



# Federal Lands Highway Road Inventory Program

Road Inventory and Condition Assessment

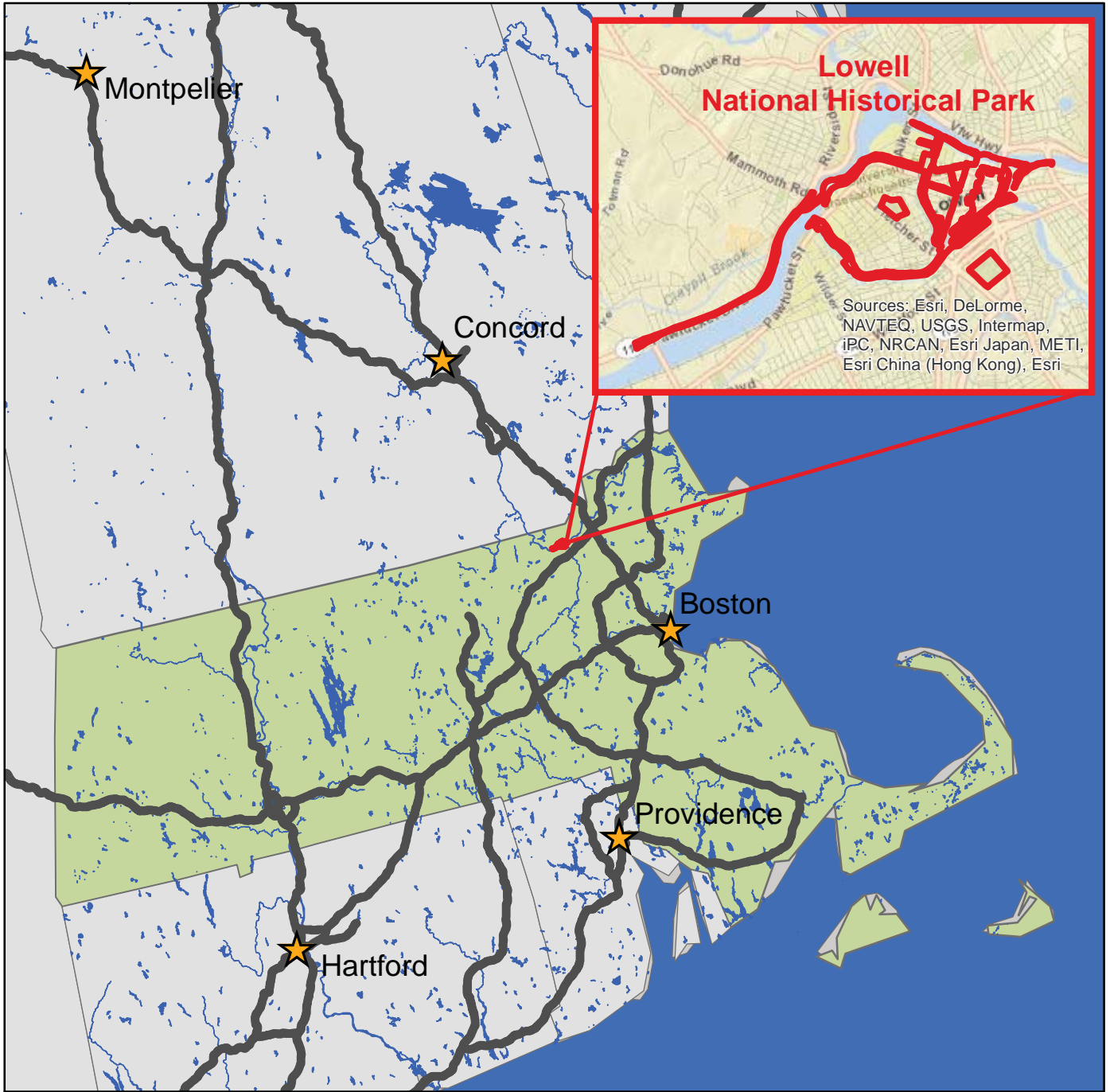


## Lowell National Historical Park LOWE

### Cycle 5 Report

Prepared By: Federal Highway Administration  
Road Inventory Program (RIP)  
Data Collected: 06/2013  
Report Date: 08/2013

# Lowell National Historical Park in Massachusetts





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# Section 1 Introduction



Lowell National Historical Park



Federal Lands Highway  
Road Inventory Program



## INTRODUCTION

The Federal Highway Administration, (FHWA), in the mid 1970s, was charged with the task of identifying surface condition deficiencies and corrective priorities on National Park Service (NPS) roads and parkways. Additionally, FHWA was tasked with establishing an integrated maintenance features inventory, locating features such as culverts, guardrails, and signs, among others, along NPS roads and parkways. As a result, in 1976 the NPS and FHWA entered into an MOA (Memorandum Of Agreement) which established the RIP (Road Inventory Program). This MOA was terminated and revised in 1980 to establish a new MOA aiming to update RIP data and develop a long-range program to improve and maintain NPS roads to designated condition standards and establish a maintenance management program.

The FHWA completed this initial phase of the RIP in the early 1980s. As a result of this effort, each NPS site included in the study received a RIP Report known as the “Brown Book” which included the information collected during this first RIP phase.

In the 1990s, the effort was again renewed to update and maintain the RIP data. By this time the computer age was upon us and a process was employed that relied heavily on electronic data collection and computer technology. A cyclical program was developed and the RIP completed two cycles of data collection from 1994 to 2001. Cycle 1, starting in 1994, was conducted in 44 “large parks” (parks containing 10 or more paved route miles). Cycle 2 began in 1997 and comprised 79 large parks and 5 small parks totaling 4,874 paved route miles. Each of these parks received a RIP Report known as the “Blue Book”. Cycle 3, from 2001 to 2004, was conducted in all parks, large and small, that contained any paved routes, including parking areas and, again, each park received a RIP Report and associated electronic files.

Cycle 4 was initiated in the spring of 2006 covering 86 large parks and several associated small parks consisting of 5,553 paved route miles and 6,232 paved parking areas. Data collection has been completed for Cycle 4 and all data has been delivered to the NPS.

In 2005, the FHWA began implementing the use of a Pavement Management System (PMS) to assist the NPS in prioritizing Pavement Maintenance and Rehabilitation activities. The PMS used by FHWA is the Highway Pavement Management Application (HPMA) and this software has the ability to store inventory and condition data from RIP and forecast future performance using prediction models. Outputs include performance and condition reports at the National, Regional, Park, or Route level. A regional prioritized list and optimization have been produced for most regions and the Federal Highway Deferred Maintenance is calculated via the HPMA.

In an effort to improve the accuracy of treatment recommendations and pavement condition descriptions, an extensive study was completed throughout 2010 that has resulted in changes to the RIP condition reporting method, specifically the distresses and indexes that comprise the Pavement Condition Rating (PCR). It was determined that a better representation of PCR could

be achieved by modifying the relative impact certain distresses would have on the overall rating. The changes that were implemented were endorsed by management at both the FHWA and NPS in October 2010. These changes will allow greater use of RIP and HPMA data for not simply condition data reporting, but also as a reliable tool for project identification and selection. Because of these changes, the PCR Condition ratings reported in Cycle 5 do not directly relate to the condition ratings reported in previous cycle RIP Reports. For more detailed information about the changes, see Section 3 and Section 10 in this RIP Report.

Cycle 5 has launched in the summer of 2010 and will again comprise all parks, large and small, that are served by paved roads and/or parking areas. For Cycle 5, the decision was made to collect condition data in large parks on Functional Class 1, 2, and 7 paved routes only, as well as any new routes that were previously not collected. In small parks, all paved routes and parking areas will be collected. As a result, this will include 81 large parks with 4,459 paved route miles and 231 small parks with 529 paved route miles and associated paved parking areas.

Since 1984, the Road Inventory Program has been funded through the Federal Lands Highway Park Roads and Parkways (PRP) Program. Currently, coordination of the RIP with FLH is under the NPS Washington Headquarters Park Facility Management Division. The FLH Washington office coordinates policy and prepares national reports and needs assessment studies for Congress.

In 1998, the Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21) amended Title 23 U.S.C., and inserted Section 204(a)(6) requiring the FHWA and NPS, to develop by rule, a Pavement Management System (PMS) applied to park roads and parkways serving the National Park System.

FLH is responsible for the accuracy of all data presented in this report. Any questions or comments concerning the contents of this report should be directed to the national RIP Coordinator located in Sterling, Virginia.

Respectfully,

FHWA RIP Team

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# Section 2

## Park Route Inventory



Lowell National Historical Park



Federal Lands Highway  
Road Inventory Program

# Cycle 5 NPS/RIP Route ID Report

Road Inventory Program 08/01/2013

(Numerical By Route #)

Page 1 of 3

Shading Color Key:  
Red text denotes approx. mileage

White = Paved Routes, DCV Driven  
Grey = Paved Routes, DCV not Driven

Yellow = Unpaved Routes, DCV not Driven

Blue = All Paved Parking Areas

Green = All Unpaved Parking Areas

Black = State, Local or Private non-NPS Routes

■ = Concession Route Flag ON

\*Unpaved route data was obtained from NPS and was not inventoried by the Road Inventory Program (RIP).

\*\* DCV - Data Collection Vehicle      NC - Not Collected

## LOWE

### LOWELL NATIONAL HISTORICAL PARK

Rte. No.	Cycle Collected	FMSS No.	Concess Route	Route Name	Route Description		Maint. District	Paved Miles	Un-Paved Miles	Total Route Length	Func. Class	Manual Rated SQ/FT	Surf. Type	Area Maps
					From	To								
0900ZZ	5	00001795		VISITOR CENTER PARKING AREAS	FROM BROADWAY STREET	TO BROADWAY STREET AND CANAL STREET	N/A	0.00	0.00	0.00		65,581	AS	1
0901	5	104088		MAINTENANCE AREA	FROM AIKEN STREET	TO AIKEN STREET	N/A	0.00	0.00	0.00		56,660	AS	1



# Cycle 5 NPS/RIP Route ID Report

Road Inventory Program 08/01/2013

(Numerical By Route #)

Page 2 of 3

Shading Color Key:  
Red text denotes approx. mileage

White = Paved Routes, DCV Driven
Grey = Paved Routes, DCV not Driven

Yellow = Unpaved Routes, DCV not Driven
Black = State, Local or Private non-NPS Routes

Blue = All Paved Parking Areas
Red = Concession Route Flag ON

Green = All Unpaved Parking Areas
-----------------------------------

\*Unpaved route data was obtained from NPS and was not inventoried by the Road Inventory Program (RIP).

\*\* DCV - Data Collection Vehicle      NC - Not Collected

## CYCLE 5 SUMMARY TOTALS FOR LOWELL NATIONAL HISTORICAL PARK

<b>CYCLE 5 ROUTE TOTALS</b>	
DCV Driven Route Miles	0.00
Manually Rated Route Miles	0.00
<b>TOTAL PARK ROUTE MILES COLLECTED IN CYCLE 5</b>	<b>0.00</b>
Manually Rated Routes (SQFT)	0
<b>TOTAL UNPAVED PARK ROUTE MILES</b>	<b>0.00</b>

<b>CYCLE 5 CONCESSION TOTALS</b>	
Concession Paved Route Miles	0.00
Concession Unpaved Route Miles	0.00
<b>TOTAL CONCESSION ROUTE MILES</b>	<b>0.00</b>
Concession Paved Parking Area SQFT	0
Concession Unpaved Parking Area SQFT	0
<b>TOTAL CONCESSION PARKING AREA SQFT</b>	<b>0</b>
Concession Manually Rated Routes SQFT	0

<b>* CYCLE 5 PARKING AREA TOTALS</b>	
Paved Parking (SQFT)	122,241
Unpaved Parking (SQFT)	0
<b>TOTAL PARKING (SQFT)</b>	<b>122,241</b>

<b>CYCLE 5 WEIGHTED AVERAGE PARK VALUES</b>	
DCV Driven PCR	N/A
**Manually Rated Routes PCR	N/A
**Parking PCR	60
<b>***Total Equivalent Lane Miles</b>	<b>2.11</b>

\* - The Parking Area Totals SQFT value represents all parking areas collected in Cycle 5, both park and concessionaire.

\*\* - Parking and Manually Rated Routes are assigned the following PCR values based on their observed condition: Construction=-1, Excellent=97, Good=90, Fair=73, and Poor=45.

\*\*\* - Equivalent Lane Miles are calculated by route using the following equations : DCV and Manually Rated Lines Routes=(PAVE\_WIDTHxPAVED\_MI)/11 foot lane. Parking Areas=SQ\_FEET/5280/11. Manually Rated Polygons=SQ\_FEET/5280/11.

# Cycle 5 NPS/RIP Route ID Report

Shading Color Key:  
Red text denotes approx. mileage

White = Paved Routes, DCV Driven	Yellow = Unpaved Routes, DCV not Driven	Blue = All Paved Parking Areas	Green = All Unpaved Parking Areas
Grey = Paved Routes, DCV not Driven	Black = State, Local or Private non-NPS Routes	■ = Concession Route Flag ON	

\*Unpaved route data was obtained from NPS and was not inventoried by the Road Inventory Program (RIP).

\*\* DCV - Data Collection Vehicle      NC - Not Collected

## General Park Road Functional Classification Table

- Class 1** Principal Park Road/Rural Parkway (Public Roads) - Roads which constitute the main access route, circulatory tour, or thoroughfare for park visitors. Route Numbers 1 - 99. Note: Rural parkways (e.g. Natchez Trace) are numbered 1 - 9. State Routes Inventoried for Park. Route Numbers 5000-5999
- Class 2** Connector Park Road (Public Roads) - Roads which provide access within a park to areas of scenic, scientific, recreational or cultural interest, such as overlooks, campgrounds, etc. Route Numbers 100-199.
- Class 3** Special Purpose Park Road (Public Roads) - Roads which provide circulation within public areas, such as campgrounds, picnic areas, visitor center complexes, concessionaire facilities, etc. These roads generally serve low-speed traffic and are often designed for one-way circulation. Route Numbers 200-299.
- Class 4** Primitive Park Roads (Public Roads) - Roads which provide circulation through remote areas and/or access to primitive campgrounds and undeveloped areas. These roads frequently have no minimum design standards and their use may be limited to specially equipped vehicles. Route Numbers 200-299. Note: Functional Classes 3 and 4 have the same route numbers because, historically, they were numbered similarly.
- Class 5** Administrative Access Road (Administrative Roads) - All public roads intended for access to administrative developments or structures such as park offices, employee quarters, or utility areas. Route Numbers 400-499.
- Class 6** Restricted Road (Administrative Roads) - All roads normally closed to the public, including patrol roads, truck trails, and other similar roads. Route Numbers 400-499. Note: Functional Classes 5 and 6 have the same route numbers because historically they were numbered similarly and often there is little distinction between these routes. For example, because utility areas and employee housing are often closed to the public, this restriction would result in classification of FC 6 rather than FC 5.
- Class 7** Urban Parkway (Urban Parkways and City Streets) - These facilities serve high volumes of park and non-park related traffic and are restricted, limited-access facilities in an urban area. This category of roads primarily encompasses the major parkways which serve as gateways to our nation's capital. Other major park roads or portions thereof, however, may be included in this category. Route Numbers 1-9.
- Class 8** City Streets (Urban Parkways and City Streets) - City streets are usually extensions of the adjoining street system that are owned and maintained by the National Park Service. The construction and/or reconstruction should conform with accepted local engineering practice and local conditions. Route Numbers 600-699.

\*\*\*\*\*

A park road system contains those roads within or giving access to a park or other unit of the NPS which are administered by the NPS, or by the Service in cooperation with other agencies. The assignment of a functional classification (FC) to a park road is not based on traffic volumes or design speed, but on the intended use or function of that road or route.

The historic route numbering system also included a 300 number series for interpretive roads, and a 500 series for one-way roads. There are approximately 250 roads nationwide which are designated by the 300 and 500 series. The numbers for these roads will be maintained for reporting consistency. However, since these interpretive and one-way routes are not as clearly tied to a specific functional class, the 300 and 500 series will be discontinued for future use.

5000 route numbers are assigned to Non-NPS Routes that are State, County or City owned which border, traverse, or provide access to Park Facilities or Locations. 5000 Routes are driven for GPS and Video Log only.

## Surface Type Abbreviations:

- AS - Asphaltic Concrete Pavement**
- CO - Portland Cement Concrete Pavement**
- BR - Brick or Pavers Road Bed**
- CB - Cobble Stone Road Bed**
- GR - Gravel Road Bed**
- SA - Sand Road Bed**
- NV - Native or Dirt Material Road Bed**
- OT - Other Materials Road Bed**

# NPS/RIP Subcomponent Details for LOWE

Road Inventory Program 08/01/2013

(Numerical By Subcomponent #)

Page 1 of 1

Shading Color Key:

Red text denotes approx. mileage

White = Paved Routes, DCV Driven

Yellow = Unpaved Routes, DCV not Driven

Blue = All Paved Parking Areas

Green = All Unpaved Parking Areas

Grey = Paved Routes, DCV not Driven

Black = State, Local or Private non-NPS Routes

■ = Concession Route Flag ON

\*Unpaved route data was obtained from NPS and was not inventoried by the Road Inventory Program (RIP).

## LOWE

### LOWELL NATIONAL HISTORICAL PARK

Rte. No.	FMSS No.	Cycle Collected	Route Name	From	To	Concess Route	Func. Class	Paved Miles	Un-Paved Miles	Total Route Length	Manual Rated SQ/FT
0900ZZ	00001795	5	VISITOR CENTER PARKING AREAS	FROM BROADWAY STREET	TO BROADWAY STREET AND CANAL STREET			0.00	0.00	0.00	65,581

### LOWE-0900ZZ Subcomponent Breakdown

Rte. No.	FMSS No.	Cycle Collected	Route Name	From	To	Concess Route	Func. Class	Paved Miles	Un-Paved Miles	Total Route Length	Manual Rated SQ/FT
0900AZ	00001795	5	VISITOR CENTER PARKING	FROM BROADWAY STREET	TO BROADWAY STREET			0.00	0.00	0.00	56,992
0900BZ	00001795	5	VISITOR CENTER BUS PARKING	FROM BROADWAY STREET	TO CANAL STREET			0.00	0.00	0.00	8,589

**ROUTE IDENTIFICATION CHANGES TO PAVED ROUTES FROM PREVIOUS CYCLE - LOWE**

OTHER CHANGES FROM PREVIOUS INVENTORY:			
Route #	Route Name	Type of Change	Comments
0900ZZ	VISITOR CENTER PARKING AREAS	SQ FEET CHANGE	THE ROAD PORTION WAS SPLIT OUT AND REMOVED BECAUSE THE PARK DOES NOT OWN BROADWAY STREET, WHICH RUNS BETWEEN THE PUBLIC PARKING AREA AND THE BUS PARKING AREA.
0901	MAINTENANCE AREA	OTHER	MINOR UPDATES WERE MADE TO THE PARKING AREA GPS TO IMPROVE THE SQUARE FOOTAGE.

# Section 3

## Park Summary Information



## Lowell National Historical Park



Federal Lands Highway  
Road Inventory Program



Note: This park is classified as a Small Park. No Data Collection Vehicle routes existed in this park at the time of data collection. Therefore, there is no data to report for this section.

# Section 4

## Park Route Location Maps

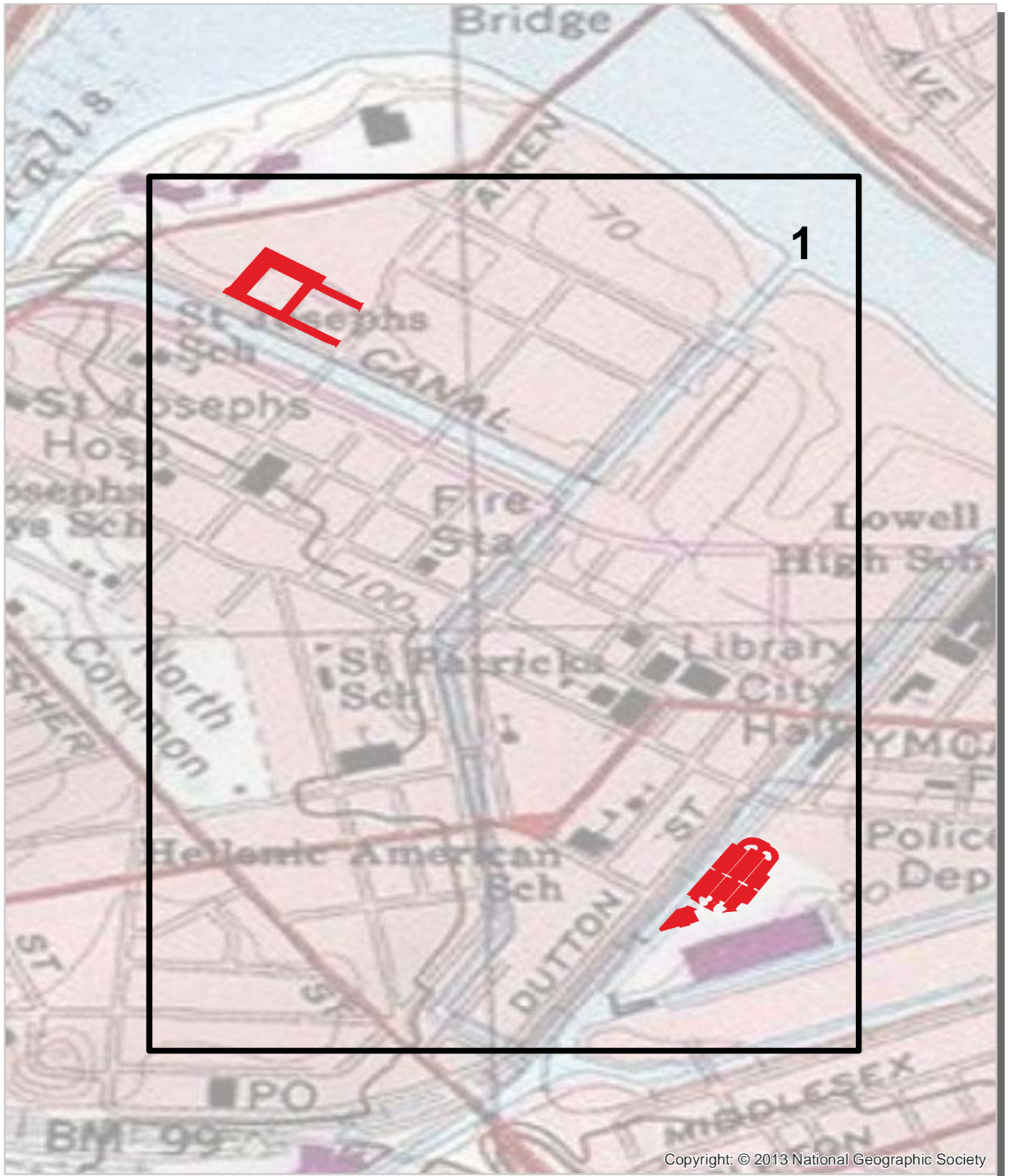



Lowell National Historical Park



Federal Lands Highway  
Road Inventory Program

Lowell National Historical Park  
Route Location Map  
Key Map

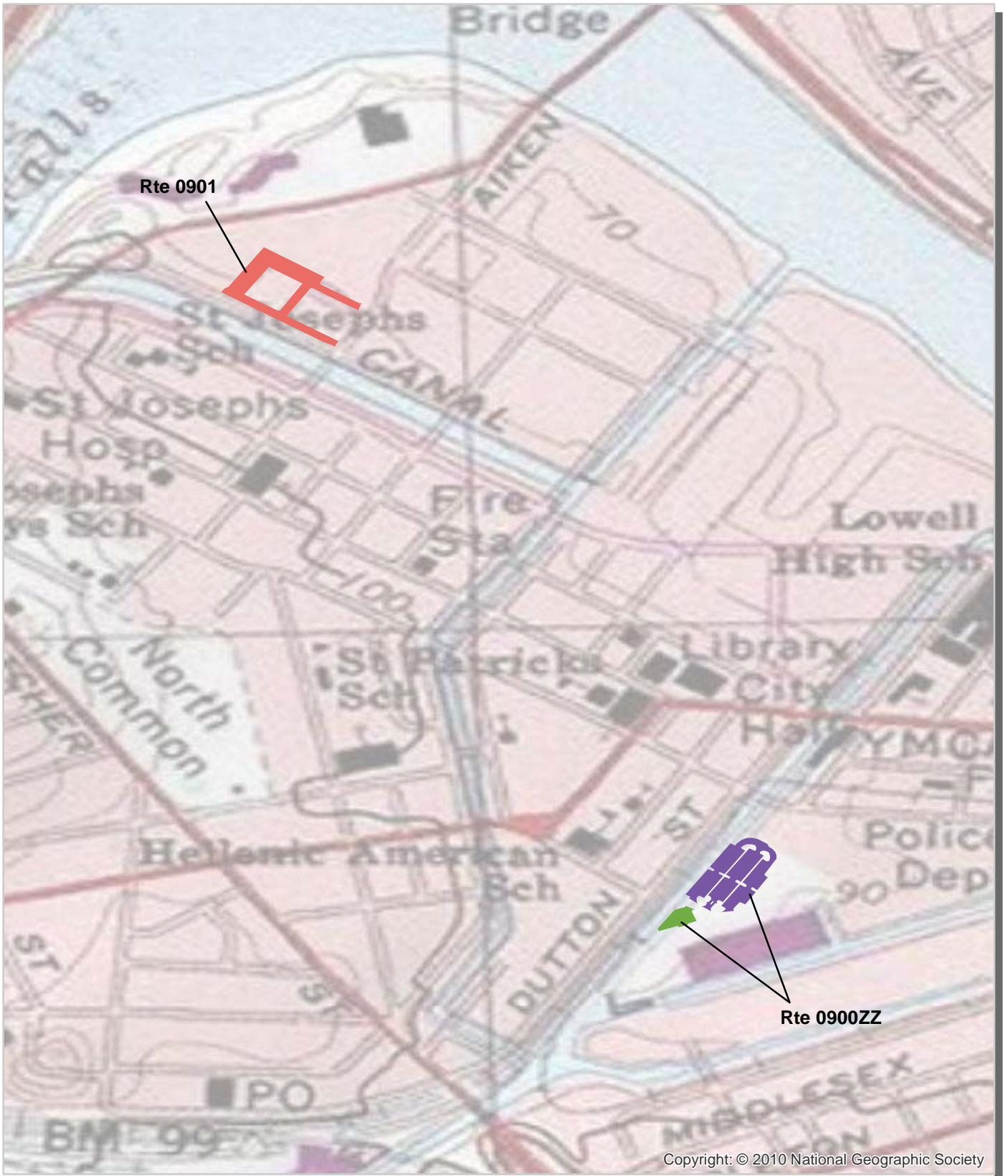


 Cycle 5 Collected Routes





**Lowell National Historical Park  
Route Location Map  
Area 1**



Copyright: © 2010 National Geographic Society

Unique colors used to differentiate routes



# Section 5

## Paved Route

### Condition Rating Sheets



Lowell National Historical Park



Federal Lands Highway  
Road Inventory Program



Note: This park is classified as a Small Park. No Data Collection Vehicle routes existed in this park at the time of data collection. Therefore, there is no data to report for this section.

**Section 6**  
**Manually Rated Paved Route**  
**Condition Rating Sheets**



Lowell National Historical Park



Federal Lands Highway  
Road Inventory Program

## **MANUALLY RATED ROUTE CONDITION RATING SHEETS**

No data available for this section.

# Section 7

## Parking Area

### Condition Rating Sheets



Lowell National Historical Park



Federal Lands Highway  
Road Inventory Program

# LOWELL NATIONAL HISTORICAL PARK

## Route 0900ZZ

### VISITOR CENTER PARKING AREAS

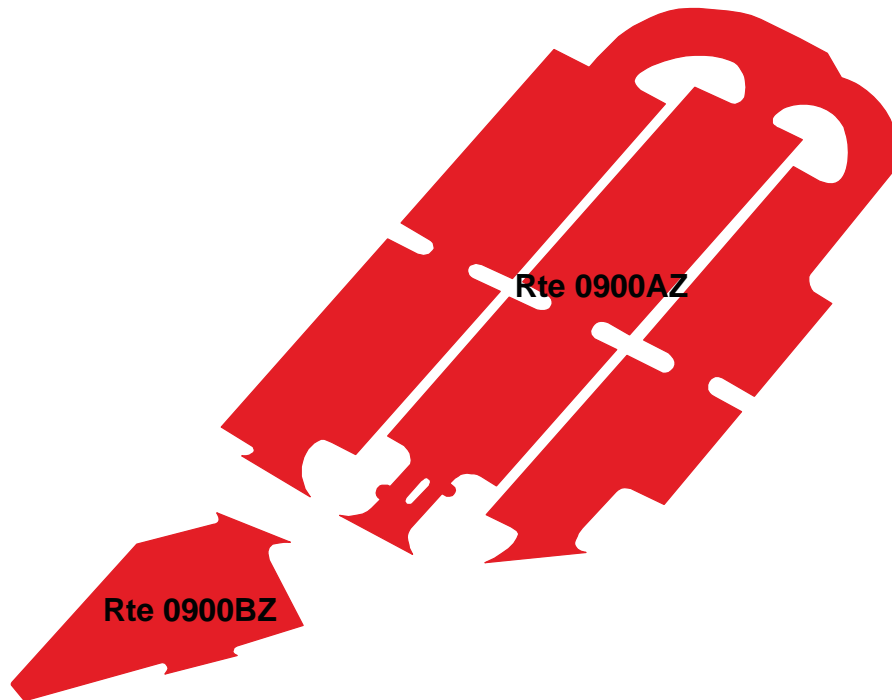
FROM BROADWAY STREET

TO BROADWAY STREET AND CANAL STREET

Summary Record

Route Number	Public / NonPublic	Date Visited	Area (sq ft)	Lane Miles *	Surface Type
0900ZZ	PUBLIC	6/27/2013	65,581	1.13	AS
Culverts	Drop Inlets	Gates	Curb & Gutter	Curb	PCR
0	10	4	NO CURB AND GUTTER	CONCRETE & STONE CURB	SUMMARY/49

\* Lane miles are based on 11' lane widths





# LOWELL NATIONAL HISTORICAL PARK

## Route 0900AZ

### VISITOR CENTER PARKING

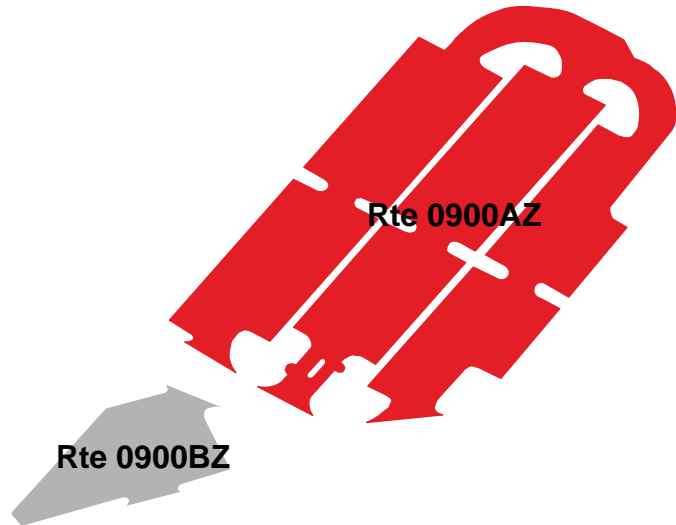
FROM BROADWAY STREET

TO BROADWAY STREET

Subcomponent Record

Route Number	Public / NonPublic	Date Visited	Area (sq ft)	Lane Miles *	Surface Type
0900AZ	PUBLIC	6/27/2013	56,992	0.98	AS
Culverts	Drop Inlets	Gates	Curb & Gutter	Curb	PCR
0	9	4	NO CURB AND GUTTER	STONE CURB	POOR/45

\* Lane miles are based on 11' lane widths



# LOWELL NATIONAL HISTORICAL PARK

## Route 0900BZ

### VISITOR CENTER BUS PARKING

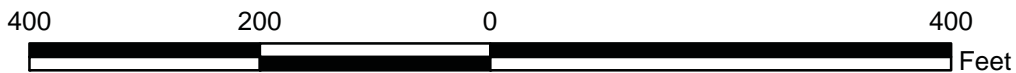
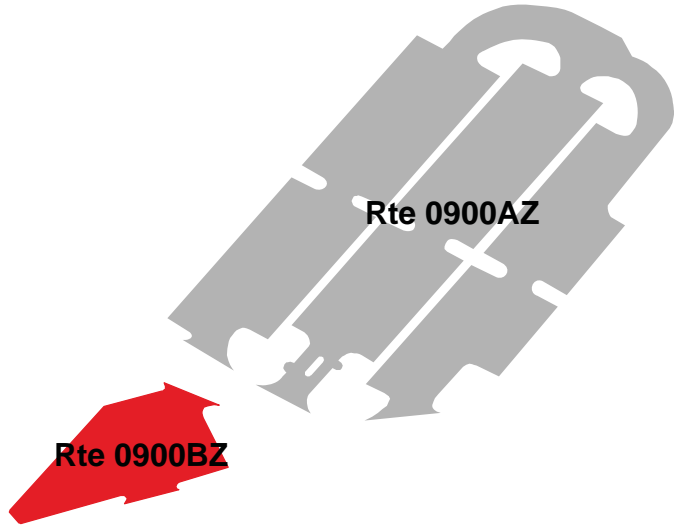
FROM BROADWAY STREET

TO CANAL STREET

Subcomponent Record

Route Number	Public / NonPublic	Date Visited	Area (sq ft)	Lane Miles *	Surface Type
0900BZ	PUBLIC	6/27/2013	8,589	0.15	AS
Culverts	Drop Inlets	Gates	Curb & Gutter	Curb	PCR
0	1	0	NO CURB AND GUTTER	CONCRETE & STONE CURB	FAIR/73

\* Lane miles are based on 11' lane widths



# LOWELL NATIONAL HISTORICAL PARK

## Route 0901

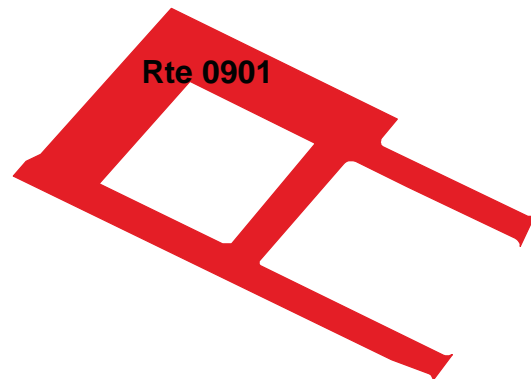
### MAINTENANCE AREA

FROM AIKEN STREET

TO AIKEN STREET

Route Number	Public / NonPublic	Date Visited	Area (sq ft)	Lane Miles *	Surface Type
0901	NONPUBLIC	6/27/2013	56,660	0.98	AS
Culverts	Drop Inlets	Gates	Curb & Gutter	Curb	PCR
0	3	7	NO CURB AND GUTTER	STONE & WOOD CURB	FAIR/73

\* Lane miles are based on 11' lane widths



# Section 8 Parkwide/Route Maintenance Features Summaries



Lowell National Historical Park



Federal Lands Highway  
Road Inventory Program

## LOWE: PARKWIDE / ROUTE MAINTENANCE FEATURES SUMMARY

Note: There are no Data Collection Vehicle routes in this park. However, counts were made of the features listed in the table below.

Route Number	Culverts	Drop Inlets	Gates	Curb	Curb & Gutter
0900ZZ	0	10	4	CONCRETE & STONE CURB	NO CURB AND GUTTER
0901	0	3	7	STONE & WOOD CURB	NO CURB AND GUTTER
Totals	0	13	11		

NC = Not Collected

NO = This feature does not exist



**Section 9**  
**Route Maintenance Features**  
**Road Logs**



Lowell National Historical Park



Federal Lands Highway  
Road Inventory Program

Note: This park is classified as a Small Park. No Data Collection Vehicle routes existed in this park at the time of data collection. Therefore, there is no data to report for this section.

# Section 10 Appendix



Lowell National Historical Park



Federal Lands Highway  
Road Inventory Program

## **GLOSSARY OF TERMS AND ABBREVIATIONS**

<b><u>TERM OR ABBREVIATION</u></b>	<b><u>DESCRIPTION OR DEFINITION</u></b>
DCV	Data Collection Vehicle
Excellent	Excellent rating with an index value of 97
Fair	Fair rating with an index value from 73
Func. Class	Functional Classification (see Route ID, Section 2)
Good	Good rating with an index value of 90
MRR	Manually Rated Route
MRL	Manually Rated Line
MRP	Manually Rated Polygon
N/A	Not Applicable
NC	Not Collected
PCR	Pavement Condition Rating
PKG	Parking Area
Poor	Poor rating with an index value of 45
RIP	Road Inventory Program

### **GPS on Manually Rated Roads (MRR)**

Parking areas, some roads, and other paved areas that are not fully drivable with the Data Collection Vehicle are collected manually by field technicians. GPS is collected for these routes using portable Trimble GPS backpack units. Paved campground pads and driveways are not typically included in the inventory or GPS.



## Geodatabase – Background and Metadata

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In addition to this park report, a *geodatabase* containing both tabular and spatial data specific to this park has been provided. All data disseminated in the preceding report has been obtained from the tables and fields within said geodatabase. The geodatabase can be referenced for tabular data via Microsoft Access or for both tabular and spatial data via ESRI's ArcGIS Suite of software which consists of; ArcMap, ArcCatalog and ArcExplorer. Consolidating the RIP data into one database creates a seamless relationship of tabular and geographic data. It will allow RIP to facilitate easier updates and enhancements in the future.

A geodatabase can be thought of as simply a database containing spatial data. Many different tables are contained within the park's geodatabase. A complete and thorough description of the tables and fields contained within this geodatabase can be found in the *metadata*. The metadata is attached directly within the geodatabase and can be accessed via ESRI's ArcCatalog. The metadata portion of the geodatabase also includes data dictionary report functionality that formats the metadata into an easy to read report.