit
End Post	Inventory Year
	Current Year:

Comments:

Road Surface Management System

Condition Survey Form!

Road Name:	
Date Surveyed:	
Surveyed By:	

Alligator Cracking

Extent
Percent of Road Surface

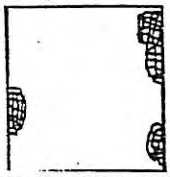
SEVERTY	No Defects	< 10%	10-30%	> 30%
Low				
Mod				
High				

Longitudinal/Transverse Cracking

Extent
Percent of Road Surface

SEVERTY	No Defects	< 10%	10-30%	>30%
Low				
Mod				
High				

Edge Cracking



Extent
Percent of Road Surface

SEVERTY	No Defect	<10%	10-30%	>30%
Low				
Mod				
High				

Patching/Potholes

Extent
Amount of Road Surface

	No Defects	Low	Med	High	

Roughness

Condition

Check for uneven surface, corrugations, sags, humps frost heaves.		Good	Fair	Poor	

Rutting

Condition

	None	0-1"	>1"	

Drainage

Condition

	Good	Fair	Poor	

ROAD SURFACE MANAGEMENT SYSTEM

Flexible Pavement Condition Survey

Condition Survey Form

Road Name:

Date Surveyed:

Surveyed by:

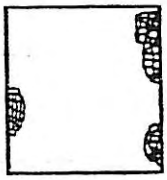
ALLIGATOR CRACKING

SEVERITY	NO DEFECTS	EXTENT (PERCENT OF ROAD SURFACE) <10%	10–30%	>30%
LOW				
MED				
HIGH				

LONGITUDINAL/ TRANSVERSE CRACKING

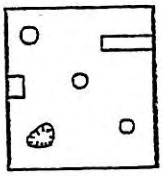
SEVERITY	NO DEFECTS	EXTENT (AMOUNT OF ROAD SURFACE) LOW	MED	HIGH
LOW				
MOD				
HIGH				

EDGE CRACKING



SEVERITY	NO DEFECTS	EXTENT (WIDTH OF EDGE CRACKING) LOW	MOD	HIGH
< 1 Ft				
1–2 Ft				
> 2 Ft				

PATCHING/ POTHOLES



NO DEFECTS	EXTENT (PERCENT OF ROAD LENGTH) LOW	MED	HIGH

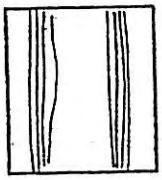
ROUGHNESS

CHECK ROAD FOR PRESENCE OF FOLLOWING:

UNEVEN SURFACE
CORRUGATIONS
SAGS
HUMPS
FROST HEAVES

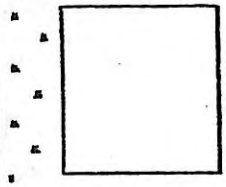
SEVERITY	CONDITION
	GOOD
	FAIR
	POOR

RUTTING



SEVERITY	CONDITION
None	
0-1"	
>1"	

DRAINAGE



SEVERITY	CONDITION
	GOOD
	FAIR
	POOR

ROAD SURFACE MANAGEMENT SYSTEM

Flexible Pavement Condition Survey

STREET: _____

SECTION NO.: _____

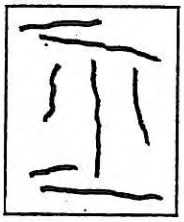
START : _____

END : _____

START MILEAGE : _____

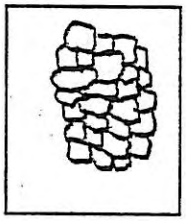
END MILEAGE : _____

LONGITUDINAL/ TRANSVERSE CRACKING



SEVERITY	NO Defects	EXTENT: Low	Med	High
Low		1	2	3
Med		4	5	6
High		7	8	9

ALLIGATOR CRACKING

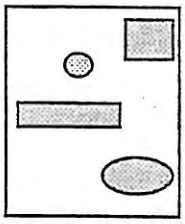


SEVERITY	NO Defects	EXTENT: Low	Med	High
Low		1	2	3
Med		4	5	6
High		7	8	9

EDGE CRACKING

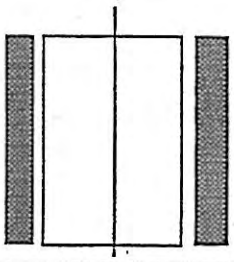
SEVERITY	NO Defects	EXTENT: Low	Med	High
Low		1	2	3
Med		4	5	6
High		7	8	9

PATCHING\ POTHOLES



NO Defects	EXTENT
	GOOD
	FAIR
	POOR

DRAINAGE



SEVERITY	CONDITION
	GOOD
	FAIR
	POOR

ROUGHNESS

CHECK ROAD FOR PRESENCE OF THE FOLLOWING :

- UNEVEN SURFACE
- CORRUGATIONS
- SAGS
- HUMPS
- FROST HEAVES

SEVERITY	CONDITION
	GOOD
	FAIR
	POOR

RUTTING

SEVERITY	CONDITION
	NO VISIBLE RUTTING (< 1 IN.)
	RUTTING VISIBLE (> 1 IN.)

APPENDIX C

EXPLANATIONS OF SURFACE DISTRESSES

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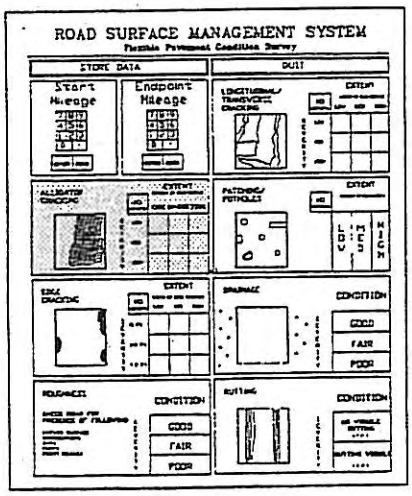
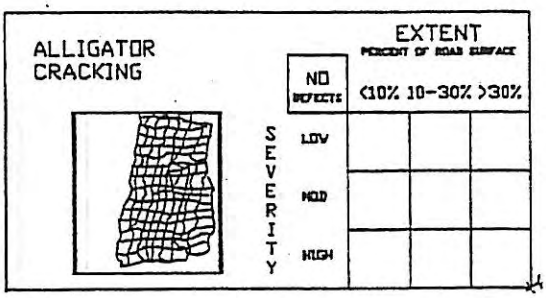




Alligator cracking refers to interconnected crack patterns that resemble alligator skin or chicken wire. Pavement pieces range in size from one to six inches on a side.

NO DEFECT: The road section has no visible alligator cracking or the total area exhibiting cracking comprises less than 1% of the entire section.

SEVERITY:

LOW Crack pattern is just beginning to appear. Cracks have no measurable *width* and no actual pavement separation is found.

MODERATE Easily discernible cracking with measurable crack *widths* up to 1/8" and some breakup. Pavement pieces, while loose, are still interconnected.

HIGH Wide cracking (1/8") has resulted in major pavement breakup with loose pieces actually displaced.

EXTENT:

LOW <10% The *total area* exhibiting alligator cracking encompasses more than 1% and less than 10% of the roadway section.

MOD. 10-30% The *total area* exhibiting alligator cracking encompasses between 10% and 30% of the roadway section.

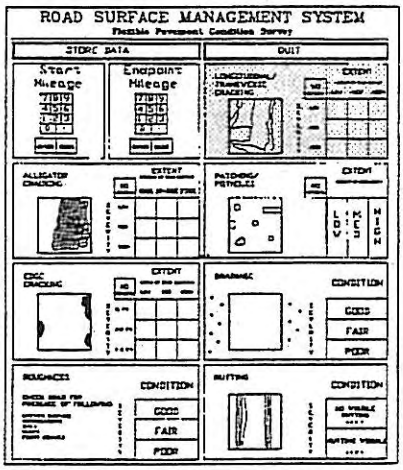
HIGH >30% The *total area* exhibiting alligator cracking encompasses greater than 30% of the roadway section.

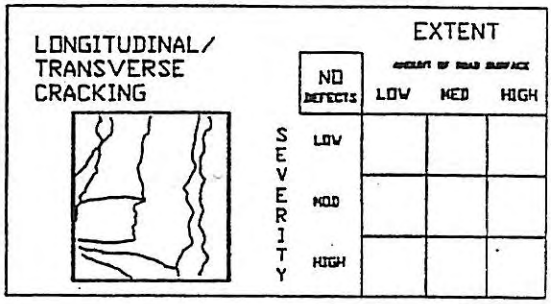
NOTES:

1. When alligator cracking is the primary distress, it is generally related to traffic loading. As such, alligator cracking will be found primarily in wheel paths.

2. It is important that surveyors be aware of the distinction between alligator cracking and the other primary distresses of edge cracking, longitudinal/transverse cracking, and rutting. This is critical to the program for selecting viable repair strategies.

Longitudinal/Transverse Cracking





Longitudinal cracks are cracks which run parallel to the roadway centerline. Longitudinal cracks are usually found at construction joints and between lanes.

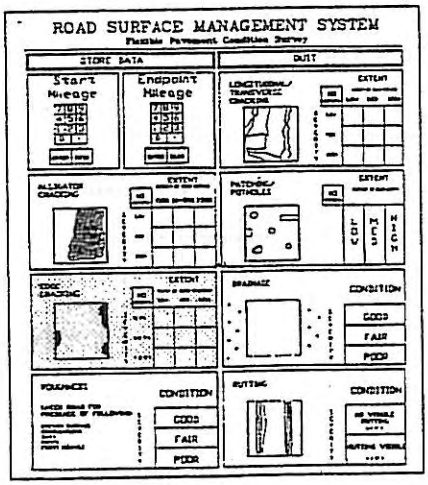
Transverse cracks run perpendicular to the roadway centerline. Transverse cracks are generally spaced at regular intervals and caused by expansion and contraction of the road surface material.

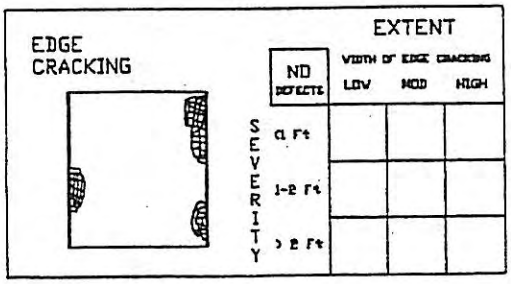
Both types of cracks can also be reflective, appearing above joints and cracks in underlying pavements.

NO DEFECT:		The road section has no visible signs of longitudinal/transverse cracking.
SEVERITY:	**LOW**	Hairline cracks with little or no spalling (width of pencil tip).
	MODERATE	Crack widths up to 1/4" in width with some spalling evident (width of pencil).
	HIGH	Well-defined cracks filled with foreign material (sand, stones, etc.). Extensive spalling and breakage.
EXTENT:	**LOW**	The overall length of *longitudinal* cracking is less than 10% of the section length and/or *transverse* cracks are 50' apart.
	MEDIUM	The overall length of *longitudinal* cracking is between 10% and 30% of the total section length and/or *transverse* cracks are between 25' and 50' apart.
	HIGH	The overall length of *longitudinal* cracking is over 30% of the total section length and/or *transverse* cracks are less than 25' apart.

NOTES:

1. Spalling refers to the physical relocation and/or displacement of pieces of original pavement.
2. Transverse cracks must extend across at least one full lane width to be counted as transverse. Cracks limited to wheel paths, typically alligator cracks, are not included in this category.
3. Multiple (parallel) cracks within 8" of primary crack are considered as part of the primary crack.





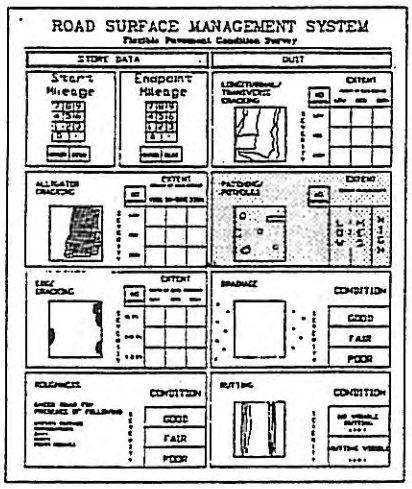
Edge cracking refers to cracks adjacent and parallel to the edge of the pavement. While generally confined to the outer one to two feet of pavement, edge cracking can progress into the travel lane.

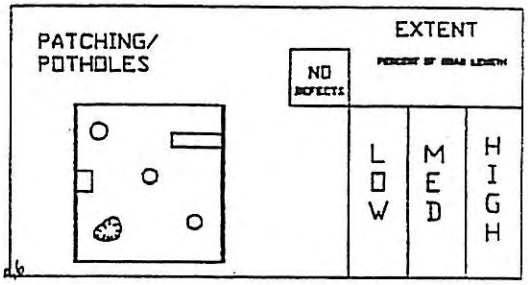
NO DEFECT:		The roadway does not exhibit edge cracking.
SEVERITY:	**LOW < 1 ft.**	Cracking evident; however, no breakup. Crack widths << 1/8" and confined to *12" from edge of pavement.*
	MOD. 1-2 ft.	Multiple cracking occurring with some breakup or raveling. Cracks extend *up to 24" into pavement.*
	HIGH > 2 ft.	Extensive cracking *beyond 24" into roadway*; breakup. This condition closely resembles alligator cracking.
EXTENT:	**LOW**	The total section length affected by cracking is *less than 10% of the section length.*
	MODERATE	The total section length affected by cracking is *between 10% and 30% of the section length.*
	HIGH	The total section length affected by cracking is *more than 30% of the section length.*

NOTE:

1. Raveling is the progressive loss of bituminous pavement materials from the road surface.

Patching/Potholes





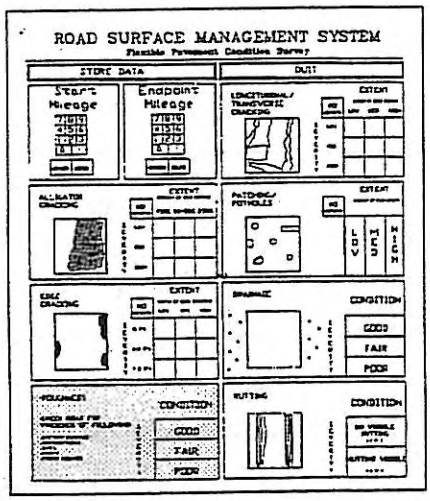
Patching refers to areas where the original pavement has been removed and subsequently replaced but is showing deterioration. Potholes are areas where portions of the road pavement have broken and loss of pavement has resulted in a bowl-shaped depression.

NO DEFECT:		No patches or potholes detected in the rated section.
EXTENT:	**LOW**	The *total area* of patching is less than 10% of the total section area and/or there are fewer than 5 potholes per 100' of section length.
	MEDIUM	The *total area* of patching is between 10% and 30% of the total section area and/or there are between 5 and 10 potholes per 100' of section length.
	HIGH	The *total area* of patching is greater than 30% of the total section area and/or there are more than 10 potholes per 100' of section length.

NOTES:

1. Edge cracks, spalling of longitudinal/transverse cracks, and displacement of alligator cracks are not counted as potholes.

2. Only patches that show deterioration should be evaluated. Good patches should be ignored. Frost heaves, including culverts that are protruding and rocks that are coming up through the surface, should be included. Surface area, rather than depth of deterioration, should be used to assess extent.



ROUGHNESS	CONDITION
CHECK ROAD FOR PRESENCE OF FOLLOWING:	
UNEVEN SURFACE CORRUGATIONS SAGS HUMPS FROST HEAVES	GOOD
SEVERITY	FAIR
	POOR

Pavement roughness is defined as irregularities in the roadway surface which adversely affect the comfort of the ride.

CONDITION:

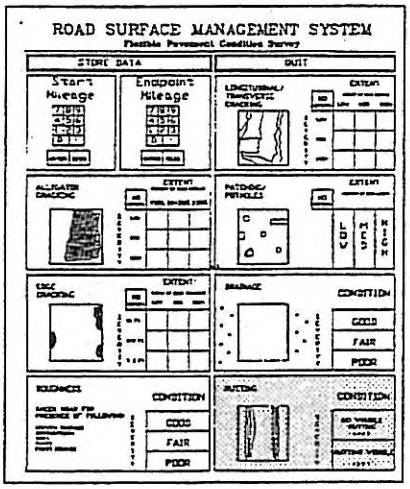
GOOD — Road has *even surface* — ideal for smooth, undisturbed travel. New roads and recent resurfacing generally fall into this category. (There may be minor distortions not noticeable to the typical rider.)

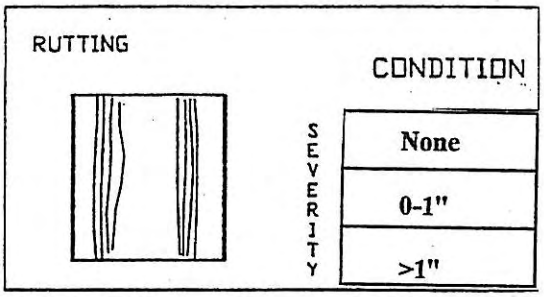
FAIR — *Noticeable unevenness*, but vehicle may continue safely at posted speeds. Sags, humps, and frost heaves have not yet become hazardous.

POOR — Pavement surface is *very uneven*, causing a safety hazard for vehicles traveling at the posted speed limit.

NOTES:

1. Assessment of roughness should be determined while the survey vehicle is traveling at posted speeds.
2. This category is also a " catch-all" for conditions which are not included in other categories — i.e., corrugations, waves, frost heaves, settlement, etc.





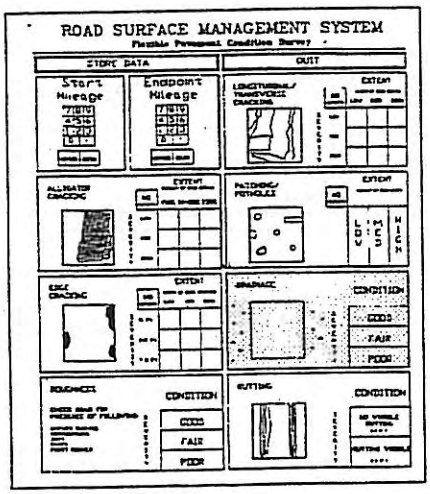
Rutting refers to channels in the wheel paths. Rutting causes water to drain along the road surface rather than drain to the edge of the road.

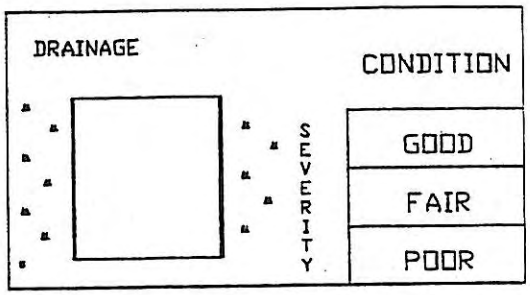
CONDITION: **NO VISIBLE RUTTING:** There is no visible evidence of rutting *(depth of rut is l less than 1").*

RUTTING VISIBLE: Road surface has visible ruts *(depth of rut is greater than 1").*

NOTE:

1. Tire path wear caused by snow tires or tires with chains is not the same as rutting, but should be recorded in the Roughness or Patching/Potholes Categories.





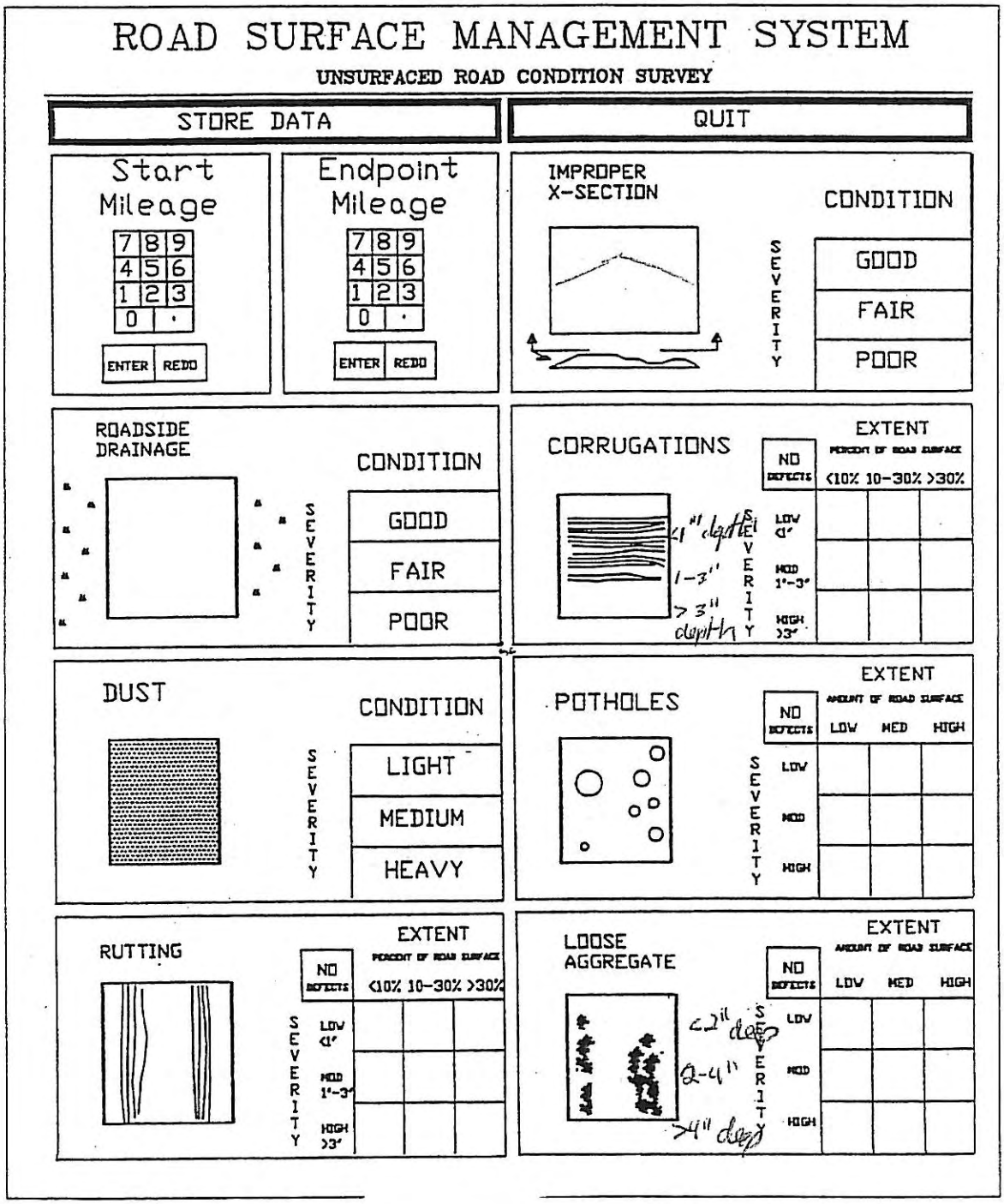
Drainage severities are judged by the ability for run-off to flow from the paved area to a location that does not influence roadway conditions. Visual indicators of drainage problems include accumulation of debris and sand and high water marks. Evaluation during or just after a rainfall event can be extremely beneficial.

CONDITION:	**GOOD**	There is no evidence of water accumulation on the pavement surface. Roadway has good crown. Positive drainage can be visually confirmed. Ditches, gutters, and other drainage structures are clear, clean, and functioning.
	FAIR	There is evidence of occasional water accumulation on the pavement surface. Road crown is minimal. Ditches, gutters and other drainage structures are functional though probably need maintenance.
	POOR	There is evidence of recurring and extensive ponding of water on the pavement surface. Roadway has no crown. Ditches, gutters and other drainage structures are not functioning or non-existent.

NOTES:

Sure signs of poor drainage include:

1. Road shoulders above the edge of pavement;
2. Standing water; and
3. Outwashes or accumulations of sand along the edge of the roadway.



Digitizing Tablet Overlay - Unpaved Roads

TYPICAL ACTIONS FOR UNPAVED ROADS

GENERAL STRATEGY	RECOMMENDED ACTION	OTHER STRATEGIES
A. **Routine Maintenance**	- Spot Regravel (Potholes)	B
	- Reshape	B
	- Reshape with Minor Additional Material	B
B. **Preventive Maintenance**	- Grade Shoulders	A
	- Clean Ditches	A
C. **Deferred Maintenance**	- Dust Control - Liquid $CaCl_2$	-
D. **Rehabilitation**	- Dust Control - Flake $CaCl_2$	-
E. **Reconstruction**	- Spot Regravel	-
	- No Action	-
	- Regrade	
	- Add Gravel, Regrade, Compact	
	- Reconstruct Road and Base	
	- Reconstruct Road, Base and Ditches	

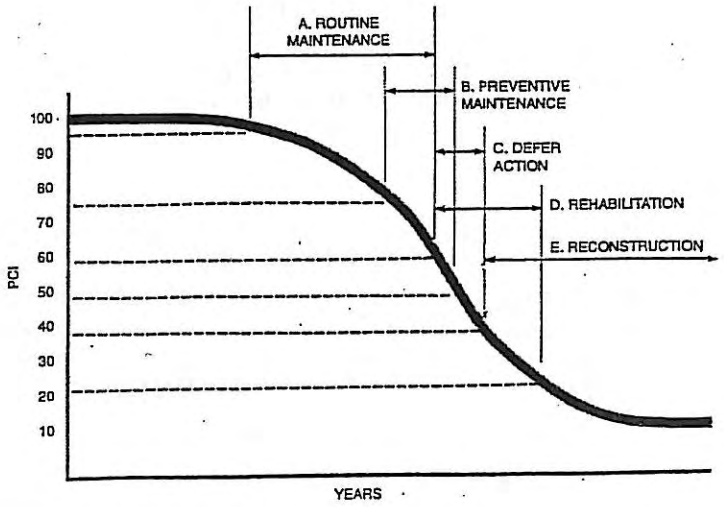
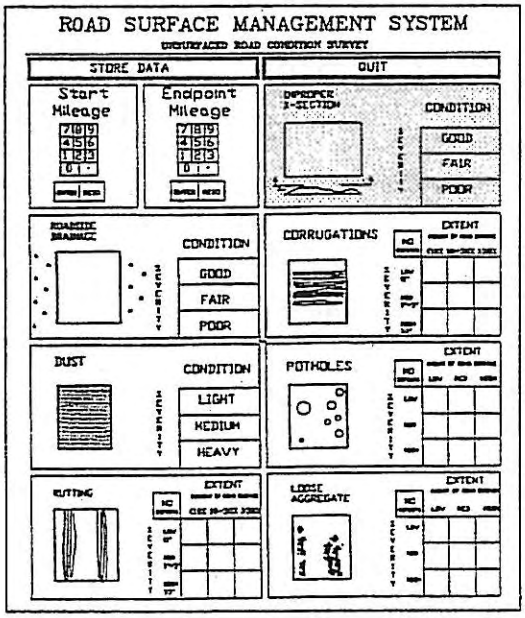
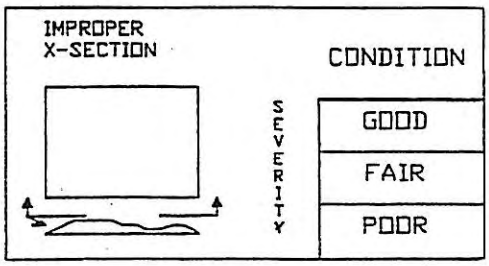


Figure 6-13 : Pavement Maintenance Curve

Cross Section — Proper Crown





Cross section condition is judged by the ability for run-off to flow from the roadway to a location that does not influence roadway conditions. Visual indicators of drainage problems include accumulation of debris and sand and high water marks. Evaluation during or just after a rainfall event can be extremely beneficial.

CONDITION: **GOOD** — There is *little or no ponding* water or evidence of ponding water. There is little or no evidence of water accumulation on the roadway surface. The roadway has good crown.

FAIR — *Moderate amounts of ponding water* or evidence of ponding water on the road surface. There is evidence of occasional water accumulation on the road surface. Road crown is minimal or completely flat, i.e. no cross-slope.

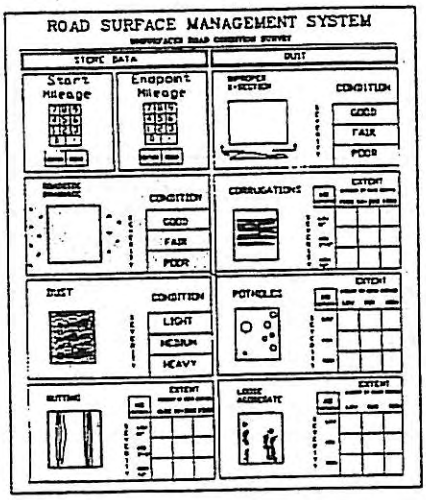
POOR — *Large amounts of ponding water* or evidence of ponding water on the road surface or severe depressions in the road surface. There is evidence of recurring and extensive ponding of water on the roadway surface. Roadway has no crown.

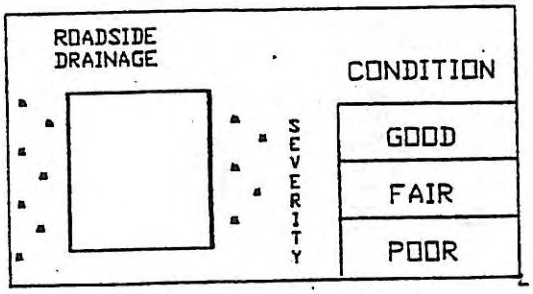
NOTES:

1. Improper cross section results when there is not sufficient slope to drain all water from the road surface.

2. Curves are often superelevated or banked in higher traffic volume locations. The use of super-elevation at curves may lead to potholes and road surface drainage problems at the transition between the normal crown section and the superelevated section. Superelevation may be avoided by increasing the radius of curvature of the road.

Inadequate Roadside Drainage





Poor roadside drainage occurs when the ditches, culverts, or shoulders are not in good enough condition to direct and carry runoff water away from the road.

CONDITION: **GOOD** — *Small amounts of ponding water* or evidence of ponding water along the sides of the roads, or small amounts of overgrowth or debris along the sides of the roads. Positive drainage can be confirmed visually. Ditches, gutters, and other drainage structures are clear, clean, and functioning.

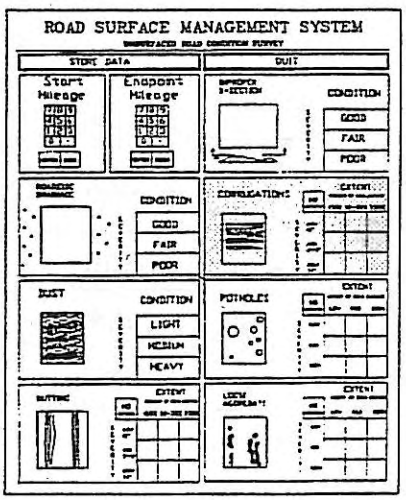
FAIR — *Moderate amounts of ponding water* or evidence of ponding water along the sides of the roads, or moderate amounts of overgrowth or debris along the sides of the roads, or some erosion of ditches into the shoulders or roadway. Ditches, gutters, and other drainage structures are functional, though probably need maintenance.

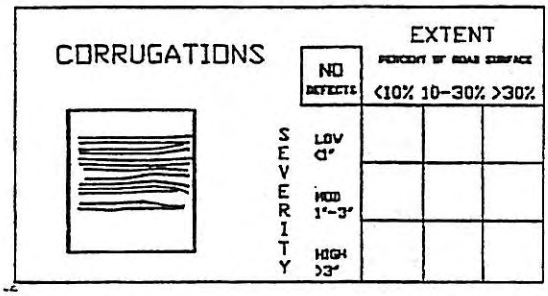
POOR — *Large amounts of ponding water* or evidence of ponding water along the sides of the roads, water running across or down the road, large amounts of overgrowth or debris along the sides of the roads, or erosion of ditches into the shoulders or roadway. Ditches, gutters and other drainage structures are not functioning or non-existent.

NOTES:

1. Inadequate Roadside Drainage must not be confused with Improper Cross Section. Improper Cross Section relates to the drainage of the roadway itself, while Inadequate Roadside Drainage relates to the ability of the area adjacent the road to carry runoff away from the roadway.

2. Signs of poor drainage include standing water, outwashes, or accumulations of sand along the edge of the roadway.



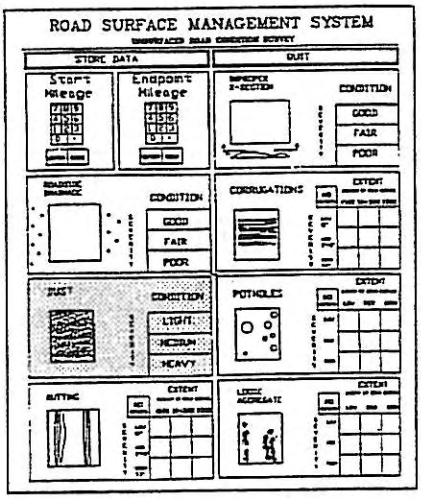


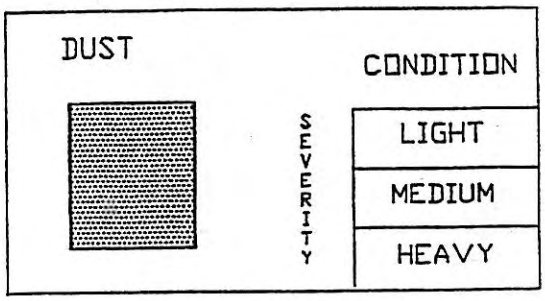
Corrugations, or washboarding, are closely spaced ridges and valleys, spaced at fairly regular intervals. These ridges and valleys are perpendicular to the travel direction.

NO DEFECTS:		No corrugations in the rated section.
SEVERITY:	LOW	Corrugations less than 1" deep.
	MODERATE	Corrugations between 1" and 3" deep.
	HIGH	Corrugations are deeper than 3" (width of baseball bat).
EXTENT:	LOW	*Less than 10% of the total road surface* is covered by corrugations.
	MODERATE	*Between 10% and 30% of the total road surface* is covered by corrugations.
	HIGH	*More than 30% of the total road surface* is covered by corrugations.

NOTES:

1. Corrugations are often caused by traffic and loose aggregate.
2. Corrugations usually form on hills, curves, acceleration or deceleration areas, or in areas where the road is soft or potholed.





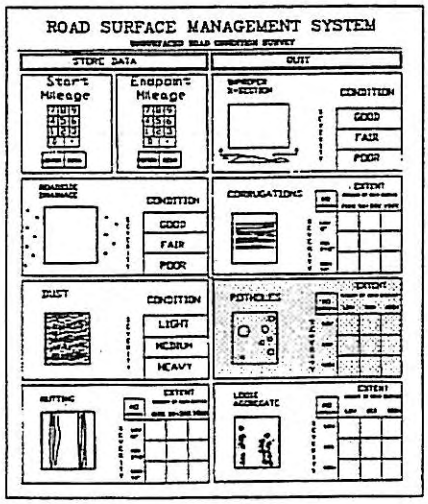
Dust creates a hazard to trailing or passing vehicles and may cause significant environmental problems. In addition, the loss of fine materials can result in the larger particles becoming unstable.

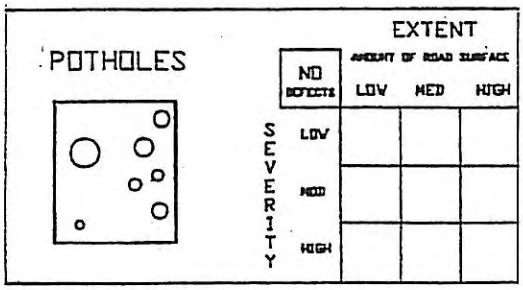
CONDITION:	**LIGHT**	Normal traffic produces a *thin dust* that does not obstruct visibility.
	MEDIUM	Normal traffic produces a *moderately thick cloud* that partially obstructs visibility and causes traffic to slow down.
	HEAVY	Normal traffic produces a *very thick cloud* that severely obstructs visibility and causes traffic to slow down significantly or stop.

NOTE:

1. Dust is measured at the posted speed.

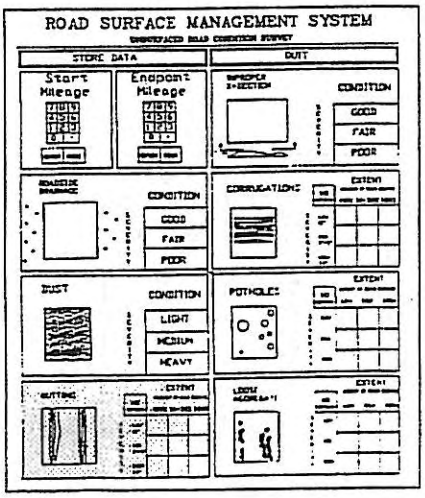
Potholes

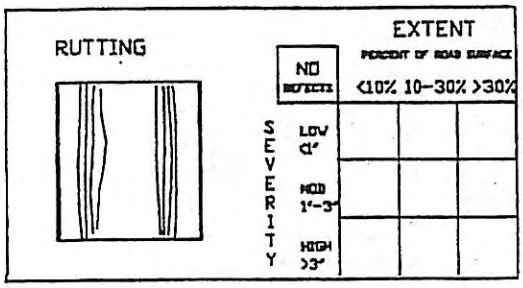




Potholes are areas where portions of the road surface have been worn away, and loss of material has resulted in a bowl-shaped depression.

NO DEFECTS:		No potholes detected in the rated section.
SEVERITY:	**LOW**	Potholes are *less than 1" deep* and/or are less than one foot in diameter.
	MODERATE	Potholes are *between 1" and 3" deep* and/or are less than two feet in diameter.
	HIGH	Potholes are *deeper than 3"* and/or are more than two feet in diameter.
EXTENT:	**LOW**	The *total area of potholes* is less than 10% of the total road surface area and/or there are fewer than 5 potholes per 100' of section length.
	MEDIUM	The *total area of potholes* is between 10% and 30% of the total road surface area and/or there are between 5 and 10 potholes per 100' of section length.
	HIGH	The *total area of potholes* is greater than 30% of the total road surface area and/or there are more than 10 potholes per 100' of section length.





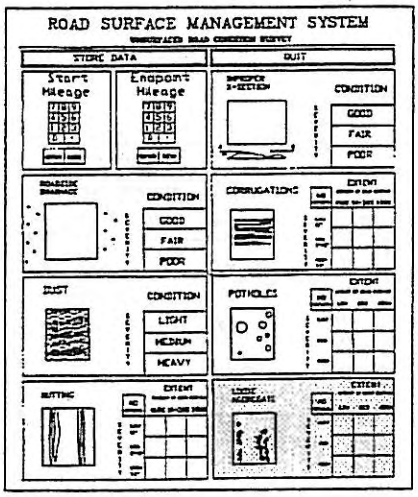
Rutting refers to channels in the wheel paths. Rutting causes water to drain along the road surface rather than drain to the edge of the road.

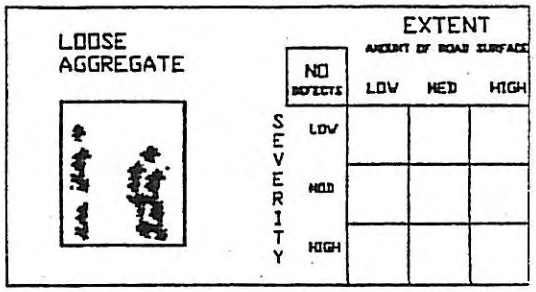
NO DEFECTS:		No visible rutting in the rated section.
SEVERITY:	**LOW**	Depth of rut is less than 1".
	MODERATE	Ruts are between 1" and 3" deep.
	HIGH	Ruts are greater than 3" deep.
EXTENT:	**LOW**	*Less than 10% of the total road surface* is covered by rutting.
	MODERATE	*Between 10% and 30% of the total road surface* is covered by rutting.
	HIGH	*More than 30% of the total road surface* is covered by rutting.

NOTE:

1. Ruts are caused by a permanent deformation in any of the road layers or subgrade. Ruts result from repeated vehicle passes when the road is soft. Significant rutting can destroy a road.

Loose Aggregate





Traffic loosens aggregate particles and moves these particles into berms along the shoulders or center of the roadway.

NO DEFECTS:		No loose aggregate in the rated section.
SEVERITY:	LOW	Loose aggregate on the road surface, or a *berm of aggregate, less than 2" deep*, on the shoulders or center of the roadway.
	MODERATE	Moderate aggregate *berm, between 2" and 4" deep*, on the shoulders or center of the roadway. A large number of fine soil particles may be found on the roadway surface.
	HIGH	Large aggregate *berm, greater than 4" deep*, on the shoulders or center of the roadway.
EXTENT:	LOW	Loose aggregate covers *less than 10% of the total road surface.*
	MEDIUM	Loose aggregate covers *more than 10% and less than 30% of the total road surface.*
	HIGH	Loose aggregate covers *more than 30% of the total road surface.*

APPENDIX D

DESCRIPTION OF REPAIR AND MAINTENANCE CATEGORIES

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MAINTENANCE AND REPAIR ALTERNATIVES

The default maintenance and repair alternatives are described below grouped by category within the two surface types. These defaults are stored in the two files:

Rmaint.dbf of 02/12/2000
Rmaint.fpt of 02/12/2000

Users are encouraged to review these alternatives for application in their agency. They should modify them as appropriate, and/or add new ones.

The default unit costs are averages from road departments in New Hampshire and Maine. Users should determine unit costs consistent with the way they define and calculate budget needs. They should especially consider the following factors:

- The extent to which the road department uses its own labor and equipment versus contract labor and equipment,
- Whether it charges those costs to particular repairs, and
- How it determines labor and material rates.

ASPHALT SURFACES

No Maintenance

Defer Maintenance

Strategy:	Deferred Maintenance
Description:	Defer all road maintenance until budget constraints allow road to be resurfaced or rebuilt.
Objective:	The town/city no longer has responsibility for the road or is a severely degraded lower traffic roads which does not warrant immediate replacement.
Cost:	$0 invested now, many $$$ required later.

Repair Only High Severity Defects

Strategy:	Deferred Maintenance
Description:	Repair highly damaged areas to maintain safe passage.
Objective:	Fulfills statutory requirements for "safe passage".
Cost:	$1.00 per sqyd now, many $$$ later.

Drainage

Defer Maintenance

See "No Maintenance" category above

Grade Shoulders and Ditches

Strategy:	Drainage, Fair or Poor
Description:	Grade shoulders and ditches with motor grader.
Objective:	Improve drainage.
Cost:	Approx. $0.10 per lineal ft.
Life/PCI Impr:	24 months/75%.

Clean Ditches, Fair and Clean Ditches, Poor

Strategy: Drainage, Fair or Poor
Description: Clean Gutters/Ditches with motor grader and dispose of material on roadside
Objective: Improve drainage.
Cost: $0.18 per lineal ft. for Fair Drainage,
$0.20 per lineal ft. for Poor Drainage
Life/PCI Impr: 12 months/90%.

Clean Ditches and Haul Away Dirt

Strategy: Drainage, Fair or Poor
Description: Clean Gutters/Ditches with motor grader and haul material for disposal.
Objective: Improve drainage.
Cost: $0.28 per lineal ft.
Life/PCI Impr: 48 months/90%.

Crack Sealing

Defer Maintenance

See "No Maintenance" category on page A-8

Fill/Seal Cracks

Strategy: Routine Maintenance, Cracks
Description: Blow out crack and apply commercial crack filling liquid or hot asphalt into crack; sand or chips may be spread over surface.
Objective: Seal cracks to prevent water damage.
Cost: $0.50 - $0.60 per linear ft. Assumes one linear foot of crack, on average, per linear of the road section.
Life/PCI Impr: 36 months/85%.

Rout & Fill/Seal Cracks

Strategy: Routine Maintenance, Cracks
Description: Rout and blow out crack and apply commercial crack filling liquid or hot asphalt into crack; sand or chips may be spread over surface.
Objective: Seal cracks to prevent water damage.
Cost: $0.60 - $0.70 per linear ft. Assumes one linear foot of crack, on average, per linear of the road section.
Life/PCI Impr: 36 months/95%.

Patching Low and Patching Medium

Defer Maintenance

See "No Maintenance" category on page A-8

Cold Patch (High Performance Mix)

Strategy: Routine Maintenance, Patch
Description: Removal of cracked and broken pavement surface and replacement with high performance, cold-mix asphalt.
Objective: Repair of potholes or very localized high severity defects.
Cost: $1.70 - $1.90 per sqft of patch.
$0.18 per lineal foot of low extent road section (10% of length).
$0.36 per lineal foot of medium extent road section (20% of length).
Life/PCI Impr: Low Extent - 36 months/85%.
Medium Extent - 36 months/80%.

Cold Patch (Normal Mix)

Strategy: Routine Maintenance, Patch
Description: Removal of cracked and broken pavement surface and replacement with standard cold asphalt mix.
Objective: Repair of potholes or very localized high severity defects.
Cost: $0.75 - $0.85 per sqft of patch.
$0.08 per lineal foot of low extent road section (10% of length).
$0.16 per lineal foot of medium extent road section (20% of length).
Life/PCI Impr: Low Extent - 10 months/85%.
Medium Extent - 10 months/80%.

Dig Out and Cold Patch

Strategy: Routine Maintenance, Patch
Description: Removal of cracked and broken pavement surface and base, and replacement with cold asphalt mix.
Objective: Repair of potholes or very localized high severity defects.
Cost: $1.00 - $1.10 per sqft of patch.
$0.10 per lineal foot of low extent road section (10% of length).
$0.20 per lineal foot of medium extent road section (20% of length).
Life/PCI Impr: 12 months/90%.

Dig Out and Hot Patch

Strategy: Routine Maintenance, Patch
Description: Remove cracked and broken pavement and replace with hot asphalt mix.
Objective: Repair of potholes or very localized high severity defects.
Cost: $1.50 per sqft of patch.
$0.15 per lineal foot of low extent road section (10% of length).
$0.30 per lineal foot of medium extent road section (20% of length).
Life/PCI Impr: 18 months/95.

Surface Coats - Seal Coats

Defer Maintenance

See "No Maintenance" category on page A-8

Chip Seal (single)

Strategy: Preventive Maintenance
Description: Spray asphalt emulsion on road suffice then apply an even graded aggregate, typically 3/8 inch; finish by rolling pavement to embed aggregate into the emulsion.
Objective: Used for preventive maintenance, sealing cracks on low volume roads, and to slow the formation of cracking.
Cost: $0.14 per sqft.
Life/PCI Impr: 60 months (5 years)/85%.

Chip Seal (double)

Strategy: Preventive Maintenance
Description: Spray asphalt emulsion on road suffice, and then apply an even graded aggregate, typically 3/8 inch. Roll to embed aggregate into the emulsion.
Objective: Used for preventive maintenance, sealing cracks on low volume roads, and to slow the formation of cracking.
Cost: $0.24 per sqft.
Life/PCI Impr: 96 months (8 years)/95%.

Thin (1") Hot Overlay

Strategy: Preventive Maintenance
Description: Add asphalt concrete (AC) as an overlay to existing surface.
Objective: Considered primarily for sealing and leveling, not structural improvement. Used to repair widespread defects, and improve ride of road.
Cost: $0.20 per sqft. per 1 inch
Life/PCI Impr: 72 months (6 years)/85%.

Hot Mix Shim Coat and Sand Seal

Strategy: Preventive Maintenance
Description: Fill ruts with hot mix and level with motor grader. Spray liquid asphalt on road surface, then spread sand over surface.
Objective: Used to seal pavements until major maintenance can be performed. Ineffective on roads with higher traffic volumes.
Cost: $0.20 per sqft.
Life/PCI Impr: 24 months/75%.

Hot Mix Shim Coat and Thin Overlay

Strategy: Preventive Maintenance
Description: Fill ruts with hot mix and level with motor grader. Add asphalt concrete (AC) as an overlay to existing surface.
Objective: Used to seal pavements until major maintenance can be performed. Ineffective on roads with higher traffic volumes.
Cost: $0.25 per sqft.
Life/PCI Impr: 36 months/95%.

Overlays:

Defer Maintenance

See "No Maintenance" category on page A-8

Hot Mix Shim Coat - Leveling

Strategy: Rehabilitation
Description: Add hot mix asphalt, level with motor grader, and roll to restore road cross section.
Objective: Used to restore ride.
Cost: $0.10 to $0.30 per sqft.
Life/PCI Impr: 24 months (2 years) to 60 months (5 years) depending on road condition/75%.

Thin (1½") Hot Overlay

Strategy: Rehabilitation
Description: Add asphalt concrete (AC) as an overlay to existing surface.
Objective: Considered primarily for sealing and leveling, not structural improvement. Used to repair widespread defects, and improve ride of road.
Cost: $0.20 per sqft per 1 inch
Life/PCI Impr: 72 months (6 years)/85%.

Thick (2") Hot Overlay

Strategy: Rehabilitation
Description: Add asphalt concrete (AC) to overlay existing surface.
Objective: Used to repair widespread high severity defects, and improve ride of road.
Cost: $0.40 per sqft.
Life/PCI Impr: 120 months (10 years) on sound, well drained base material/95%.

Thick (2") Cold Overlay

Strategy: Preventive Maintenance, Rehabilitation, and Reconstruction
Description: Add asphalt cold mix as overlay to existing surface..
Objective: Used to repair widespread high severity defects, and improve ride of road.
Cost: $0.23 per sqft.
Life/PCI Impr: 60-120 months (5-10 years)/90%.

Rebuild/Replace

Defer Maintenance

See "No Maintenance" category on page A-8

Revert to Gravel

Strategy: Reconstruction
Description: No work performed; allow road to revert to gravel.
Objective: For very low traffic roads that do not warrant maintenance.
Cost: $0 invested now, many $ required later if traffic increases.

6" Base Replacement and 2" Pavement Overlay

Strategy: Reconstruction
Description: Remove surface, excavate base, replace with 6" graded material, and place 2" asphalt overlay.
Objective: For repair of high severity defects.
Cost: $1.65 sqft.
Life/PCI Impr: 60 months (5 years)/85%.

10" Base Replacement and 2" Pavement Replacement

Strategy: Reconstruction
Description: Remove surface, excavate base, replace with 10" graded material, and place 2" asphalt overlay. Remove surface and base of effected area, rebuilding road from the base up to the wearing surface.
Objective: For repair of high severity defects.
Cost: $1.90 per sqft.
Life/PCI Impr: 96 months (8 years)/95%.

Cold Planing w/1½" Overlay)

Strategy: Reconstruction
Description: Plane off 1" existing surface and repave with a 1" overlay.
Objective: Restore crown and smoothness.
Cost: $0.44 per sqft.
Life/PCI Impr: 60 months (5 years)/85%.

Cold Planing w/2" Overlay)

Strategy: Reconstruction
Description: Plane off 2" existing surface and repave with a 2" overlay.
Objective: Restore crown and smoothness.
Cost: $0.54 per sqft.
Life/PCI Impr: 96 months (10 years)/85%.

Reclaimer Recycling w/1½" Overlay

Strategy: Reconstruction
Description: Recycle existing pavement and some base gravel and repave with 1" hot mix.
Objective: Rebuild surface and top of base.
Cost: $0.36 per sqft.
Life/PCI Impr: 96 months (8 years)/95%.

Reclaimer Recycling w/2" Hot Surface Mix

Strategy: Reconstruction
Description: Recycle existing pavement and some base gravel and repave with 2" hot mix.
Objective: Rebuild surface and top of base.
Cost: $0.56 per sqft.
Life/PCI Impr: 120 months (10 years)/95%.

UNPAVED SURFACES

No Maintenance

Defer Maintenance

Strategy: Deferred Maintenance
Description: Defer all road maintenance until budget constraints allow road to be resurfaced or rebuilt.
Objective: The town/city no longer has responsibility for the road or is a severely degraded lower traffic roads which does not warrant immediate replacement.
Cost: $0 invested now, many $$$$$ required later.

Dust Control and Stabilization

Defer Maintenance

See "No Maintenance" category above.

Apply Liquids - Dust Control and Stabilization

Strategy: Dust Control, Light or Medium
Description: Grade road and apply liquid calcium chloride
Objective: Bind surface materials to stabilize wearing surface and eliminate dust.
Cost: $0.05 per sqft.
Life/PCI Impr: 24 months/90%.

Apply Solids - Dust Control and Stabilization

Strategy: Dust Control, Light or Medium
Description: Grade road and apply solid calcium chloride
Objective: Bind surface materials to stabilize wearing surface and eliminate dust.
Cost: $0.05 per sqft.
Life/PCI Impr: 24 months/85%.

Add Minor Gravel, Regrade and Compact

Strategy: Dust Control, Heavy
Description: Regrade road by breaking up surface crust, restore cross section of road by using new and existing materials. Compact surface of road. Regrade ditches.
Objective: Replace lost roadway material, remove surface material which has accumulated in ditches, and restore road to proper cross section.
Cost: $0.47 per sqft.
Life/PCI Impr: 36 months/90%.

Roadside Drainage

Defer Maintenance

See "No Maintenance" category on page A-14

Grade Shoulders and Ditches

Strategy: Drainage, Fair
Description: Grade shoulders and ditches to improve drainage, leave accumulated road material on road side.
Objective: Improve roadside drainage to eliminate potential roadside drainage-related problems.
Cost: $0.10 per lineal ft.
Life/PCI Impr: 12 months/75%.

Clean Ditches

Strategy: Drainage, Fair or Poor
Description: Clean ditches with a motor grader and dispose of material on roadside.
Objective: Improve drainage.
Cost: $0.18 per lineal ft.
Life/PCI Impr: 24 months/90%.

Clean Ditches and Haul Away Dirt

Strategy: Drainage, Fair or Poor
Description: Clean ditches with a motor grader, and load and haul away the dirt.
Objective: Improve drainage and control erosion.
Cost: $0.28 per lineal ft.
Life/PCI Impr: 48 months/90%.

Patch/Spot Additional Material

Defer Maintenance

See "No Maintenance" category on page A-14

Spot Regraveling

Strategy: Routine Maintenance
Description: Add gravel or stone to fill potholes
Objective: Fill minor irregularities in road to improve ride. (Calcium chloride will help gravel bind together.)
Cost: $0.20 per sqft.
Life/PCI Impr: 12 months/85%.

Spot Regraveling with Gravel/Calcium Chloride Mix

Strategy: Routine Maintenance
Description: Fill potholes with 50/50 gravel/calcium chloride mix.
Objective: Fill minor irregularities in road to improve ride. (Calcium chloride will help gravel bind together.)
Cost: $0.25 per sqft.
Life/PCI Impr: 24 months/90%.

Reshape, Add Minor Material

Defer Maintenance

See "No Maintenance" category on page A-14

Reshape (Blading or Dragging)

Strategy: Preventive Maintenance
Description: Smooth and reshape road by dragging or blading.
Objective: Remove material from surface and ditches; reshape road cross section.
Cost: $0.08 per sqyd.
Life/PCI Impr: 24 months/75%.

Reshape w/minor added material

Strategy: Preventive Maintenance
Description: Smooth and reshape road by dragging or blading and add minor additional material.
Objective: Remove surface material which has accumulated in ditches; reshape road cross section and add some material for leveling.
Cost: $0.12 per sqyd.
Life/PCI Impr: 24 months/90%.

Grade, Add Major Material

Defer Maintenance

See "No Maintenance" category on page A-14

Regrade

Strategy: Rehabilitation
Description: Regrade road by breaking up surface crust and restore cross section of road. Regrade ditches.
Objective: Break up surface crust, eliminate surface irregularities, remove surface material which has accumulated in ditches, and restore cross section of road.
Cost: $0.08 per sqft.
Life/PCI Impr: 36 months/70%.

Add Minor Gravel, Regrade and Compact

Strategy: Rehabilitation
Description: Regrade road by breaking up surface crust, restore cross section of road by using new and existing materials. Compact surface of road. Regrade ditches.
Objective: Replace lost roadway material, remove surface material which has accumulated in ditches, and restore road to proper cross section.
Cost: $0.47 per sqft.
Life/PCI Impr: 36 months/85%.

Add Major Gravel, Regrade and Compact

Strategy: Rehabilitation
Description: Add base gravel to "build up" road to 12 inch base, regrade and compact.
Objective: Strengthen road foundation by adding to gravel base, regrade, compact.
Cost: $0.60 per sqft.
Life/PCI Impr: 60 months/95%.

Rebuild

Defer Maintenance

See "No Maintenance" category on page A-14

Reconstruct Surface and Base

Strategy: Reconstruction
Description: Reconstruct road
Objective: Remove existing material and completely reconstruct road.
Cost: $3.00 per sqft.
Life/PCI Impr: 60 months/90%.

Reconstruct Surface, Base, Drainage, etc.

Strategy: Reconstruction
Description: Reconstruct road and drainage.
Objective: Remove existing material and drainage and completely reconstruct road with new culverts, ditches, etc.
Cost: $4.00 per sqft.
Life/PCI Impr: 60 months/95%.

APPENDIX E

PRIORITY REPAIR RANKINGS
and
RECOMMENDED REPAIR STRATEGIES

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Road Name	Priority Ranking	From Street	To Street	Length (feet)	Repair Category
Pine Hill Rd	600	Nashua Town Line	Hollis Town Line	1,640	Surface Coat
Pine Hill Rd	600	Farley Rd.	Nartoff Rd.	720	Surface Coat
S Merrimack Rd	600	Meadow Dr.	Marion Dr.	1,118	Surface Coat
Ridge Rd	600	NH 122	Brown Rd.	3,933	Surface Coat
Worcester Rd	600	NH 122	N. Pepperell Rd	4,229	Surface Coat
S Merrimack Rd	600	Marion Dr.	Nevins Rd.	2,409	Surface Coat
Richardson Rd	600	Depot Rd.	Van Dyke Rd.	1,996	Reshape Minor Material
Nartoff Rd	600	Pine Hill Rd	Public Rd	1,392	Reshape Minor Material
Van Dyke Rd	600	Broad St.	Juniper Ln. (dirt start)	1,007	Surface Coat
Ranger Rd	600	Pine Hill Rd.	Louise Dr	3,249	Surface Coat
Mooar Hill Rd	600	Sargent Rd.	Cul-de-sac	1,841	Surface Coat
Buttonwood Dr	600	Meadow Dr	S. Merrimack Rd. South	2,442	Surface Coat
Mooar Hill Rd	600	Truell Rd.	Sargent Rd.	1,588	Surface Coat
Hannah Dr	600	beginning of cul de sac	end of cul de sac	2,215	Surface Coat
Louise Dr	600	Ranger Rd	Pavement change (@29 Louise Ln)	1,435	Surface Coat
Nartoff Rd	600	Public Rd	Broad St	4,025	Reshape Minor Material
Richardson Rd	600	Van Dyke Rd.	Depot Rd.	4,050	Reshape Minor Material
Spaulding Ln	600	NH 122	NH 122	2,389	Surface Coat
Clinton Dr	600	Runnells Bridge	end/cul de sasc	1,680	Surface Coat
Flagg Rd	600	Ridge Rd	N. Pepperell Rd	2,307	Reshape Minor Material
Sargent Rd	600	Mooar Hill Rd.	Cul-de-sac	2,219	Surface Coat
Black Oak Dr	600	N, Pepperell Rd.	End	3,007	Surface Coat
Laurel Hill Rd	600	NH 122	Foxden Rd.	772	Surface Coat
Hideaway Ln	600	Maple Knoll Dr.	Broad St.	3,806	Surface Coat
Ranger Rd	600	Louise Dr	Broad St.	2,205	Surface Coat
Oakwood Ln	600	Meadow Dr.	End	782	Surface Coat
Glenice Dr	600	Ash St.	End	664	Surface Coat
Hayden Rd	600	Rocky Pond Rd.	Forest View Rd.	3,597	Surface Coat
Shipley Dr	600	Howe Ln.	End	2,124	Surface Coat
Winding Valley Rd	600	Federal Hill Rd.	End	1,656	Surface Coat
Truell Rd	600	NH 122	Mooad Rd.	4,408	Surface Coat
Witches Spring Rd	600	Ames Rd.	NH 122	1,620	Surface Coat
Snow Ln	600	Rideout Rd.	End	1,355	Reshape Minor Material
Apple Ln	600	Wood Ln.	End	2,059	Surface Coat
Rocky Pond Rd	600	Hampshire 130	Deacon Ln.	1,683	Surface Coat
Sumner Ln	600	Rideout Rd.	End	2,283	Surface Coat
Brown Ln	600	Ridge Rd.	End	3,191	Reshape Minor Material
Dalkeith Rd	600	Jewett Ln.	End	1,793	Surface Coat
Irene Dr	600	Worcester Rd	end/cul de sac	4,890	Surface Coat
Mill Rd	600	Hayden Rd	Plain Rd	2,237	Reshape Minor Material
Wheeler Rd	500	Shattuck Ln.	Farley Rd.	2,913	Patch
S Merrimack Rd	500	Witches Spring Rd.	Fletcher Ln.	848	Patch
S Merrimack Rd	500	Witches Spring Rd.	Fletcher Ln.	887	Patch
S Merrimack Rd	500	Witches Spring Rd.	Fletcher Ln.	267	Patch
Hayden Rd	500	Shedd Ln.	NH 122	1,134	Patch
Hayden Rd	500	Adams Rd.	Shedd Ln	348	Patch
S Merrimack Rd	500	Fletcher Ln.	Alsun Dr.	700	Patch
Wheeler Rd	500	Hardy Ln.	Shattuck Ln.	2,887	Patch

Road Name	Priority Ranking	From Street	To Street	Length (feet)	Repair Category
Pine Hill Rd	500	Nartoff Rd.	Howe Ln.	5,101	Patch
S Merrimack Rd	500	Alsun Dr.	Meadow Dr.	657	Patch
Farley Rd	500	Wheeler Rd.	Pine Hill Rd.	3,365	Patch
Pine Hill Rd	500	Howe Ln./Ranger Rd.	Nartoff North	1,145	Patch
Hayden Rd	500	Mill Rd.	Adams Rd.	2,210	Patch
Farley Rd	500	Town Line	Wheeler Rd.	845	Patch
Wheeler Rd	500	Pierce Ln.	Hardy Ln.	2,495	Patch
Rideout Rd	500	Broad St.	Parker Ln.	992	Patch
Rideout Rd	500	Parker Ln.	Powers Rd.	314	Patch
Rideout Rd	500	Powers Rd.	Snow Ln.	172	Patch
Hayden Rd	500	Federal Hill Rd.	Mill Rd.	1,710	Patch
Worcester Rd	500	N. Pepperell Rd	Ridge Rd	1,628	Patch
Witches Spring Rd	500	S. Merrimack Rd.	Fletcher Ln.	2,741	Patch
Witches Spring Rd	500	Fletcher Ln.	Emerson Ln.	201	Patch
Rideout Rd	500	Snow Ln.	Hannah Dr.	1,474	Patch
Pine Hill Rd	500	Nartoff South	Pierce Rd.	3,135	Patch
Rideout Rd	500	Hannah Dr.	Sumner Ln.	523	Patch
Pine Hill Rd	500	Pierce Rd.	Hills Farm Ln.	802	Patch
Wheeler Rd	500	Baxter Rd.	Pierce Ln.	3,585	Patch
Wheeler Rd	500	Cameron Dr.	Baxter Dr.	98	Patch
Rideout Rd	500	Sumner Ln.	Hillside Dr. (change in pavement)	1,488	Patch
Howe Ln	500	Shipley Dr	Nashua Town Line	310	Patch
Wheeler Rd	500	Tyng Hill Rd.	Cameron Dr.	1,390	Patch
Howe Ln	500	Mendelssohn Dr	Shipley Dr	635	Patch
Flint Pond Dr	500	Crestwood Dr	End	278	Patch
Blood Rd	500	Southgate Rd.	Dow Rd.	1,391	Patch
Plain Rd	500	Coburn Rd.	NH 122	480	Patch
Meadow Dr	500	Oakwood Ln	Buttonwood Dr.	1,685	Patch
Ridge Rd	500	Flagg Rd.	Worcester Rd.	540	Patch
Long Hill Rd	500	Parkhurst Rd	Tyng Hill Rd.	2,417	Patch
Rocky Pond Rd	500	Willoughby Ln.	Wood Ln.	1,682	Patch
Worcester Rd	500	Irene Dr	Lawrence Ln	977	Patch
Plain Rd	500	Mill Rd.	Coburn Rd.	997	Patch
Old Runnells Brg	500	Gilson Rd	Runnells Bridge	810	Patch
Rocky Pond Rd	500	Deacon Ln.	Willoughby Ln.	294	Patch
Federal Hill Rd	500	Winding Valley	Wood Ln.	532	Patch
Pierce Ln	500	Winchester Dr.	Wheeler Rd.	1,940	Patch
Iron Works Ln	500	State Line	end/cul de sac	1,174	Patch
French Mill Rd	500	Wright Rd.	Rideout Rd.	2,428	Patch
Jambard Rd	500	Barton Rd	End/cul de sac	1,527	Patch
Laurel Hill Rd	500	Foxden Rd.	Town Line	2,791	Patch
Meadow Dr	500	Hickory Ln	Oakwood Ln	2,000	Patch
Marion Dr	500	S. Merrimack Rd.	End	1,180	Patch
Meadow Dr	500	Pond Farm Ln	Hickory Ln	301	Patch
Cavalier Ct	500	Jeff Smith Dr	End	995	Patch
Lovejoy Ln	500	Richardson Rd	end/cul de sac	1,501	Patch
Baxter Rd	500	#38 Baxter Rd/ begin Pavement	end/cul de sac	1,925	Patch
Deacon Ln	500	Pavement change @ Stream Crossing	end/cul de sac	3,958	Patch

Road Name	Priority Ranking	From Street	To Street	Length (feet)	Repair Category
Deacon Ln	500	Rocky Pond Rd	Change in Pavement @ stream crossing	1,252	Patch
Hannah Dr	500	Rideout Rd	pavement change @ beginning of cul de sac	1,791	Patch
Hillside Dr	500	Rideout Rd	pavement change @ beginning of cul de sac	1,017	Patch
Louise Dr	500	#29 Louise Dr (Pavement change)	Nahsua T/L	1,737	Patch
Wood Ln	500	Federal Hill Rd	end of Pavement	243	Patch
Plain Rd	500	# 49 Plain Rd	Mill Rd	1,026	Patch
Plain Rd	500	Federal Hill Rd	Change in Pavement (@ 49 Plain Rd)	856	Patch
Federal Hill Rd	500	Wood Ln	Silver Hill Park	1,427	Patch
S Merrimack Rd	500	Town Line	Witches Spring	1,739	Patch
Farm Pond Ln	500	Meadow Dr.	End	691	Patch
Flint Pond Dr	500	Broad St.	Crestwood Dr	3,601	Patch
Blood Rd	500	NH 122	Southgate Rd.	3,403	Patch
Eastman Ln	500	Dow Rd.	End	2,000	Patch
Milton Pl	500	Wright Rd.	End	3,168	Patch
Pine Hill Rd	500	Hills Farm Ln.	Broad St.	5,612	Patch
Gilson Rd	500	Old Runnels Bridge Rd	Town Line	629	Patch
Foxden Rd	500	Laurel Hill Rd.	End	1,266	Patch
Howe Ln	500	Pine Hill Rd.	Mendelssohn Dr	3,838	Patch
Swallow Dr	500	Farley Dr.	End	2,269	Patch
Jeff Smith Dr	500	Love Ln.	Cavalier Ct.	585	Patch
Forrence Dr	500	Nevins Rd.	End	1,595	Patch
Parker Ln	500	Rideout Ln.	Broad St.	1,480	Patch
Drury Ln	500	NH 122	End	1,198	Patch
Old Runnells Brg	500	Runnells Bridge	Gilson Rd	1,698	Patch
Lynne Dr	500	Twiss Ln	end/cul de sac	1,800	Patch
Southgate Rd	500	Blood Rd.	End	1,823	Patch
Hickory Ln	500	Meadow Dr.	End	519	Patch
Emerson Ln	500	Witches Spring	Witches Spring	2,218	Patch
Cameron Dr	500	Wheeler Rd.	End	3,095	Patch
Toddy Brook Rd	500	NH 122	End	1,071	Patch
Deer Run Rd	500	N. Pepperell Rd.	End	2,164	Patch
Long Hill Rd	500	Tyng Hill Rd.	End	1,699	Patch
Long Hill Rd	500	NH 122	Parkhurst Rd	2,067	Patch
Hardy Ln	500	Wheeler Rd.	End	1,165	Patch
Colburn Ln	500	Plain Rd.	NH 122	2,896	Patch
Federal Hill Rd	500	NH 122	Winding Valley	1,229	Patch
Winchester Dr	500	Pierce Ln.	End	1,622	Patch
Nutting Ln	500	Broad St.	End	703	Patch
Patch Rd	500	NH 122 North	End	2,030	Patch
Hills Farm Ln	500	Pine Hill Rd.	End	708	Patch
Marion Dr	500	S. Merrimack Rd.	End	527	Patch
Worcester Rd	500	Lawrence Ln	W. Hollis Rd	1,893	Patch

Road Name	Priority Ranking	From Street	To Street	Length (feet)	Repair Category
Jambard Rd	500	Jewett Ln	Barton Rd	811	Patch
Mooar Hill Rd	500	East End	Truell Rd.	459	Patch
Shedd Ln	500	Hayden Rd.	Cul-de-sac	1,600	Patch
Meadow Dr	500	S. Merrimack Rd.	Farm Pond Ln	458	Patch
Barton Rd	500	Jambard Rd.	End	922	Patch
Iron Works Ln	500	W. Hollis Rd	State Line	1,018	Patch
Baldwin Ln	500	NH 122	End	2,304	Patch
Lund Ln	500	NH 122	End	658	Patch
Marion Dr	500	S. Merrimack Rd.	End	701	Patch
Merrill Ln	500	NH 122	Depot Rd.	1,821	Patch
Buttonwood Dr	500	S. Merrimack Rd. North	Meadow Dr	1,090	Patch
Alsun Dr	500	S. Merrimack Rd.	End	4,167	Patch
Tyng Hill Rd	500	Wheeler Rd.	Long Hill Rd.	2,143	Patch
Powers Rd	500	Rideout Rd.	End	3,483	Patch
Cavalier Ct	500	NH 122	Jeff Smith Dr	350	Crack Seal
Ames Rd	500	Witches Spring	NH 122	798	Patch
Pine Hill Rd	500	Nartoff Rd. North	Nartoff Rd. South	479	Patch
Orchard Dr	500	Depot Rd	cul de sac	2,392	Patch
Wright Rd	500	Depot Rd	French Mill	1036	Patch
Wright Rd	500	French Mill	Milton Place	522	Patch
Wright Rd	500	Milton Pl	95 Wright Rd	798	Patch
Rocky Pond Rd	400	Hayden Rd.	Town Line	4,071	Grade Major Material
Federal Hill Rd	400	Hayden Rd	Town Line	5,511	Grade Major Material
Dow Rd	400	Jewett Ln.	Depot Rd.	2,151	Overlay
Dow Rd	400	Jewett Ln.	Depot Rd.	1,415	Overlay
Dow Rd	400	Jewett Ln.	Depot Rd.	381	Overlay
Farley Rd	400	Nevins Rd.	Swallow Dr.	1,809	Overlay
N Pepperell Rd	400	Black Oak Rd.	Pepperell Rd.	4,340	Grade Major Material
N Pepperell Rd	400	Flagg Rd.	Black Oak Rd.	813	Grade Major Material
Jewett Ln	400	Jambard Rd	Depot Rd	1,354	Overlay
Ridge Rd	400	Brown Rd	Flagg Rd	6,371	Grade Major Material
N Pepperell Rd	400	Worcester Rd.	Flagg Rd.	1,848	Grade Major Material
Jewett Ln	400	dalkeith Rd	Jambard Rd	2,702	Overlay
N Pepperell Rd	400	State Line	Worcester Rd.	1,552	Grade Major Material
French Mill Rd	400	Sherwood Dr.	Wright Rd.	624	Overlay
Baxter Rd	400	Wheeler Rd	#38 Baxter /Begin Pavement	1,916	Grade Major Material
Love Ln	400	#34 Love Ln	end of pavement	994	Overlay
S. Merrimack Rd	400	35 S. Merrimack Rd	Wheat Ln	1,371	Overlay
Pierce Ln	400	Pine Hill Rd.	Winchester Dr.	1,199	Overlay
S Merrimack Rd	400	Wheat Ln	Silver Lake Rd	573	Overlay
Juniper Ln	400	Maple Knoll Dr.	Van Dyke Rd.	708	Overlay
French Mill Rd	400	Depot Rd.	Sherwood Dr.	251	Overlay
Fieldstone Dr	400	Depot Rd.	End	1,755	Overlay
Love Ln	400	NH122	Jeff Smith Rd	472	Overlay
Ridge Rd	400	Worcester Rd	State Line	2,543	Grade Major Material
Shattuck Ln	400	Wheeler Rd.	End	2,638	Grade Major Material
Nartoff Rd	400	Pine Hill Rd.	Pine Hill Rd.	6,295	Overlay
Lawrence Ln	400	W. Hollis Rd	Worcester Rd	2,273	Grade Major Material
Jewett Ln	400	Dow Rd	Dalkeith Rd	945	Overlay
Fletcher Ln	400	S. Merrimack Rd.	Witches Spring Rd.	2,194	Grade Major Material

Road Name	Priority Ranking	From Street	To Street	Length (feet)	Repair Category
Sherwood Dr	400	Depot Rd.	French Mill Rd.	2,985	Overlay
Dow Rd	400	State Line	Blood Rd.	1,607	Overlay
Muzzey Rd	400	NH 122	End	673	Overlay
Van Dyke Rd	400	Juniper Ln	Richardson Rd	3,415	Grade Major Material
Federal Hill Rd	400	Plain Rd	Hayden Rd	1,719	Grade Major Material
Wood Ln	400	Apple Ln	Pavement Begin	1,807	Grade Major Material
Wood Ln	400	Rocky Pond Rd	Apple Ln	341	Grade Major Material
Farley Rd	250	Swallow Dr.	Town Line	1,955	Rebuild
S Merrimack Rd	250	Nevins Rd.	Farley Rd.	3,617	Rebuild/Replace
Rocky Pond Rd	250	Wood Ln.	Hayden Rd.	6,258	Rebuild
Nevins Rd	250	Forrence Rd	Farley Rd.	443	Rebuild
Worcester Rd	250	Ridge Rd	Irene Dr	4,394	Rebuild/Replace
Rideout Rd	250	Hillside Dr.	French Mill Rd. (change in pavement)	2,077	Rebuild
Twiss Ln	250	Lynne Dr	Depot Rd	2,892	Rebuild
Dow Rd	250	Twiss Ln.	Jewett Ln.	4,047	Rebuild
Witches Spring Rd	250	Emerson Lane	Ames Rd.	5,266	Rebuild
Dow Rd	250	Blood Rd.	Twiss Ln.	334	Rebuild
Crestwood Dr	250	Springvale Dr	Flint Pond Dr.	3,248	Rebuild
Maple Knoll Dr	250	Hideaway Ln	end	264	Rebuild/Replace
Maple Knoll Dr	250	Juniper Ln	Hideaway Ln.	463	Rebuild/Replace
Farley Rd	250	S. Merrimack Rd.	Nevins Rd.	5,730	Rebuild/Replace
Love Ln	250	Jeff Smith Rd	Pavement change near #34 Love Ln	1,263	Rebuild/Replace
Hillside Dr	250	pavement change/cul de sac	end of cul de sac	1,176	Rebuild
Nevins Rd	250	S. Merrimack Rd.	Forrence Dr.	3,148	Rebuild
Twiss Ln	250	Dow Rd	Lynne Dr	2,638	Rebuild
Springvale Dr	250	Crestwood Dr.	End	1,328	Rebuild
Bell Ln	250	Dow Rd.	End	1,013	Rebuild/Replace
Maple Knoll Dr	250	Broad St.	Juniper Ln.	782	Rebuild/Replace
Mendelssohn Dr	250	Howe Ln.	End	2,598	Rebuild/Replace
Rideout Rd	250	French Mill Rd. (change in pavement)	Depot Rd.	2,684	Rebuild
Crestwood Dr	250	Broad St.	Springvale Dr	1,365	Rebuild
Arbor Ln	250	NH 122	Cul-de-sac	3,393	Rebuild
Wright Rd	250	95 Wright Rd	Broad St	4,893	Rebuild