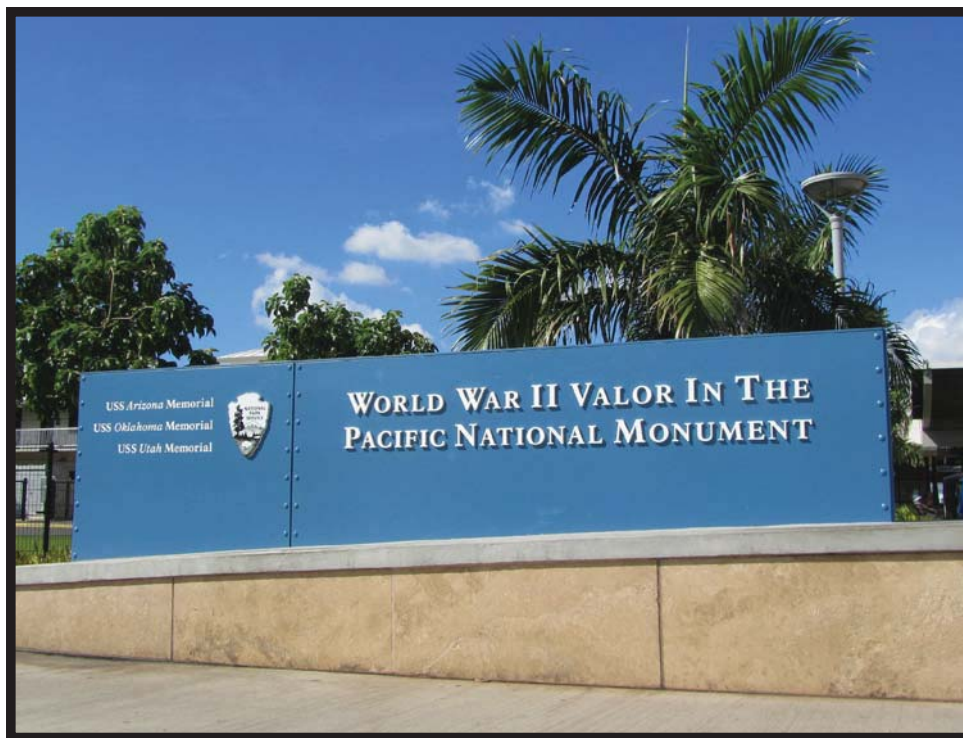




# Federal Lands Highway Road Inventory Program

Road Inventory and Condition Assessment



## World War II Valor in the Pacific National Monument VALR

### Updated Cycle 5 Report

Prepared By: Federal Highway Administration  
Road Inventory Program (RIP)  
Data Collected: 04/2014  
Report Date: 09/2014

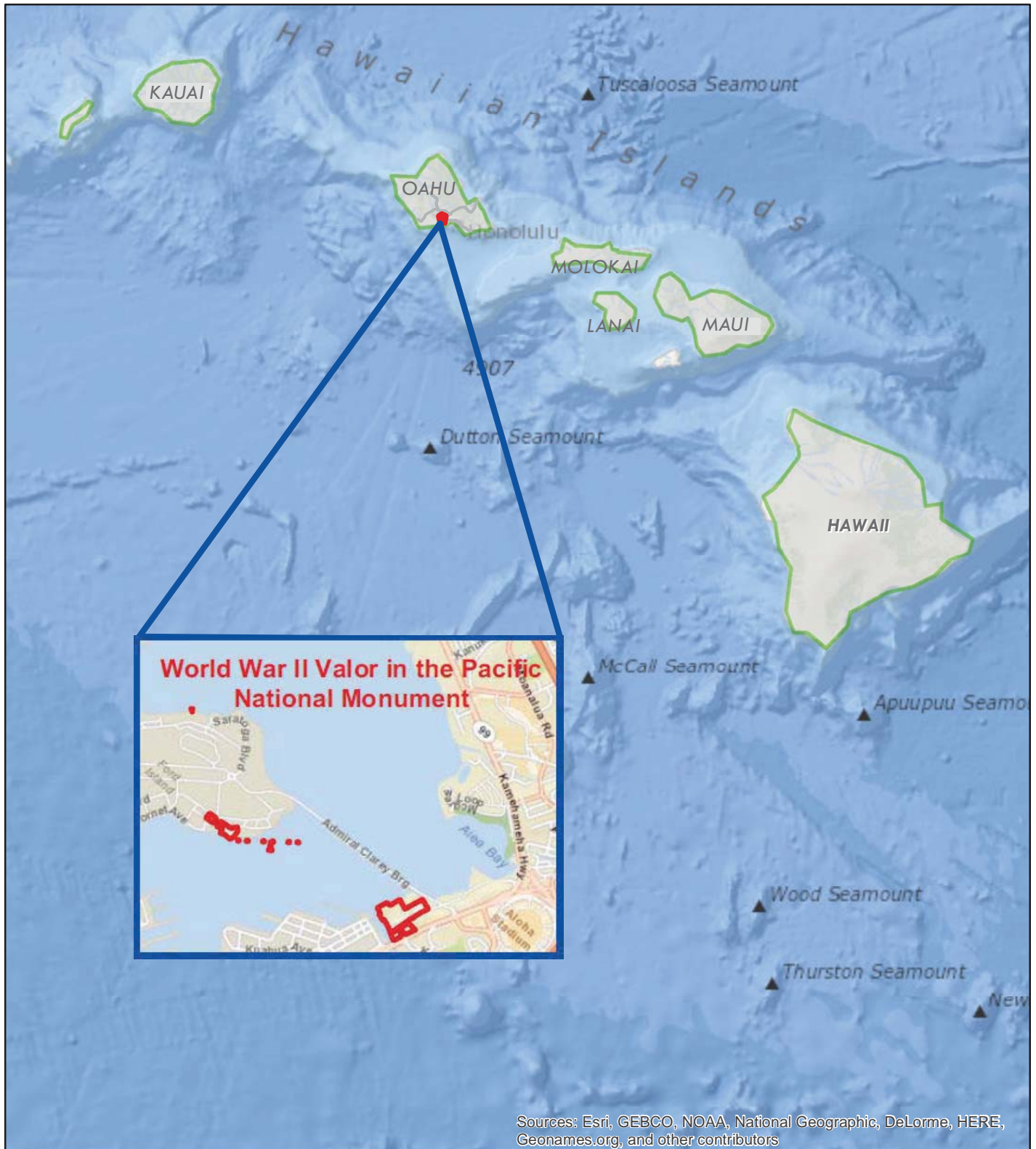
## **UPDATED CYCLE 5 RATINGS FOR THIS REPORT**

The first Cycle 5 Manual Condition Assessment for World War II Valor in the Pacific National Monument (VALR) occurred in January of 2012, and the report for this collection was published and delivered to the park in April of 2012.

Following the 2012 data collection effort, the Road Inventory Program Automated Data Collection Vehicle (DCV) visited Hawaii in April of 2014 to perform automated collection on all NPS paved roads. While no Automated Data Collection Vehicle routes exist VALR, a second manual condition assessment was performed during the 2014 trip to Hawaii and the previous Cycle 5 manual condition ratings were updated.

The 2014 condition assessment at VALR incorporated new manual rating methodologies designed to improve the identification of treatment recommendations and pavement condition descriptions for Manually Rated Routes. These new methodologies will be used in future Cycle 6 collections at all NPS park units and were, therefore, incorporated into this 2014 Report and Cycle 5 collection of VALR as an update to the previous 2012 collection report.

# World War II Valor in the Pacific National Monument in Hawaii





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# Section 1 Introduction



## World War II Valor in the Pacific National Monument



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 168 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

FHWA/Eastern Federal Lands  
21400 Ridgetop Circle  
Sterling, VA 20166  
(703) 404-6371

FHWA/Central Federal Lands  
12300 West Dakota Ave  
Lakewood, CO 80228  
(720) 963-3560

## Section 2 Park Route Inventory



### World War II Valor in the Pacific National Monument



Federal Lands Highway  
Road Inventory Program



# Cycle 5 NPS/RIP Route ID Report

Road Inventory Program 09/04/2014

(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

Black = State, Local or Private non-NPS Routes

Blue = All Paved Parking Areas

■ = 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

## VALR

### WORLD WAR II VALOR IN THE PACIFIC NATIONAL MONUMENT

Rte. No.	Cycle Collected	FMSS No.	Concess Route	Route Name	From	To	Maint. District	Paved Miles	Un-Paved Miles	Total Route Length	Func. Class	Manual Rated SQ/FT	Surf. Type	Area Maps
0010	5	104202		USS ARIZONA MEMORIAL "U" ROAD	FROM ARIZONA MEMORIAL ROAD	TO ARIZONA MEMORIAL ROAD	N/A	0.00	0.00	0.00	3	10,590	CO	1
0400	5	7644690		BUNGALOW ROAD	FROM COWPENS STREET	TO LANGLEY AVENUE	N/A	0.12	0.00	0.12	6	15,525	AS	2
0401	5	234219		EMERGENCY/MAINT ENANCE VEHICLE ACCESS ROAD	FROM ARIZONA MEMORIAL ROAD	TO END AT VISITOR CENTER	N/A	0.00	0.00	0.00	6	16,263	AS	1
0402	5	234220		BUS TURNAROUND ROAD "C"	FROM ARIZONA MEMORIAL ROAD	TO END OF LOOP	N/A	0.00	0.00	0.00	6	26,670	CO	1
0900	5	32030		VISITOR CENTER PARKING LOT "A"	FROM ARIZONA MEMORIAL ROAD	TO PARKING	N/A	0.00	0.00	0.00		27,281	AS	1
0901	5	48323		MAINTENANCE FACILITY PARKING LOTS	FROM ARIZONA MEMORIAL ROAD	TO PARKING	N/A	0.00	0.00	0.00		13,726	AS	1
0902	5	104198		MAUKA PARKING AREA LOT "B"	FROM ARIZONA MEMORIAL ROAD	TO PARKING	N/A	0.00	0.00	0.00		30,414	AS	1
0903	5	104199		COMMERCIAL PARKING AREA	FROM ARIZONA MEMORIAL ROAD	TO ARIZONA MEMORIAL ROAD	N/A	0.00	0.00	0.00		40,419	CO	1
0905	5	114617		VISITOR CENTER PARKING MAIN LOT "C"	FROM ARIZONA MEMORIAL ROAD	TO ROUTE 0402 (BUS TURNAROUND ROAD "C")	N/A	0.00	0.00	0.00		90,725	CO	1
0906	5	239310		FORD ISLAND PARKING	FROM LONG ISLAND STREET	TO PARKING	N/A	0.00	0.00	0.00		1,869	AS	2
0907ZZ	5	7644690		BUNGALOW ROAD PARKING AREAS	ADJACENT TO ROUTE 0400 (BUNGALOW ROAD) ON LEFT AND RIGHT		N/A	0.00	0.00	0.00		4,879	AS	2
0908	5			USS UTAH MONUMENT PARKING	FROM SARATOGA BOULEVARD	TO PARKING	N/A	0.00	0.00	0.00		4,801	AS	2

# Cycle 5 NPS/RIP Route ID Report

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 WORLD WAR II VALOR IN THE PACIFIC NATIONAL MONUMENT

<b>CYCLE 5 ROUTE TOTALS</b>	
DCV Driven Route Miles	0
Manually Rated Route Miles	0.12
<b>TOTAL PARK ROUTE MILES COLLECTED IN CYCLE 5</b>	<b>0.12</b>
Manually Rated Routes (SQFT)	53,523
<b>TOTAL UNPAVED PARK ROUTE MILES</b>	<b>0</b>

<b>CYCLE 5 CONCESSION TOTALS</b>	
Concession Paved Route Miles	0
Concession Unpaved Route Miles	0
<b>TOTAL CONCESSION ROUTE MILES</b>	<b>0</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)	214,114
Unpaved Parking (SQFT)	0
<b>TOTAL PARKING (SQFT)</b>	<b>214,114</b>

<b>CYCLE 5 WEIGHTED AVERAGE PARK VALUES</b>	
DCV Driven PCR	N/A
**Manually Rated Routes PCR	77
**Parking PCR	85
<b>***Total Equivalent Lane Miles</b>	<b>4.88</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 VALR

Road Inventory Program 09/02/2014

(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).

## VALR

### WORLD WAR II VALOR IN THE PACIFIC NATIONAL MONUMENT

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
0907ZZ	7644690	5	BUNGALOW ROAD PARKING AREAS	ADJACENT TO ROUTE 0400 (BUNGALOW ROAD) ON LEFT AND RIGHT				0.00	0.00	0.00	4,879

### VALR-0907ZZ 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
0907AZ	7644690	5	BUNGALOW ROAD PARKING A	ADJACENT TO ROUTE 0400 (BUNGALOW ROAD) ON LEFT				0.00	0.00	0.00	4,019
0907BZ	7644690	5	BUNGALOW ROAD PARKING B	ADJACENT TO ROUTE 0400 (BUNGALOW ROAD) ON RIGHT				0.00	0.00	0.00	860

**ROUTE IDENTIFICATION CHANGES TO PAVED ROUTES FROM 2012 CYCLE 5 COLLECTION**

**ROUTES ADDED FROM PREVIOUS INVENTORY:**

Route #	Route Name	Reason for Addition	Comments
0908	USS UTAH MONUMENT PARKING	OTHER	NEW PARKING ADDED IN 2014 CYCLE 5 COLLECTION.

# Section 3

## Park Summary Information



## World War II Valor in the Pacific National Monument



Federal Lands Highway  
Road Inventory Program

### **Section 3: Park Summary Information**

Note: No Data Collection Vehicle routes exist 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



## World War II Valor in the Pacific National Monument

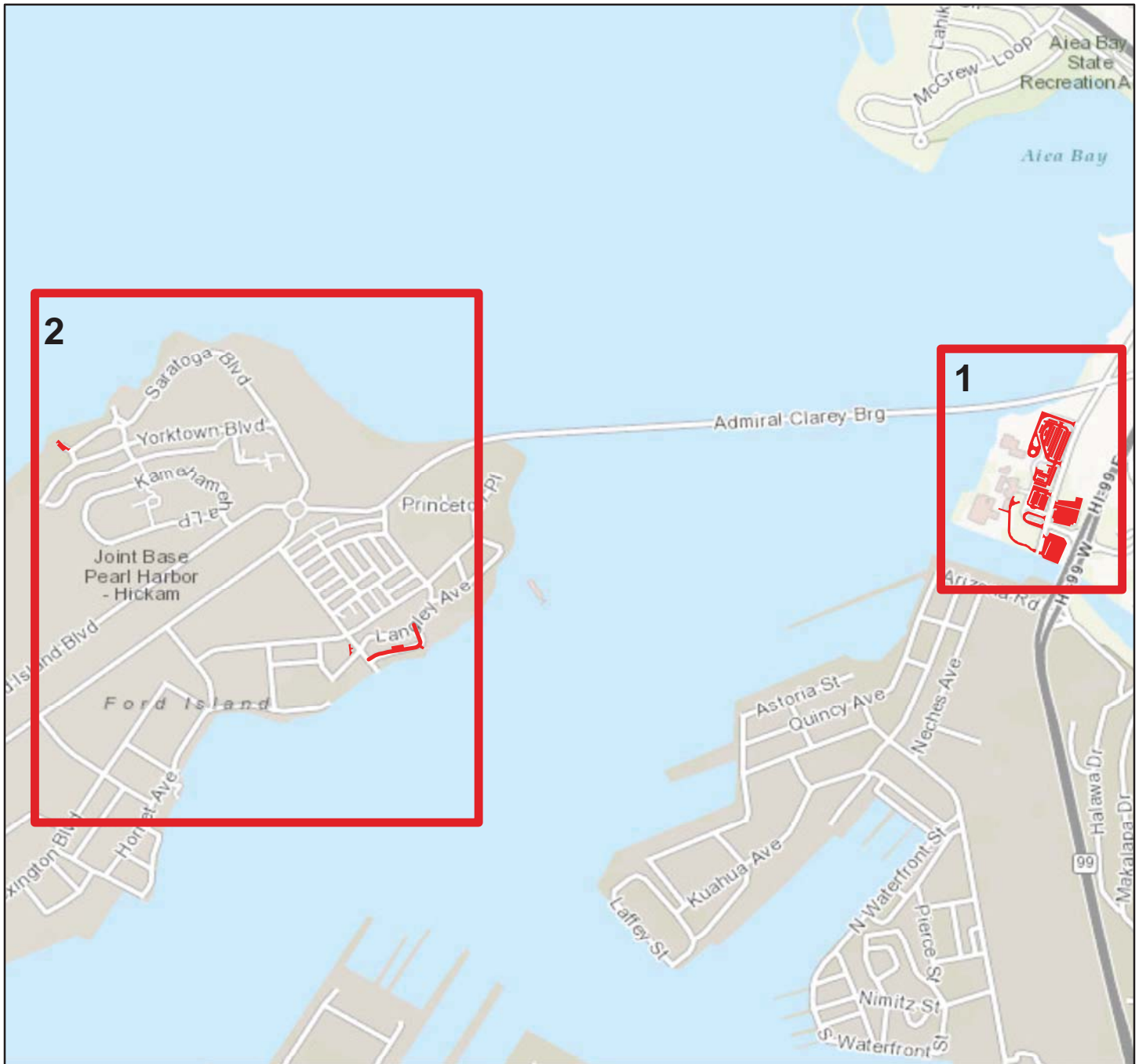


Federal Lands Highway  
Road Inventory Program



# World War II Valor in the Pacific National Monument

## Route Location Map Key Map



0 0.125 0.25 0.5 0.75 1 Miles

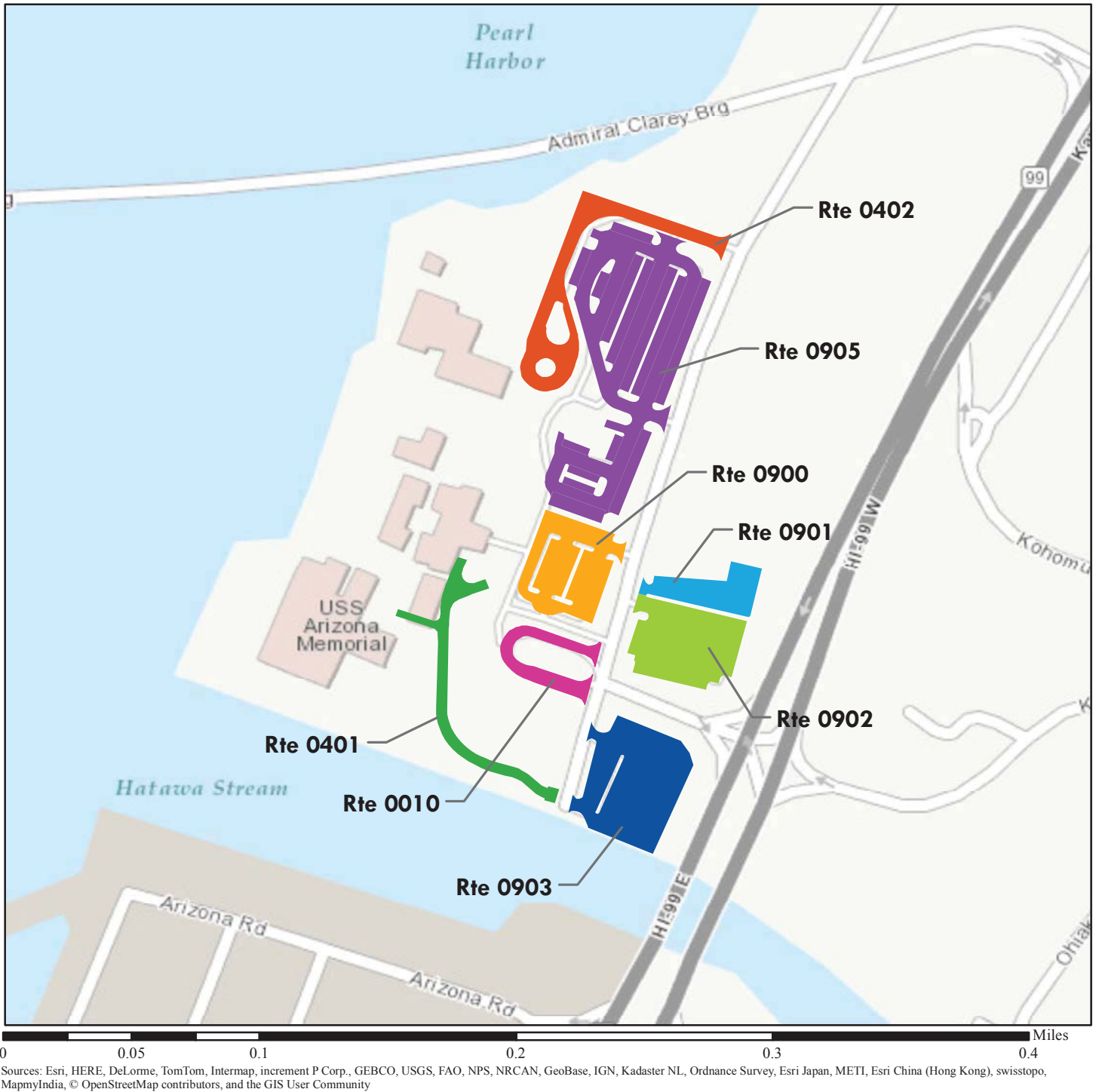
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

 Cycle 5 Collected Routes



# World War II Valor in the Pacific National Monument

## Route Location Map Area 1



Cycle 5 Collected Routes



# World War II Valor in the Pacific National Monument

## Route Location Map Area 2



0 0.05 0.1 0.2 0.3 0.4 Miles  
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



Cycle 5 Collected Routes



# Section 5

## Paved Route Condition Rating Sheets



## World War II Valor in the Pacific National Monument



Federal Lands Highway  
Road Inventory Program

## **Section 5: Paved Route Condition Rating Sheets**

Note: No Data Collection Vehicle routes exist 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**



World War II Valor in the Pacific  
National Monument



Federal Lands Highway  
**Road Inventory Program**

# World War II Valor in the Pacific National Monument

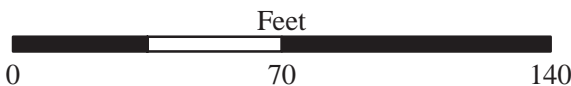
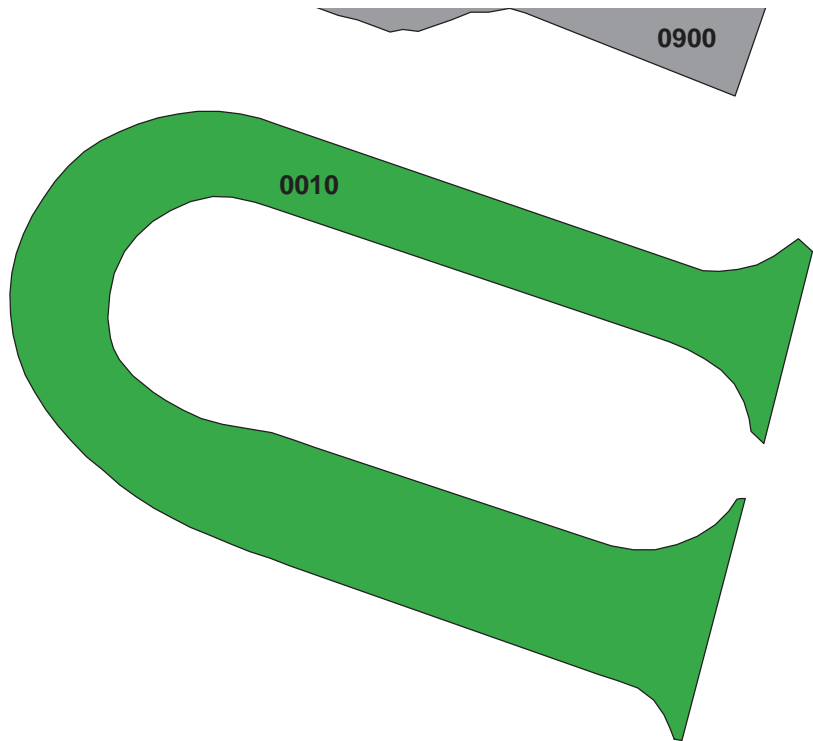
## ROUTE 0010: USS ARIZONA MEMORIAL "U" ROAD

Manual Rating

FROM ARIZONA MEMORIAL ROAD

TO ARIZONA MEMORIAL ROAD

Inspection Date	FMSS Number	User Access
4/6/2014	104202	PUBLIC
Surface Type	Area (Sq. Ft.)	Lane Miles (11' Widths)
ASPHALT	10,590	0.182
Culverts	Drop Inlets	Gates
0	2	2
Pavement Recommendation		Condition Rating / PCR
PREVENTIVE MAINTENANCE		GOOD / 90
<b>Route Condition Legend – Pavement Condition Rating (PCR)</b> Poor (0 - 60) Fair (61 - 84) Good (85 - 94) Excellent (95 - 100) Not Rated		
See Appendix for definitions and formulas		



# World War II Valor in the Pacific National Monument

## ROUTE 0400: BUNGALOW ROAD

Manual Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)									
Poor	(0 - 60)	Fair	(61 - 84)	Good	(85 - 94)	Excellent (95 - 100)	No Data		N
See Appendix for definitions and formulas									
<b>Inspection Date:</b>	4/6/2014	<b>Section Number</b>	0						
<b>Paved Length (Miles):</b>	0.12	<b>Section Length (MI)</b>	0.12						
<b>Surface Type:</b>	ASPHALT	<b>Route Summary</b>							
<b>Roadway Condition Information</b>									
Pavement Condition Rating (PCR)		30	30						
Surface Condition Rating (SCR)		N/A	N/A						
Roughness Condition Index (RCI)		N/A	N/A						
<b>Distress Index Values</b>									
Structural Crack Index		N/A	N/A						
Transverse Cracking Index		N/A	N/A						
Patching Index		N/A	N/A						
Rutting Index		N/A	N/A						
International Roughness Index (IRI)		N/A	N/A						
<b>Lane &amp; Width Information</b>									
Number of Lanes		1	1						
Paved Width (ft)		24.3	24.3						
Lane Width (ft)		24.3	24.3						



# World War II Valor in the Pacific National Monument

## ROUTE 0400: BUNGALOW ROAD

### Condition Photos



VALR\_0400\_7289.JPG



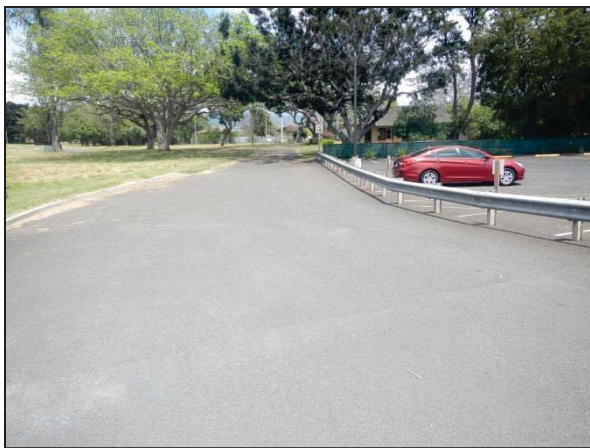
VALR\_0400\_7290.JPG



VALR\_0400\_7291.JPG



VALR\_0400\_7292.JPG



VALR\_0400\_7293.JPG

# World War II Valor in the Pacific National Monument

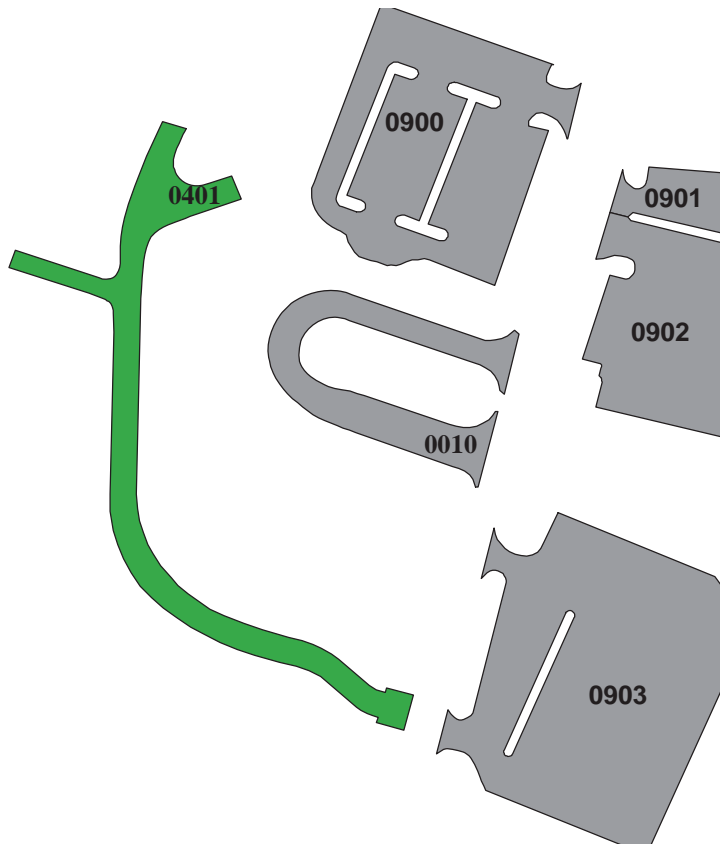
## ROUTE 0401: EMERGENCY/MAINTENANCE VEHICLE ACCESS ROAD

Manual Rating

FROM ARIZONA MEMORIAL ROAD

TO END AT VISITOR CENTER

Inspection Date	FMSS Number	User Access
4/6/2014	234219	NONPUBLIC
Surface Type	Area (Sq. Ft.)	Lane Miles (11' Widths)
ASPHALT	16,263	0.280
Culverts	Drop Inlets	Gates
0	2	2
Pavement Recommendation		Condition Rating / PCR
PREVENTIVE MAINTENANCE		GOOD / 90
<b>Route Condition Legend – Pavement Condition Rating (PCR)</b> Poor (0 - 60) Fair (61 - 84) Good (85 - 94) Excellent (95 - 100) Not Rated		
See Appendix for definitions and formulas		



# World War II Valor in the Pacific National Monument

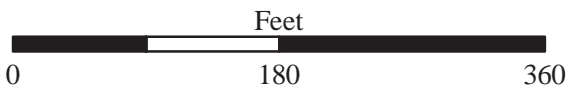
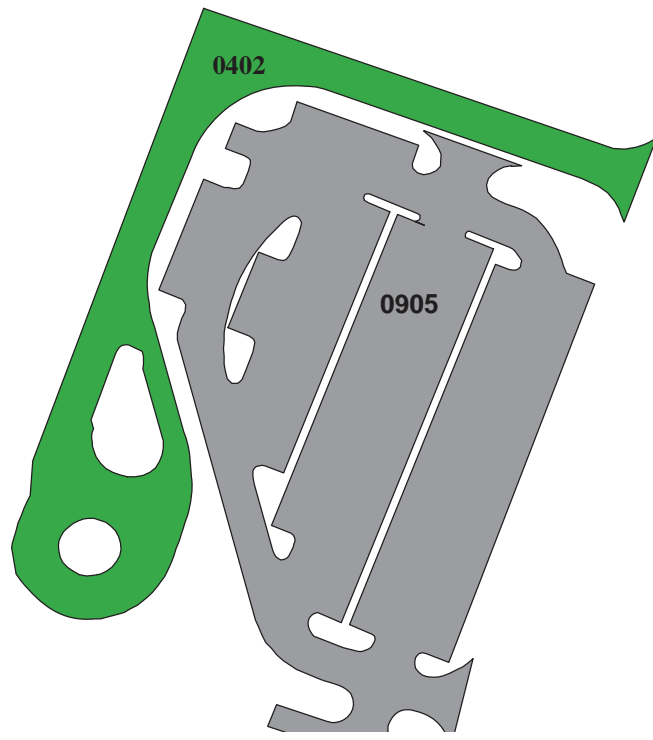
## ROUTE 0402: BUS TURNAROUND ROAD "C"

Manual Rating

FROM ARIZONA MEMORIAL ROAD

TO END OF LOOP

Inspection Date	FMSS Number	User Access							
4/6/2014	234220	NONPUBLIC							
Surface Type	Area (Sq. Ft.)	Lane Miles (11' Widths)							
ASPHALT	26,670	0.459							
Culverts	Drop Inlets	Gates							
0	1	4							
Pavement Recommendation		Condition Rating / PCR							
PREVENTIVE MAINTENANCE		GOOD / 90							
Route Condition Legend – Pavement Condition Rating (PCR)									
Poor	<span style="background-color: red; color: white;">(0 - 60)</span>	Fair	<span style="background-color: yellow;">(61 - 84)</span>	Good	<span style="background-color: green;">(85 - 94)</span>	Excellent	<span style="background-color: blue;">(95 - 100)</span>	Not Rated	<span style="background-color: black; color: black;"> </span>
See Appendix for definitions and formulas									



# Section 7

## Parking Area

### Condition Rating Sheets



## World War II Valor in the Pacific National Monument



Federal Lands Highway  
Road Inventory Program

# World War II Valor in the Pacific National Monument

## ROUTE 0900: VISITOR CENTER PARKING LOT "A"

Manual Rating

FROM ARIZONA MEMORIAL ROAD

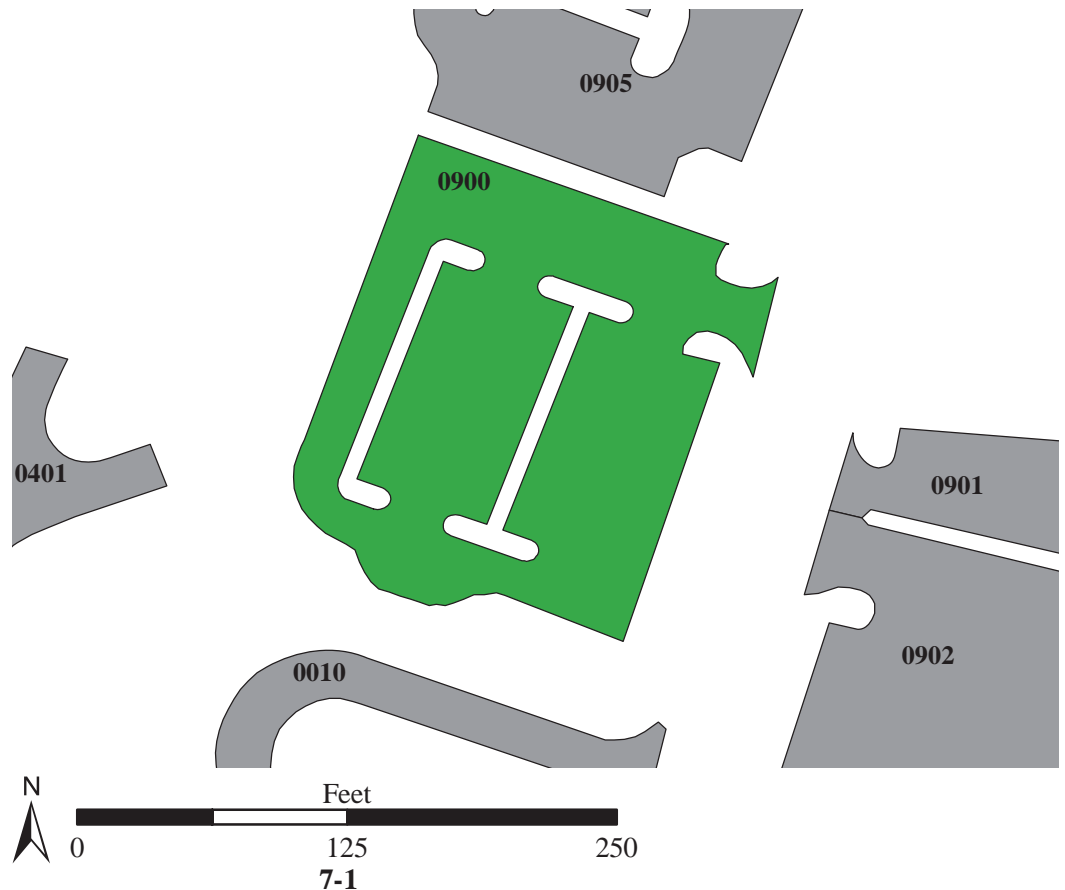
TO PARKING

Inspection Date	FMSS Number	User Access	Surface Type
4/6/2014	32030	PUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
27,281	0.47	6	LIGHT REPAIR
Curb Type		Curb & Gutter Type	
CONCRETE		NO CURB AND GUTTER	
Culverts	Drop Inlets	Gates	
0	4	1	
Pavement Recommendation		Condition Rating / PCR	
PREVENTIVE MAINTENANCE		GOOD / 90	

### Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60) Fair (61 - 84) Good (85 - 94) Excellent (95 - 100) Not Rated

See Appendix for definitions and formulas



# World War II Valor in the Pacific National Monument

## ROUTE 0901: MAINTENANCE FACILITY PARKING LOTS

Manual Rating

FROM ARIZONA MEMORIAL ROAD

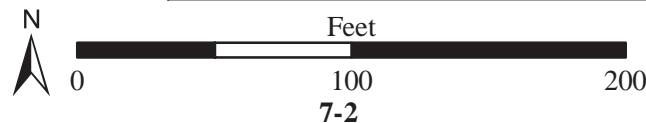
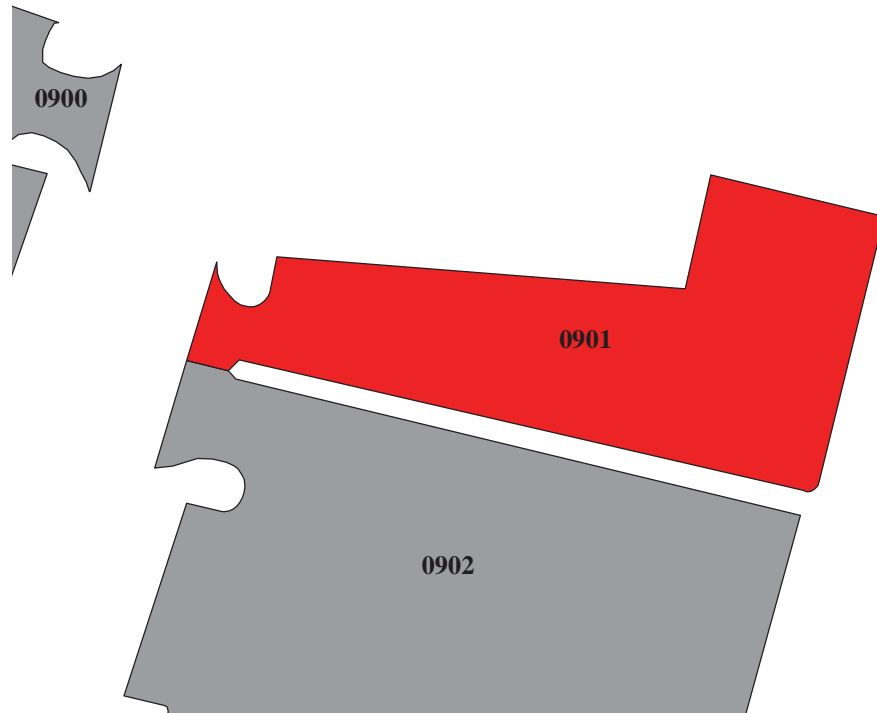
TO PARKING

Inspection Date	FMSS Number	User Access	Surface Type
4/6/2014	48323	NONPUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
13,726	0.236	5	LIGHT REPAIR
Curb Type		Curb & Gutter Type	
CONCRETE		CONCRETE	
Culverts	Drop Inlets	Gates	
0	0	1	
Pavement Recommendation		Condition Rating / PCR	
RECONSTRUCTION		POOR / 53	

### Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60) Fair (61 - 84) Good (85 - 94) Excellent (95 - 100) Not Rated

See Appendix for definitions and formulas



# World War II Valor in the Pacific National Monument

## ROUTE 0902: MAUKA PARKING AREA LOT "B"

Manual Rating

FROM ARIZONA MEMORIAL ROAD

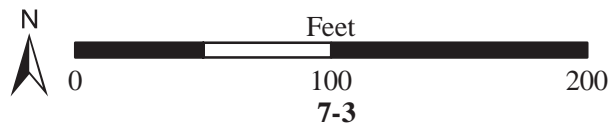
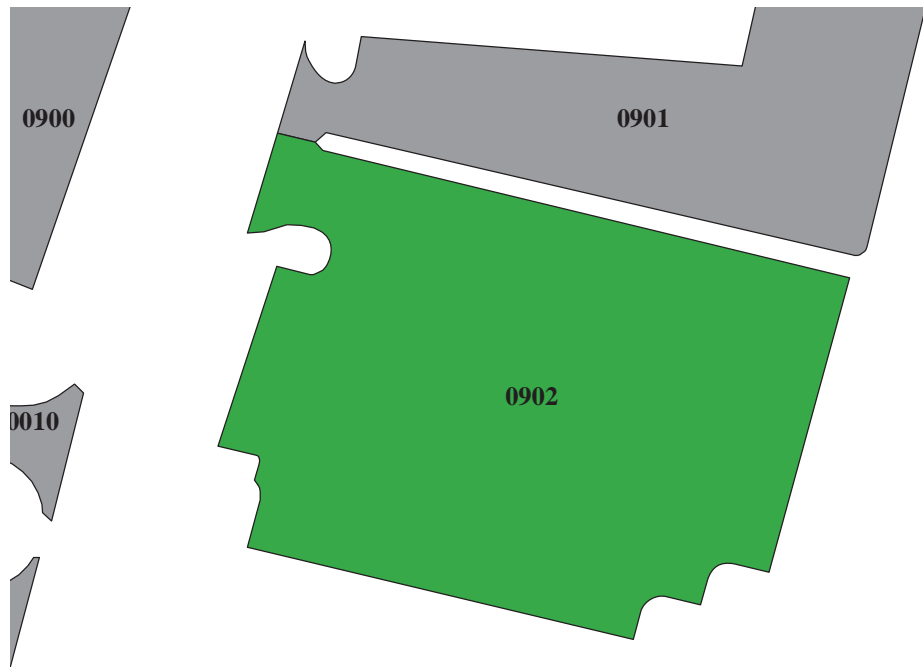
TO PARKING

Inspection Date	FMSS Number	User Access	Surface Type
4/6/2014	104198	PUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
30,414	0.524	5	LIGHT REPAIR
Curb Type		Curb & Gutter Type	
CONCRETE		CONCRETE	
Culverts	Drop Inlets	Gates	
0	3	1	
Pavement Recommendation		Condition Rating / PCR	
PREVENTIVE MAINTENANCE		GOOD / 90	

### Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60) Fair (61 - 84) Good (85 - 94) Excellent (95 - 100) Not Rated

See Appendix for definitions and formulas



# World War II Valor in the Pacific National Monument

## ROUTE 0903: COMMERCIAL PARKING AREA

Manual Rating

FROM ARIZONA MEMORIAL ROAD

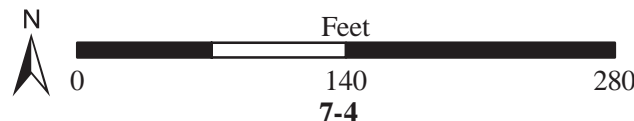
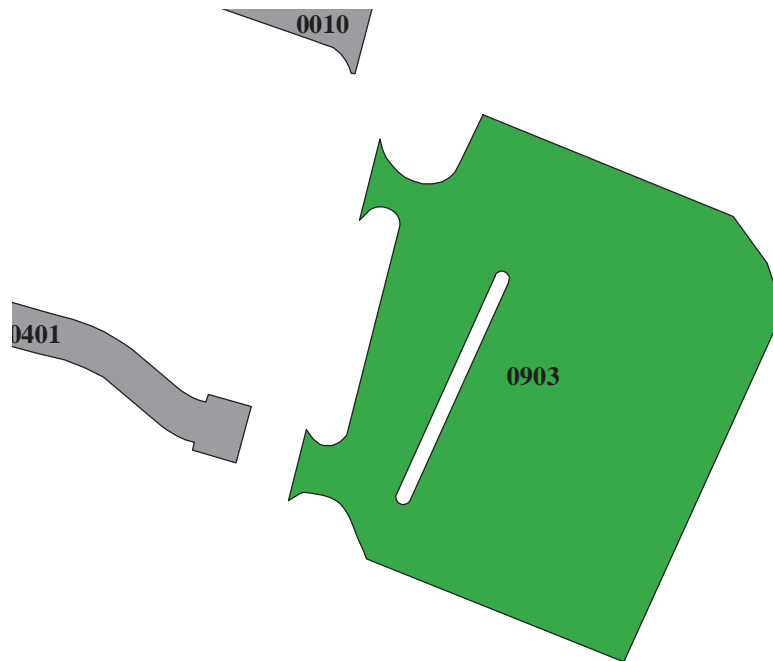
TO ARIZONA MEMORIAL ROAD

Inspection Date	FMSS Number	User Access	Surface Type
4/6/2014	104199	NONPUBLIC	CONCRETE
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
40,419	0.696	5	LIGHT REPAIR
Curb Type		Curb & Gutter Type	
CONCRETE		NO CURB AND GUTTER	
Culverts	Drop Inlets	Gates	
2	0	2	
Pavement Recommendation		Condition Rating / PCR	
PREVENTIVE MAINTENANCE		GOOD / 90	

### Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60) Fair (61 - 84) Good (85 - 94) Excellent (95 - 100) Not Rated

See Appendix for definitions and formulas





# World War II Valor in the Pacific National Monument

## ROUTE 0905: VISITOR CENTER PARKING MAIN LOT "C"

Manual Rating

FROM ARIZONA MEMORIAL ROAD

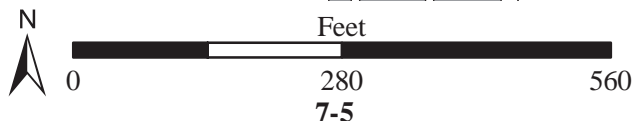
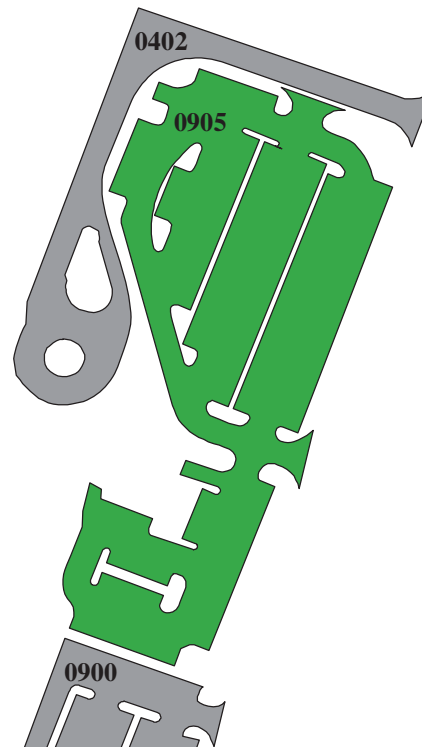
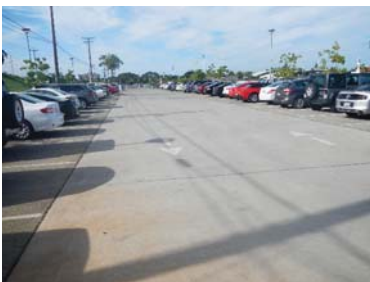
TO ROUTE 0402 (BUS TURNAROUND ROAD "C")

Inspection Date	FMSS Number	User Access	Surface Type
4/6/2014	114617	PUBLIC	CONCRETE
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
90,725	1.562	6	DO NOTHING
Curb Type		Curb & Gutter Type	
CONCRETE		NO CURB AND GUTTER	
Culverts	Drop Inlets	Gates	
0	2	4	
Pavement Recommendation		Condition Rating / PCR	
PREVENTIVE MAINTENANCE		GOOD / 90	

### Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60) Fair (61 - 84) Good (85 - 94) Excellent (95 - 100) Not Rated

See Appendix for definitions and formulas



# World War II Valor in the Pacific National Monument

## ROUTE 0906: FORD ISLAND PARKING

Manual Rating

FROM LONG ISLAND STREET

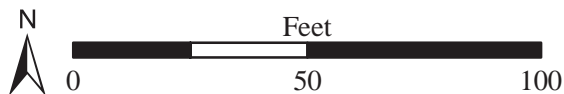
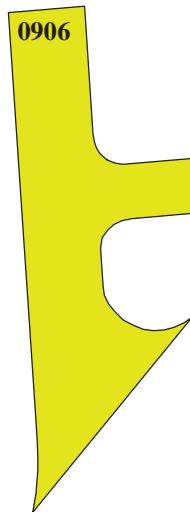
TO PARKING

Inspection Date	FMSS Number	User Access	Surface Type
4/6/2014	239310	NONPUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
1,869	0.032	5	MODERATE REPAIR
Curb Type		Curb & Gutter Type	
CONCRETE		NO CURB AND GUTTER	
Culverts	Drop Inlets	Gates	
0	0	0	
Pavement Recommendation		Condition Rating / PCR	
LIGHT 3R TREATMENTS		FAIR / 73	

### Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60) Fair (61 - 84) Good (85 - 94) Excellent (95 - 100) Not Rated

See Appendix for definitions and formulas



# World War II Valor in the Pacific National Monument

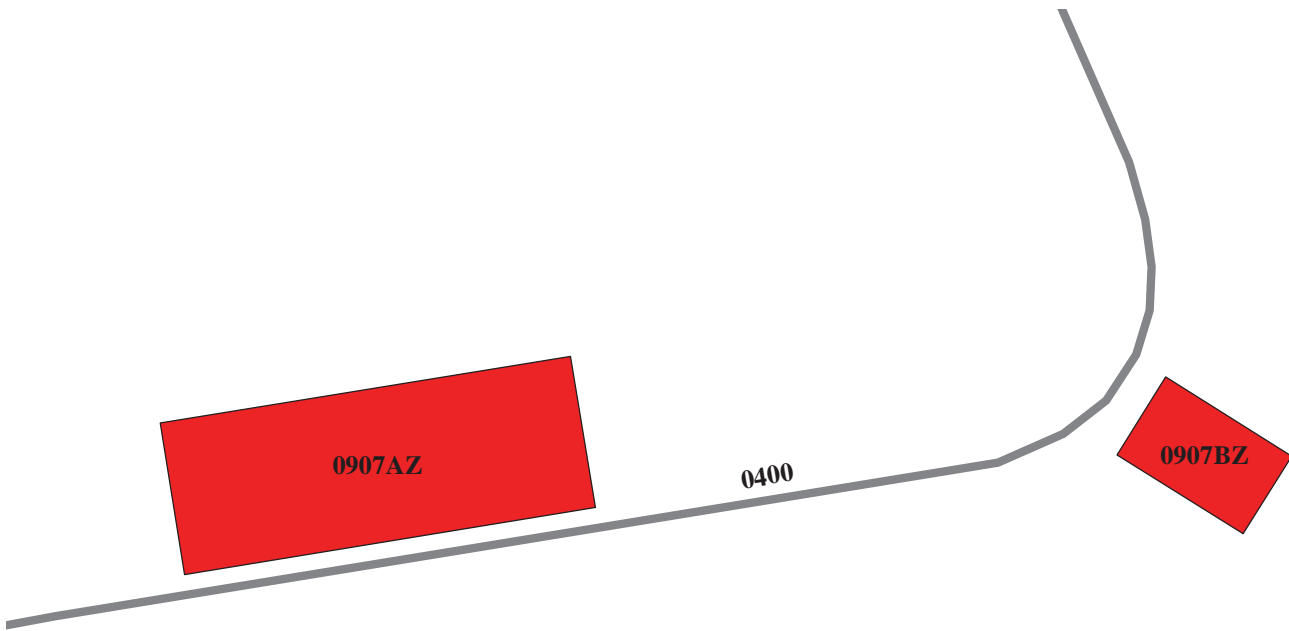
## ROUTE 0907ZZ: BUNGALOW ROAD PARKING AREAS

Summary Route

Manual Rating

ADJACENT TO ROUTE 0400 (BUNGALOW ROAD) ON LEFT AND RIGHT

Inspection Date	FMSS Number	User Access	Surface Type
4/6/2014	7644690	NONPUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Condition Rating / PCR	
4,879	0.084	SUMMARY / 30	
<b>Route Condition Legend – Pavement Condition Rating (PCR)</b>			
Poor	<span style="background-color: red; color: white; padding: 2px;">(0 - 60)</span>	Fair	<span style="background-color: yellow; padding: 2px;">(61 - 84)</span>
		Good	<span style="background-color: green; padding: 2px;">(85 - 94)</span>
		Excellent	<span style="background-color: blue; padding: 2px;">(95 - 100)</span>
		Not Rated	<span style="background-color: black; color: black; padding: 2px;"> </span>
See Appendix for definitions and formulas			



# World War II Valor in the Pacific National Monument

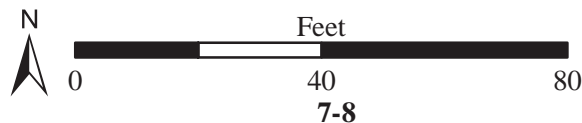
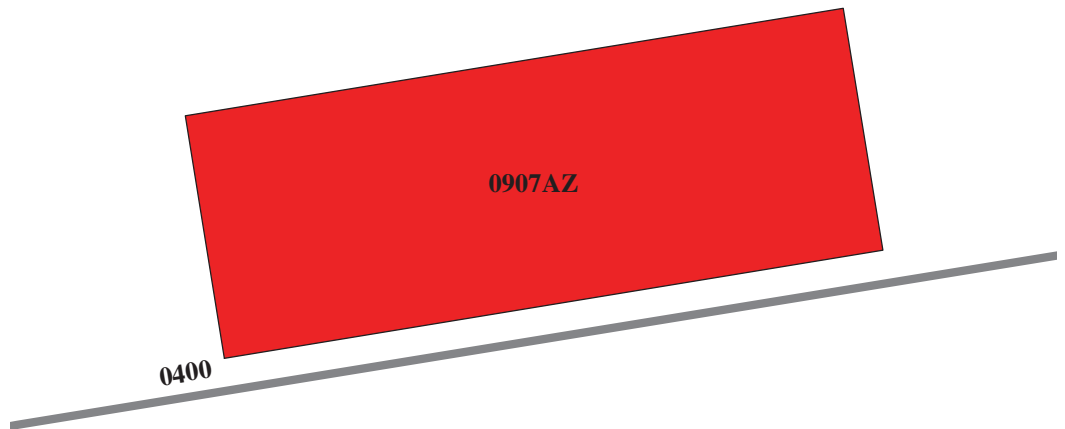
## ROUTE 0907AZ: BUNGALOW ROAD PARKING A

Subcomponent Route

Manual Rating

ADJACENT TO ROUTE 0400 (BUNGALOW ROAD) ON LEFT

Inspection Date	FMSS Number	User Access	Surface Type						
4/6/2014	7644690	NONPUBLIC	ASPHALT						
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation						
4,019	0.069	6	REPLACE						
Curb Type		Curb & Gutter Type							
WOOD		NO CURB AND GUTTER							
Culverts	Drop Inlets	Gates							
0	0	0							
Pavement Recommendation		Condition Rating / PCR							
RECONSTRUCTION		POOR / 30							
Route Condition Legend – Pavement Condition Rating (PCR)									
Poor	(0 - 60)	Fair	(61 - 84)	Good	(85 - 94)	Excellent	(95 - 100)	Not Rated	
See Appendix for definitions and formulas									



# World War II Valor in the Pacific National Monument

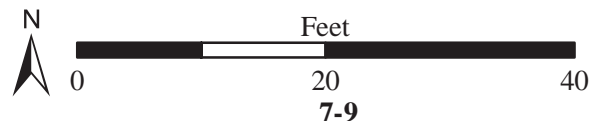
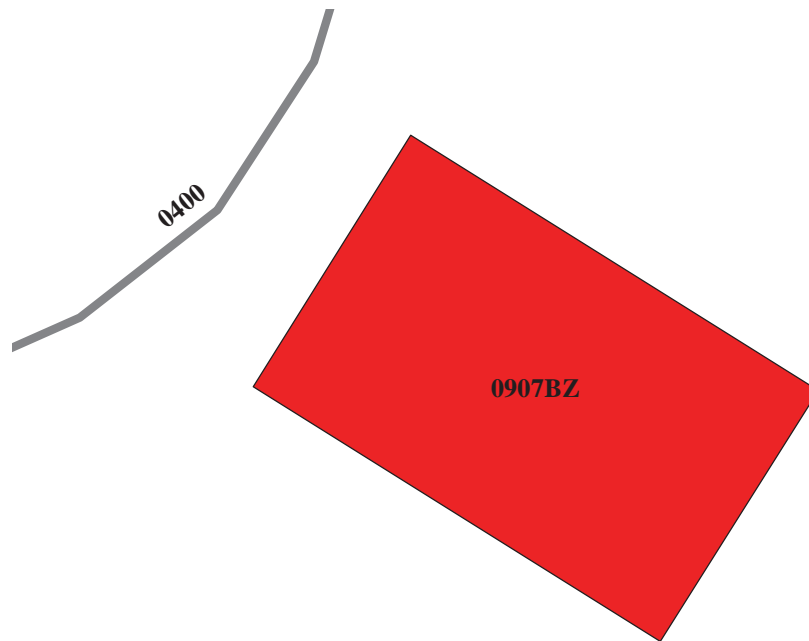
## ROUTE 0907BZ: BUNGALOW ROAD PARKING B

Subcomponent Route

Manual Rating

ADJACENT TO ROUTE 0400 (BUNGALOW ROAD) ON RIGHT

Inspection Date	FMSS Number	User Access	Surface Type						
4/6/2014	7644690	NONPUBLIC	ASPHALT						
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation						
860	0.015	N/A	NOT APPLICABLE						
Curb Type		Curb & Gutter Type							
NO CURB		NO CURB AND GUTTER							
Culverts	Drop Inlets	Gates							
0	0	0							
Pavement Recommendation		Condition Rating / PCR							
RECONSTRUCTION		POOR / 30							
Route Condition Legend – Pavement Condition Rating (PCR)									
Poor	(0 - 60)	Fair	(61 - 84)	Good	(85 - 94)	Excellent	(95 - 100)	Not Rated	
See Appendix for definitions and formulas									



# World War II Valor in the Pacific National Monument

## ROUTE 0908: USS UTAH MONUMENT PARKING

Manual Rating

FROM SARATOGA BOULEVARD

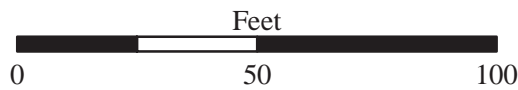
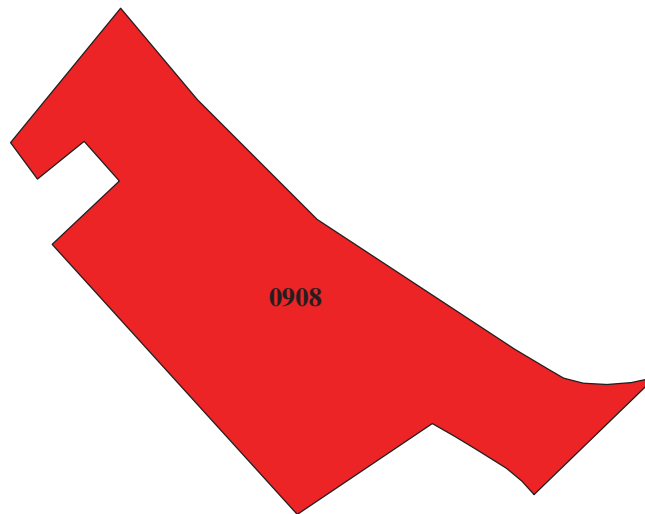
TO PARKING

Inspection Date	FMSS Number	User Access	Surface Type
4/7/2014	N/A	PUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
4,801	0.083	5	LIGHT REPAIR
Curb Type		Curb & Gutter Type	
CONCRETE		NO CURB AND GUTTER	
Culverts	Drop Inlets	Gates	
0	0	0	
Pavement Recommendation		Condition Rating / PCR	
RECONSTRUCTION		POOR / 30	

**Route Condition Legend – Pavement Condition Rating (PCR)**

Poor (0 - 60) Fair (61 - 84) Good (85 - 94) Excellent (95 - 100) Not Rated

See Appendix for definitions and formulas



**Section 8**  
**Parkwide / Route Maintenance**  
**Features Summaries**



**World War II Valor in the Pacific**  
**National Monument**



**Federal Lands Highway**  
**Road Inventory Program**

## VALR: PARKWIDE MAINTENANCE FEATURES SUMMARY

Note: Only culverts, drop inlets, and gates were collected on Routes 0010, 0401, 0402 and parking areas (MRP and PKG Routes).

FEATURE	LINEAR FEET	COUNT
BRIDGE	--	0
CATTLE GUARD	--	0
CULVERT	--	2
CURB	111	--
DROP INLET	--	14
GATE	--	17
GUARD/GUIDE RAIL	121	--
CABLE	0	--
NON-CABLE	121	--
GUARD/GUIDE WALL	0	--
BOLLARD	0	--
TEMPORARY BARRIER	0	--
NON TEMP/BOLLARD	0	--
INTERSECTION	--	6
LOW WATER CROSSING	--	0
LOW WATER CROSSING	0	--
MILE MARKER	--	0
OVERPASS	--	0
PARK BOUNDARY	--	0
PAVED DITCH	0	--
PULLOUT	--	0
PULLOUT	0	--
RAILROAD CROSSING	--	0
RETAINING WALL	--	0
RETAINING WALL	0	--
SIGN	--	3
STATE BOUNDARY	--	0
TRAFFIC LIGHT	--	0
TUNNEL	--	0
TUNNEL	0	--

*Date Collected 04/2014*



## VALR: ROUTE MAINTENANCE FEATURES SUMMARY

Note: Routes 0010, 0401 and 0402 are not shown on this page because they are non-linear routes (MRP Routes) that have only culverts, drop inlets, and gates counted. Please refer to Section 6 for individual feature counts on these routes.

FEATURE	ROUTE 0400 BUNGALOW ROAD	UNIT
BRIDGE	0	EACH
CATTLE GUARD	0	EACH
CULVERT	0	EACH
CURB	111	LINEAR FEET
DROP INLET	0	EACH
GATE	0	EACH
GUARD/GUIDE RAIL	121	LINEAR FEET
CABLE	0	LINEAR FEET
NON-CABLE	121	LINEAR FEET
GUARD/GUIDE WALL	0	LINEAR FEET
BOLLARD	0	LINEAR FEET
TEMPORARY BARRIER	0	LINEAR FEET
NON TEMP/BOLLARD	0	LINEAR FEET
INTERSECTION	6	EACH
LOW WATER CROSSING	0	EACH
LOW WATER CROSSING	0	LINEAR FEET
MILE MARKER	0	EACH
OVERPASS	0	EACH
PARK BOUNDARY	0	EACH
PAVED DITCH	0	LINEAR FEET
PULLOUT	0	EACH
PULLOUT	0	LINEAR FEET
RAILROAD CROSSING	0	EACH
RETAINING WALL	0	EACH
RETAINING WALL	0	LINEAR FEET
SIGN	3	EACH
STATE BOUNDARY	0	EACH
TRAFFIC LIGHT	0	EACH
TUNNEL	0	EACH
TUNNEL	0	LINEAR FEET

**VALR: STRUCTURE LIST**

No data available for this section.

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



World War II Valor in the Pacific  
National Monument



Federal Lands Highway  
Road Inventory Program

**VALR: ROUTE MAINTENANCE FEATURES ROAD LOG**  
**ROUTE 0400: BUNGALOW ROAD**

<b>FROM MILEPOST</b>	<b>TO MILEPOST</b>	<b>FEATURE</b>	<b>SIDE</b>	<b>COMMENT</b>
0.000	0.000	ROUTE BEGIN	N/A	FROM COWPENS STREET
0.000	0.000	INTERSECTION	LEFT	PAVED ROUTE (COWPENS STREET (NON NPS))
0.000	0.000	INTERSECTION	RIGHT	PAVED ROUTE (COWPENS STREET (NON NPS))
0.000	0.021	CURB	LEFT	CONCRETE CURB
0.003	0.003	SIGN	RIGHT	REGULATORY, GRAPHIC SIGN, NO TRUCKS
0.003	0.003	SIGN	LEFT	REGULATORY, STOP
0.003	0.026	GUARD/GUIDE RAIL	RIGHT	GUARD RAIL
0.026	0.026	SIGN	RIGHT	REGULATORY, SPEED LIMIT 15
0.049	0.049	INTERSECTION	LEFT	ROUTE 0907AZ (BUNGALOW ROAD PARKING A)
0.084	0.084	INTERSECTION	RIGHT	ROUTE 0907BZ (BUNGALOW ROAD PARKING B)
0.121	0.121	INTERSECTION	LEFT	PAVED ROUTE (LANGLEY AVENUE (NON NPS))
0.121	0.121	INTERSECTION	RIGHT	PAVED ROUTE (LANGLEY AVENUE (NON NPS))
0.121	0.121	ROUTE END	N/A	TO LANGLEY AVENUE

Note: Routes 0010, 0401, and 0402 are not shown in Section 9 because they are non-linear roads (MRP routes) that do not have linear referenced mile post information.

# Section 10 Appendix

NS	E. H. IVERSEN	S2c	J. E. LAKE, JR.	PAYCLK	R. H. MATO	EM2c	H. P. OSMON	SM3c
Mic	N. K. IVERSEN	S2c	D. L. LAKIN	Sic	W. M. McCARY	S2c	V. S. OFF	Sic
Sic	C. A. IVEY, JR.	S2c	J. J. LAKIN	Sic	J. C. McCLAFFERTY	BM2c	V. W. OGLE	S2c
M3c			R. "B" LA MAR	FC3c	H. M. McClUNG	ENS	L. H. OGLESBY	S2c
Sic	D. P. JACKSON, JR.	Sic	G. S. LAMB	CSF	L. J. McFADDIN	Y2c	R. B. OLIVER	Sic
Fic	R. W. JACKSON	Y3c	H. LANDMAN	AMM2c	J. O. McGLASSON	GM3c	E. K. OLSEN	ENS
Sic	J. B. JAMES	Sic	J. J. LANDRY, JR.	BKR2c	S. W. G. McGRADY	MATT1c	G. M. OLSON	S2c
M2c	E. E. JANTE	Y3c	E. W. LANE	COX	F. R. McGUIRE	SK2c	R. E. O'NEALL	Sic
M3c	C. T. JANZ	LT	M. C. LANE	Sic	J. B. McHUGHES	CWT	W. T. O'NEILL, JR.	ENS
IM2c	E. C. JASTRZEMSKI	Sic	R. C. LANGE	Sic	H. G. McINTOSH	Sic	D. J. ORR	Sic
Sic	V. L. JEANS	WT2c	O. J. LANGENWALTER	SK2c	R. McKINNIE	MATT2c	S. J. ORZECH	S2c
WTic	K. JEFFRIES	COX	H. J. LANOUILLE	COX	M. M. McKOSKY	Sic	M. E. OSBORNE	Fic
Sic	R. H. D. JENKINS	S2c	L. C. LARSON	F3c	J. B. McPHERSON	Sic	L. G. OSTRANDER	PHM3c
S2c	K. M. JENSEN	EM3c	W. D. LA SALLE	Sic	L. MEANS	MATT1c	P. D. OTT	Sic
Sic	P. F. JOHANN	GM3c	B. LATTIN	RM3c	J. M. MEARES	S2c	F. H. OWEN	S2c
MMic	D. A. JOHNSON, JR.	OC2c	C. V. LEE, JR.	Sic	J. A. MENELEE	Sic	R. A. OWENS	SK2c
Sic								
Fic	<p><b>TO THE MEMORY OF THE GALLANT MEN HERE ENTOMBED AND THEIR SHIPMATES WHO GAVE THEIR LIVES IN ACTION ON DECEMBER 7, 1941 ON THE U.S.S. ARIZONA</b></p> <p style="font-size: small;">THIS MEMORIAL WALL WAS INSTALLED AND REDEDICATED BY AMVETS APRIL 4, 1984</p>							
COX	E. R. JOHNSON	MMic	H. L. LEE	Sic	V. G. MENO	MATT2c	T. L. OWSLEY	SC2c
COX	J. R. JOHNSON	RM3c	D. A. LEEDY	FC2c	S. P. MENZENSKI	COX		
GM3c	S. C. JOHNSON	COX	J. G. LEGGETT	BM2c	H. D. MERRILL	ENS	A. P. PAGE	BM1c
GM3c	S. E. JOHNSON	CDR(MC)	J. M. LEGROS	Sic	O. W. MILES	Sic	H. E. PARKES	BM1c
SM3c	B. S. JOLLEY	S2c	M. H. LEIGH	GM3c	C. J. MILLER	F2c	P. J. PAROLI	BKR3c
Fic	D. P. JONES	S2c	J. W. LEIGHT	S2c	D. A. MILLER	COX	H. L. PATTERSON	
ENS	E. E. JONES	Sic	R. L. LEOPOLD	Sic				
Sic								

## World War II Valor in the Pacific National Monument



**Federal Lands Highway  
Road Inventory Program**

## Explanation of the Condition Descriptions

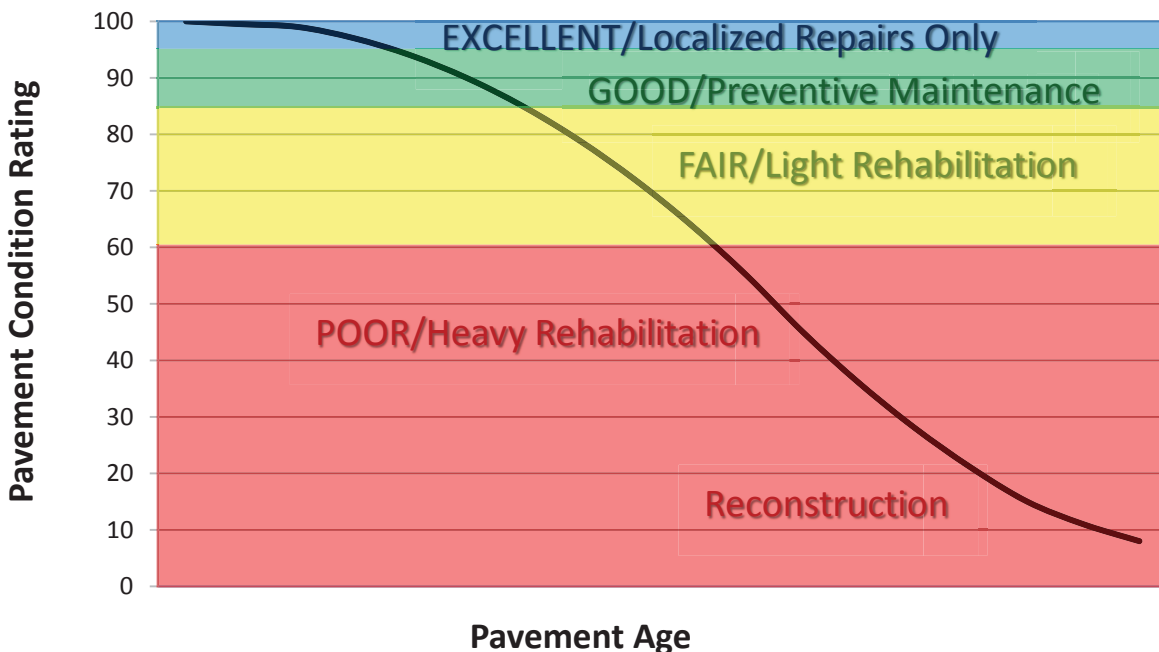
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The Pavement Condition Rating (PCR) can be used to indicate the place in the Pavement Life Cycle and the types of treatments that should be considered now and into the future.

- Excellent/New: PCR of 95-100. Pavements in this range will require only spot repairs
- Good: PCR of 85-94. Pavements in this range will likely be candidates for Preventive Maintenance. Examples include Chip and Slurry Seals, Micro Surfacing and Thin Overlays.
- Fair: PCR of 61-84. Pavements in this range will likely be candidates of Light Rehabilitation (L3R). Examples include single-lift overlays up to 2.5 inches in total thickness, milling and overlays.
- Poor: PCR of 60 or below. Pavements in this range will likely be candidates of Heavy Rehabilitation or Reconstruction (H3R or 4R). Examples include Pulverization, Multiple Lift Overlays, and Reconstruction.

At this time, specific Maintenance and Rehabilitation activities should be evaluated and recommended at the project level. Site-specific conditions that influence treatment type should be determined based on performing a subsurface investigation and/or pavement condition survey, and not be based solely on RIP data. Additionally, RIP produces a snapshot of conditions the year in which the data was collected. For further information or to obtain additional Pavement Management System's data from our Highway Pavement Management Application (HPMA) please contact the Eastern Federal Lands pavement team.

### Condition Categories and Treatments



## Description of Pavement Treatment Types

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1. Preventive Maintenance is a planned strategy of cost-effective treatments to an existing roadway system and its appurtenances that preserves the system, retards future deterioration, and maintains or improves the functional condition of the system (without significantly increasing the structural capacity). Preventive maintenance is typically applied to pavements in good condition having significant remaining service life. As a major component of pavement preservation, preventive maintenance is a strategy of extending the service life by applying cost-effective treatments to the surface or near-surface of structurally sound pavements. Examples of preventive treatments include asphalt crack sealing, chip sealing, slurry or micro-surfacing, thin and ultra-thin hot-mix asphalt overlay, concrete joint sealing, diamond grinding, dowel-bar retrofit, and isolated, partial and/or full-depth concrete repairs to restore functionality of individual slabs.
2. Pavement Rehabilitation consists of structural enhancements that extend the service life of an existing pavement and/or improve its load carrying capacity. Rehabilitation techniques include restoration treatments and structural overlays. Rehabilitation projects extend the life of existing pavement structures either by restoring existing structural capacity through the elimination of age-related, environmental cracking of embrittled pavement surface or by increasing pavement thickness to strengthen existing pavement sections to accommodate existing or projected traffic loading conditions. Two sub-categories result from these distinctions, which are directly related to the restoration or increase of structural capacity.
  - **Light Rehabilitation (L3R)** - Examples include single-lift overlays up to 2.5 inches in total thickness and milling and overlays for flexible pavements
  - **Heavy Rehabilitation (H3R)** – Requires rehabilitation with grade improvement. H3R stands for resurfacing, restoration, and rehabilitation projects. H3R projects typically involve multi-depth (overlays > 2.5 inches) pavement improvement work (short of full-depth replacement) and targeted safety improvements. H3R projects generally involve retention of the existing three-dimensional alignment.
3. Reconstruction (4R) is defined as the replacement of the entire existing pavement structure by the placement of the equivalent or increased pavement structure. Reconstruction usually requires the complete removal and replacement of the existing pavement structure. Reconstruction may utilize either new or recycled materials incorporated into the materials used for the reconstruction of the complete pavement section. Reconstruction is required when a pavement has either failed or has become functionally obsolete.

## **Description of Manual Rating Methods**

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In 2013, the Federal Highway Administration updated existing Manual Rating Procedures in an effort to better align pavement conditions for Manually Rated Routes and Parking with the Highway Pavement Management Application (HPMA). HPMA is the Pavement Management System used by the FHWA to store inventory and condition data from the Road Inventory Program (RIP) and forecast future performance using prediction models. HPMA uses pavement condition data (collected by the Road Inventory Program) to develop life cycles for pavements and recommend treatments to maximize useable pavement life while minimizing costs associated with maintenance and repair.

The Federal Highway Administration (FHWA) developed a set of manual rating methods for pavement that are appropriate for Federal Roadways. Two different methods were developed for linear roads and a separate method was developed for parking areas and nonlinear roads. These methods employ a 0-100 rating scale and improve consistency and objectivity in the manual evaluation of surface distresses. They are compatible with ratings that are collected by the automated Data Collection Vehicle (DCV).

- The first of the two manual evaluation methods for roads uses rating criteria to assign index values to each distress type based on a visual evaluation of severity and extent.
- The second manual evaluation method for roads is very time demanding and is best employed on only a select set of routes which may have the highest visitor use and require a more intensive assessment. This method will be used for the Manual Rating of Function Class 1, 2, 7, and 8 Roads. This method is based on measurements that are recorded for each instance of a surface distress. These measurements are converted into index values using conversion formulas.
- Parking areas and non-linear roads are rated similar to the first method shown above, however, there are some slight differences due to the non-linear nature.

The details and criteria used for each of these rating methods are outlined below.



## **Visual Inspection Method for Manually Rating Secondary Roads**

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The visual inspection method for manually rated roads uses condition rating criteria that have been developed by FHWA. This criteria is based on a visual evaluation of the severity and extent of distresses to determine the overall condition of the roadway. This method is used for secondary roads that are Functional Class 3, 4, 5, and 6. This constitutes the majority of manually rated roads collected by the Road Inventory Program.

### **Rating Section Lengths**

For this method, Manually Rated Roads are rated in sections. These sections may be made based on length of changes in surface type or condition as described below. The ratings are then aggregated to give an overall rating for the Route:

- Rating sections should be no longer than .25 miles in order to keep the area being rated manageable.
- A new rating section may be started based on changes in condition, width, or surface type if these changes represent a significant portion of the route (are not isolated instances).
- If the road condition, width, and surface type remain constant then new sections do not need to be created unless the road exceeds .25 miles.

### **Rating Criteria**

For this method, Manually Rated Roads are evaluated using a visual inspection of the six distress types listed below. Each distress is assigned one of five index values. An overall Surface Condition Rating (SCR) and Pavement Condition Rating (PCR) are calculated based on these index values.

- Alligator Cracking
  - Rating based on percentage of road surface affected
- Longitudinal Cracking
  - Rating based on severity level (crack width) and percentage of road section length of longitudinal cracks
- Transverse Cracking
  - Rating based on crack width, crack spacing, and percentage of surface affected
- Patching
  - Rating based on percentage of road surface affected
- Rutting
  - Rating based on percentage of road surface affected
- Roughness
  - Only included if the overall roadway length is greater than 0.5 miles and the posted speed limit is greater than or equal to 25 mph. Subjective rating based on the overall ride comfort of the section.

Concrete Routes also receive a PCR rating based on visual evaluation of the following six distress types.

- Slab Faulting at Joints
- Slab Cracking and breakup
- Surface Delamination and Pop-outs
- Joint Distresses
- Patching

## **Distress Measurement Method for Manually Rating Primary Roads**

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A more intensive and time demanding assessment than our standard method was developed for Primary roads that are functional class 1, 2, 7, or 8. These high visitation roads are usually accessible by the automated Data Collection Vehicle but in rare instances may need to be manually rated. The method developed is based on measuring each instance of a distress. These measurements are totaled over each section length being measured and are then converted into index values between 0 and 100 (100 being a road with no distress) using index formula equations outlined below. The goal of this method is to produce measured index values which are directly comparable to the automated Data Collection Vehicle.

### **Rating Section Lengths**

For the distress measurement method roads are broken into sections in order to rate. Distress measurements are totaled for each section separately in order to determine the index value for that particular section. The section length to be rated is determined based on the following rules:

- Rating sections are between 0.25 and 0.50 miles long
- A new rating section is created if there is a significant change in condition or pavement width
- If there are no significant changes in condition or pavement width, rating sections are broken at equal intervals, typically 0.50 miles

### **Manual Distress Measurements**

#### **Alligator Cracking**

- Alligator cracking is measured by area (square feet). Instances of Alligator cracking are measured along the length and multiplied by the average width of the distressed area.
- The index for alligator cracking takes the total area of cracking compared to the interval length and converts it to a percentage. That percentage is then input into an index formula that yields a value between 0 and 100 (0 being the most distressed).
- Severity levels are not defined for manually measured Alligator cracks. The Alligator Crack Index formula is calculated based on an assumption of medium severity.

#### **Longitudinal Cracking**

- Longitudinal cracking (cracking in the direction parallel to the roadway) is measured by length (ft).
- The index for longitudinal cracking takes the total length of cracking compared to the interval length and converts it to a percentage broken down by severity. That percentage is then input into a formula that yields a value between 0 and 100 (0 being the most distressed).
- Two severity levels are defined for manually measured Longitudinal Cracks. Lower severity cracks are those with a mean width of less than 0.25 inches. Sealed cracks with sealant in good condition are also considered lower severity. Higher severity cracks are those with a mean width of greater than 0.25 inches.

#### **Transverse Cracking**

- Transverse cracking (cracking in the direction perpendicular to the roadway) is measured by length (ft).
- The index for transverse cracking takes the total number of cracks (1 crack would encompass the full lane) broken down by severity. The total numbers of each severity are then put into a formula that yields a value between 0 and 100 (0 being the most distressed).

- Two severity levels are defined for manually measured Transverse Cracks. Lower severity cracks are those with a mean width of  $\leq 0.25$  inches. Sealed cracks with sealant in good condition are also considered lower severity. Higher severity cracks are those with a mean width of  $> 0.25$  inches.

#### **Patching and Potholes**

- Patching and Potholes are measured by area (square feet). Instances of Patching are measured along the length and multiplied by the average width of the patch.
- Instances of full lane width patching cannot be longer than 0.100 miles, otherwise it should be considered a pavement change rather than a distress.
- There are no stratified severities for Patching. It is either present or it is not.

#### **Rutting**

- Visible rutting is measured by length (feet) in each wheelpath. Rutting needs only to be visible for it to be rated.
- Severity levels are not defined for manually measured rutting.

#### **Roughness**

- Roughness is given a subjective rating of Excellent, Good, Fair, or Poor based on the overall riding comfort of the section. Roughness is only included if the overall roadway length is greater than 0.5 miles and the posted speed limit is greater than or equal to 25 mph.

### **Index Formulas for Distress Measurement Method:**

The method used to convert distress measurements into index values is shown below. The Surface Condition Rating and Pavement Condition Rating are calculated based on these index values.

#### **Alligator Crack Index for Manual Rating:**

$$AC\_INDEX = 100 - 40 * (\%ALLIGATOR / 15)$$

Where:

$\%ALLIGATOR$  = Percent of total area of section being rated that contains Alligator cracking.

#### **Longitudinal Crack Index for Manual Rating:**

$$LC\_INDEX = 100 - 40 * [(\%LOW / 175) + (\%MED / 75)]$$

Where:

$\%LOW$  = Percent length of longitudinal cracks where crack width  $\leq 0.25$  inches

$\%HIGH$  = Percent length of longitudinal cracks where crack width  $> 0.25$  inches

#### **Transverse Crack Index for Manual Rating:**

$$TC\_INDEX = 100 - 40 * [(LOW / 21.1) + (MED / 4.4)]$$

Where:

LOW = Count of the total number of transverse cracks within the section length where

one transverse crack is equal to the lane width and the crack width  $\leq 0.25$  inches

HIGH = Count of the total number of transverse cracks within the section length where

one transverse crack is equal to the lane width and the crack width  $> 0.25$  inches

Number of cracks is computed as:

Total length of transverse cracks/Lane width

**Patching Index for Manual Rating:**

$$\text{PATCH\_INDEX} = 100 - 40 * (\% \text{PATCHING} / 80)$$

Where:

**%PATCHING** = Percentage of pavement section that contains patching/potholes.

**Rutting Index for Manual Rating:**

$$\text{RUT\_INDEX} = 100 - 40 * (\% \text{RUTTING} / 205)$$

Where:

**%RUTTING** = Percentage length of rutting within the section being measured.

## **Method for Manually Rating Paved Parking Areas and Non-Linear Roads**

Parking areas are evaluated based on a visual inspection using condition rating criteria that has been developed by FHWA. This criteria is based on a visual evaluation of the severity and extent of distresses to determine the overall condition of the parking area. This overall condition rating is linked to the level of repair and rehabilitation practices required.

A distress index is determined for each of the distresses listed below for Asphalt and Concrete Parking areas. The overall Pavement Condition Rating (PCR) of the parking lot is driven by the most severe distress present.

### **Rating Criteria:**

#### **Asphalt Parking Distress Types**

- Alligator Cracking
  - Rating based on percentage of road surface affected
- Longitudinal, Transverse and Block cracking
  - Rating based on crack width, crack spacing, and percentage of surface affected
- Rutting and Distortions
  - Rating based on percentage of road surface affected
- Hot Mix Asphalt Patches
  - Rating based on overall percentage of HMA patches
- Potholes and Cold Patches
  - Rating based on percentage of road surface affected
- Surface Raveling and Bleeding
  - Rating based on percentage of road surface affected

#### **Concrete Parking Distress Types**

- Slab Faulting at Joints
  - Rating based on height differential between adjacent slabs or pieces of broken slabs
- Slab Cracking and breakup
  - Rating based on quantity of cracks and if slab is acting to able distribute load as designed
- Surface Delamination and Pop-outs
  - Rating based on percentage of road surface affected to include pop-outs, spalls and surface delamination
- Joint Distresses
  - Rating based on sealant condition and concrete distresses at/or adjacent to joints
- Patching
  - Rating based on percentage of road surface affected

## **Curb Inspection and Treatments**

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During inspections of manually rated parking lots and routes, the curb reveal and overall curb condition are evaluated. The curb condition is used to determine a recommendation.

### **Curb Reveal**

The vertical distance on the curb face from the gutter flow line or pavement surface to the top of curb. When resurfacing adjacent to curb, the resulting curb reveal should be no less than 4 inches. Additionally, when resurfacing adjacent to a gutter, the resulting pavement surface should be flush with the gutter pan. In cases where a resurfacing would violate either of these parameters, the surface may need to be milled or removed to adjust to these field conditions.

### **Curb Recommendations**

The following treatment categories are based on the overall percentage of distresses along the entire curb structure for a specific pavement structure. Distresses include spalling, cracking, loss of material and any other damage which prevents the curb from conveying storm runoff or failing to perform in its intended function.

- Overall curb damage ranging 0%-5%:
  - DO NOTHING
- Overall curb damage ranging 5%-20%
  - LIGHT REPAIR
- Overall curb damage ranging 20%-50%
  - MODERATE REPAIR
- Overall curb damage greater than 50%:
  - REPLACE

## Glossary of Terms and Abbreviations

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<b>TERM OR ABBREVIATION</b>	<b>DESCRIPTION OR DEFINITION</b>
AC	Alligator Cracking
CRS	Condition Rating Sheets (Section 5)
Curb Recommendation	Curb remediation based on overall percentage of curb distress
Curb Reveal	Height of curb exposed from gutter flow line to top of curb
DCV	Data Collection Vehicle
Excellent	Excellent rating with an index value of 95 to 100
Fair	Fair rating with an index value from 61 to 84
FUNCT_CLASS	Functional Classification (see Route ID, Section 2)
Good	Good rating with an index value from 85 to 94
IRI	International Roughness Index
HPMA	Highway Pavement Management Application
Lane Width	Width from road centerline to fogline, or from centerline to edge-of-pavement when no fogline exists
LC	Longitudinal Cracking
MRR	Manually Rated Route
MRL	Manually Rated Line
MRP	Manually Rated Polygon
N/A	Not Applicable
NC	Not Collected
PATCH	Patching and Potholes
Paved Width	Width from edge-of-pavement to edge-of-pavement
PCR	Pavement Condition Rating
PKG	Parking Area
Poor	Poor rating with an index value of 0 to 60
RCI	Roughness Condition Index
SC	Structural Cracking
SCR	Surface Condition Rating
TC	Transverse Cracking

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

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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.