

## CHAPTER 11.

# RECREATIONAL RESOURCES

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### 11.1 INTRODUCTION

This chapter discusses potential environmental consequences associated with implementing the alternatives within the region of influence for each resource. A description of the affected environment for each resource is provided in Volume 2. The locations described in Volume 2 include the region of influence for the utilities and roadway projects with the chapters presented in the same order as in Volume 6.

### 11.2 ENVIRONMENTAL CONSEQUENCES

#### 11.2.1 Approach to Analysis

##### 11.2.1.1 Methodology

###### Utilities

Information on recreational resources on Guam and public access was collected through stakeholder meetings in April 2007, Geographic Information System data compiled and reviewed for this Environmental Impact Statement (EIS) literature review, personal communications, and limited visitor data that are available for a few specific locations on the island. A comprehensive recreational carrying capacity analysis—assessing the number of individuals who can be supported in a given area within natural resource limits without degrading the natural social, cultural, and economic environment (Global Development Research Center 2008)—was not conducted as part of this EIS, but is suggested as a mitigation measure to better quantify potential impacts on recreational resources. Existing baseline data for conducting recreational resource impact analyses are somewhat limited because the Guam Department of Parks and Recreation (GDPR) does not collect visitor data (e.g., user counts, visitor satisfaction, user conflicts, visitor demands, and etc.) for its recreational facilities (GDPR 2009). Consequently, the analysis in this chapter relied considerably on information obtained through site reconnaissance and communications with natural resource planners at Andersen Air Force Base (AFB). The analysis of potential impacts on recreational resources is based on the long-term (operational) effects (i.e., after construction has occurred and all buildings, facilities, and structures are in place as well as the temporary impacts resulting from the influx of off-island workers). Construction-related activities would be relatively minimal in their impacts (i.e., earth-moving equipment clearing vegetation and constructing facilities and other structures).

###### Roadway Projects

The methodology used in assessing recreational resource impacts as a result of the proposed roadway improvements is generally the same as that described in the preceding “Utilities” section. However, the analysis focuses on direct (e.g., land acquisitions, elimination of access, degradation of facilities) and indirect (e.g., degradation of use due to traffic delays), temporary (i.e., construction), and permanent (i.e., operation) effects that could result by implementing the proposed Guam Road Network (GRN) under each alternative.

### 11.2.1.2 Determination of Significance

For the purpose of this EIS, the proposed action and alternatives would cause a significant impact on recreational resources if they:

- Would impede access to recreational resources
- Would substantially reduce recreational opportunities
- Would cause substantial conflicts between recreational users
- Would cause substantial physical deterioration of recreational resources

Recreational impacts as a result of the proposed roadway improvement projects are assessed following Federal Highway Administration Guidance for Preparing and Processing Environmental and Section 4(f) Documents (Federal Highway Administration 1987), which are similar to those listed above.

### 11.2.1.3 Issues Identified During Public Scoping Process

As part of the analysis, concerns related to recreational resources that were mentioned by the public, including regulatory stakeholders, during the public scoping meetings were addressed. These included the potential impact of the proposed action on civilian access to Department of Defense (DoD) facilities, recreation areas, Apra Harbor, and other locations, both in terms of construction and operations impacts.

## 11.2.2 Power

### 11.2.2.1 Basic Alternative 1: Recondition up to Five Existing Guam Power Authority–Permitted Facilities to Provide Peaking Power/Reserve Capacity

Basic Alternative 1 would recondition five existing Combustion Turbines (CTs) and upgrade and provide some new Transmission and Distribution (T&D) systems within existing utility corridors and would not require enlargement of the existing footprint of the generating facilities or new construction. Reconditioning would be made to existing permitted facilities at the Marbo, Yigo, Dededo (2 units), and Macheche CTs. T&D system upgrades would be on existing above ground and underground transmission lines. This alternative supports Main Cantonment Alternatives 1 and 2 and Main Cantonment Alternatives 3 and 8 would require additional upgrades to the T&D system.

#### Construction

The proposed reconditioning of the existing GPA facilities would be confined to the existing locations, wherein general overhaul, capabilities testing, and controlled startups would be performed. Also T&D systems would be upgraded. This upgrade would include installing larger wires on existing overhead distribution lines, moving some of the overhead lines to underground, and upgrading to existing substations within their current footprints. The proposed construction activities may impede roadway access to recreational areas by way of coning off construction area and/or diverting traffic to other routes. Increased time traveling on affected roads may occur; however, direct impacts on recreational resources are not expected.

For information on impacts caused by population growth from the influx of off-island workers, see Volume 2, Chapter 9, Section 9.2.2.2.

#### Operation

The proposed reconditioning of the existing CTs and T&D improvements would be confined to the existing locations and routes. At present, there are no recreational resources sited near the proposed

(preexisting) location of the reconditioning and T&D upgrades. Therefore, Basic Alternative 1 would result in no impacts on recreational resources.

Proposed Mitigation Measures

No proposed mitigation measures would be needed.

11.2.2.2 Summary of Impacts

Table 11.2-1 summarizes the potential impacts of the Basic Alternative 1.

**Table 11.2-1. Summary of Potential Impacts on Recreational Resources – Power**

<i>Basic Alternative 1*</i>
NI
Recreational Resources (trails, historic and cultural attractions, dive sites, game hunting, fishing/crabbing, scenic points, golf course, day use resorts, spelunking, parks, beaches)

Legend: NI = No impact. \*Preferred Alternative.

The Basic Alternative 1 would recondition the existing CTs and upgrade T&D systems. The upgraded distribution lines would be routed within the existing utility corridors and distribution system upgrades would occur within the footprint of existing substations. In as much as there are no identified recreational resources in proximity of the locations considered, the components of the proposed activities would be consistent with existing environment and adverse impacts on recreational resources are not anticipated.

**11.2.3 Potable Water**

11.2.3.1 Basic Alternative 1 (Preferred Alternative)

Basic Alternative 1 would provide additional water capacity of 11.3 MGd (42.8 MLd), which is anticipated to be met by an estimated 22 new wells at Andersen Air Force Base (AFB), rehabilitate existing wells, interconnect with the Guam Waterworks Authority (GWA) water system, and associated treatment, storage and distribution systems. Two new 2.5 MG (9.5 ML) water storage tanks would be constructed at ground level at NCTS Finegayan. Up to two new elevated 1 MG (3.8 ML) water storage tanks would be constructed at Finegayan within the Main Cantonment footprint.

Construction

Development of the proposed wells at Andersen AFB and the two new 2.5 MG (9.5 ML) ground-level water storage tanks and two new 1 MG (3.8 ML) elevated storage tanks at Naval Computer Telecommunications Station Finegayan may impede roadway access to recreational areas (e.g., coning off construction area, diverting traffic). Increased time traveling on affected roads would likely result; however, direct impacts on recreational resources is not anticipated.

For information on impacts caused by population growth from the influx of off-island workers, see Volume 2, Chapter 9, Section 9.2.2.2.

Operation

The proposed development is not situated on or near the existing recreational resources. Inhibited access or the loss of use of recreational resources are not anticipated. Therefore, Alternative 1 would result in no impacts on recreational resources.

Proposed Mitigation Measures

No mitigation measures are needed.

11.2.3.2 Basic Alternative 2

Basic Alternative 2 would provide additional water capacity of 11.7 MGd (44.3 MLd), which is anticipated to be met by an estimated 20 new wells at Andersen Air Force Base (AFB) and 11 new wells at Air Force Base Barrigada, rehabilitate existing wells, interconnect with the Guam Waterworks Authority (GWA) water system, and associated treatment, storage and distribution systems. Two new 1.8 MG (6.8 ML) water storage tanks would be constructed at ground level at NCTS Finegayan and one 1 MG (3.8 ML) water storage tank would be construction at Air Force Base Barrigada. Up to two new elevated 1 MG (3.8 ML) water storage tanks would be constructed at Finegayan within the Main Cantonment footprint.

Construction

The effects of the proposed actions under Basic Alternative 2 would be similar to those described under Alternative 1.

For information on impacts caused by population growth from the influx of off-island workers, see Volume 2, Chapter 9, Section 9.2.2.2.

Operation

The implementation of Basic Alternative 2 is limited to DoD lands where access is restricted to installation personnel and guests. Operation of the existing water supply wells and water storage tanks at Finegayan and Air Force Barrigada would not affect the function of the existing recreational resources that are near the project. Therefore, Alternative 2 would result in no impacts on recreational resources.

Proposed Mitigation Measures

No mitigation measures are needed.

11.2.3.3 Summary of Impacts

Table 11.2-2 summarizes the potential impacts of each interim alternative.

**Table 11.2-2. Summary of Potential Impacts on Recreational Resources – Potable Water**

<i>Basic Alternative 1*</i>	<i>Basic Alternative 2</i>
NI	NI
Recreational Resources (trails, historic and cultural attractions, dive sites, game hunting, fishing/crabbing, scenic points, golf course, day use resorts, spelunking, parks, beaches)	Recreational Resources (trails, historic and cultural attractions, dive sites, game hunting, fishing/crabbing, scenic points, golf course, day use resorts, spelunking, parks, beaches)

Legend: NI = No impact. \*Preferred Alternative.

The proposed alternatives for potable water, wherein new water supply wells would be developed at Andersen AFB and at Barrigada, and the construction of ground-level water storage tanks at Finegayan and Barrigada, would be confined to areas not within proximity to recreational resources. During the construction period, there may be slight delays on public right-of-ways (ROWs) due to the presence of construction-related vehicles; however, no direct impacts on the existing recreational resources in the proximity of the project locations are anticipated. The operation of the proposed features under either alternative would have no effect on the existing recreational resources.

## 11.2.4 Wastewater

### 11.2.4.1 Basic Alternative 1a (Preferred Alternative) and 1b

Basic Alternative 1 (Alternative 1a supports Main Cantonment Alternatives 1 and 2; and Alternative 1b supports Main Cantonment Alternatives 3 and 8) combines upgrade to the existing primary treatment facilities and expansion to secondary treatment at the Northern District Wastewater Treatment Plant (NDWWTP). The difference between Alternatives 1a and 1b is a requirement for a new sewer line from Barrigada housing to NDWWTP for Alternative 1b.

#### Construction

The proposed upgrade of the existing primary treatment facilities and expansion of the secondary treatment at the NDWWTP would be confined to the existing location. Although the Tanguisson Beach and Hilaan coastline are near the NDWWTP site, loss of access and use to these resources during the construction period is not expected. The proposed construction of wastewater facilities are not anticipated to have a direct impact on the existing recreational resources.

For information on impacts caused by population growth from the influx of off-island workers, see Volume 2, Chapter 9, Section 9.2.2.2.

#### Operation

The operation of the NDWWTP and Hagatna Wastewater Treatment Plant (WWTP) would not directly affect the access and use of nearby recreational resources because of the considerable distance from the point of wastewater outfall discharge to the near-shoreline area where recreational uses occur—particularly near Tanguisson Beach and the Hilaan coastlines (e.g., snorkeling, swimming, beachcombing) where NDWWTP is situated in proximity. Therefore, Basic Alternative 1a would result in less than significant impacts on recreational resources.

The construction workforce housing, in addition to the existing population serviced by the Hagatna WWTP, which is not proposed to be upgraded and/or expanded, would likely experience frequent sewer system overflows. Sewage spilling into marine and terrestrial recreational resources would likely result in temporary to permanent loss of access and use of recreational resources. Therefore, the operation of the existing indirect impact on recreational resources would be potentially significant.

### 11.2.4.2 Basic Alternative 1b

#### Construction

In addition to a sewer line proposed under Basic Alternative 1a, a new sewer line would be installed to convey wastewater generated from Barrigada housing to the NDWWTP. During the construction period, there may be slight delays on public ROWs in or near the Barrigada site caused by the presence of construction-related vehicles. Travel on affected roads may be delayed; however, direct impacts on recreational resources are not expected.

For information on impacts caused by population growth from the influx of off-island workers, see Volume 2, Chapter 9, Section 9.2.2.2.

#### Operation

The effects during the operational phase would be similar to those described under Basic Alternative 1a.

### Proposed Mitigation Measures

No mitigation measures are needed.

#### 11.2.4.3 Summary of Impacts

Table 11.2-3 summarizes the potential impacts of each interim alternative. An analysis of long-term alternatives was not developed because the alternatives are not ready for project-specific analysis.

**Table 11.2-3. Summary of Potential Impacts on Recreational Resources – Wastewater**

<i>Basic Alternative 1a*</i>	<i>Basic Alternative 1b</i>
Construction Impacts (direct and indirect are the same)	
NI No loss of access and use of recreational resources during construction.	NI No loss of access and use of recreational resources during construction.
Operation Impacts (direct with indirect in parentheses)	
LSI (SI) The operation of the existing facilities, upgraded or not, is not expected to inhibit the access and use of existing recreational resources. (Overflow of the sewer system, particularly into marine and/or terrestrial recreational resources, could result in temporary to permanent loss of access and use).	LSI (SI) The operation of the existing facilities, upgraded or not, is not expected to inhibit the access and use of existing recreational resources. (Overflow of the sewer system, particularly into marine and/or terrestrial recreational resources, could result in temporary to permanent loss of access and use).

*Legend:* LSI = Less than significant impact; NI = No impact; SI = Significant impact. \*Preferred Alternative.

The upgrade of the existing primary treatment facilities and the expansion of the secondary treatment facilities at the NDWWTP site involve site-specific work that would not impede the existing access to and the use of the recreational resources, which can be found at the nearby Tanguisson beach and the Hilaan coastline. Therefore, a direct impact on the existing recreational resources during construction period is not expected. The proposed installation of the new sewer line from Barrigada housing to NDWWTP would have similar effect on the ROWs and persons traveling by car to the recreational resource in the Barrigada area—during the construction phase only. No impacts on the recreational resources near the Barrigada area is anticipated during the operational phase. Under either alternative, the operation of the Hagatna WWTP, which would service the indirect permanent population in addition to the existing visitor and resident population, would likely experience overflows. In the event sewage overflows to marine or terrestrial recreational resources, access and use of these features would likely cease temporarily or permanently. These prospects would signal potentially significant indirect impacts on the existing recreational resources.

### 11.2.5 Solid Waste

#### 11.2.5.1 Basic Alternative 1 (Preferred Alternative)

The Preferred Alternative would be to continue to use the Navy Landfill at Apra Harbor for municipal solid waste (MSW) until the new GovGuam Layon Landfill at Dandan is available for use. Disposal of other waste streams excluded from Layon Landfill would continue at the Navy Landfill. Construction and demolition (C&D) debris would continue to be disposed at the Navy hardfill.

#### Construction

The proposed construction efforts for the planned Layon Landfill would likely be completed before the relocation of the Marines and their dependents to Guam. No impacts on the recreational resources are anticipated.

For information on impacts caused by population growth from the influx of off-island workers, see Volume 2, Chapter 9, Section 9.2.2.2.

### Operation

This alternative proposes the use of the existing Navy Landfill until the completion of the new Layon Landfill in July 2011. Continued use of the existing Navy Landfill is not expected to cause adverse impacts on the recreational resources as they are not situated within proximity. There are no recreational resources at the proposed Layon Landfill.

### Proposed Mitigation Measures

No mitigation measures are needed.

#### 11.2.5.2 Summary of Impacts

Table 11.2-4 summarizes the potential impact of the Preferred Alternative. A text summary is provided below.

**Table 11.2-4. Summary of Potential Impacts of the Preferred Alternative – Solid Waste**

<i>Basic Alternative 1</i>
NI
Recreational Resources (trails, historic and cultural attractions, dive sites, game hunting, fishing/crabbing, scenic points, golf course, day use resorts, spelunking, parks, beaches)

*Legend:* NI = No impact.

The existing Navy landfill near Apra Harbor is not situated in close proximity to the recreational resources in the area. Adverse impacts on the access to and the use of these resources as the result of continued operation of the landfill is not anticipated. Similar to the Navy Landfill, there are no recreational resources at or near the proposed Layon Landfill site. There are no impacts on the recreational resources anticipated with the implementation of the proposed actions.

#### 11.2.6 Off Base Roadways

This section addresses effects to non-public and public recreational facilities during the peak construction and post-construction periods (2014 to 2030). The analysis focuses on direct (e.g., land acquisitions, elimination of access, degradation of facilities) and indirect (e.g., degradation of use due to increased noise, traffic delays) temporary (i.e., construction) and permanent (i.e., operation) effects that could result with implementation of the proposed GRN under each alternative. Because the GRN projects are public works-type improvements, such as pavement strengthening (including some projects that could include widening), intersection improvement, road widening, road rehabilitation, bridge replacement, road relocation, and Military Access Point (MAP) construction, they generally include small to medium work crews and machinery. Most of the proposed improvements would be constructed within the public ROW or within existing DoD lands. Only a small number of projects that involve intersection improvement, road widening, and road relocation would require some ROW acquisition. Construction activities would include identifying and locating staging areas (e.g., machinery and material storage, equipment, trailers, employee parking); construction material and equipment transportation; site clearing and demolition, utility relocation, roadway/bridge construction, and finish work (e.g., landscaping, signage). Most of the environmental consequences associated with implementation of the proposed action would occur during construction. Once the construction is completed, its operation would be tested, including traffic signal system, communications systems, and associated equipment (if any) prior to actual usage of the roadways.

### 11.2.6.1 Alternative 1

The roadway projects that would be implemented for Alternative 1 are listed in Volume 6, Chapter 2, Table 2.5-3, with the exception of the following GRN projects: #38 (MAP), #39 (MAP), #41 (MAP), #47 (MAP), #48 (MAP), #49 (MAP), #49A (MAP), #63 (pavement strengthening), and #74 (pavement strengthening). The following subsections described impacts on recreation resources during the peak construction period and the future year 2030 due to the proposed roadway construction.

#### Year 2014 (Peak Construction and Population)

##### *North*

The proposed roadway improvement projects within the North Region are located along Routes 1, 3, 9, 15, and 28. There are no GRN projects that would result in either direct or indirect effects to recreational facilities located at Andersen AFB, including the Northwest Field area. These recreational facilities are located on base property north of the proposed GRN projects. In addition, access to these facilities is limited to installation personnel and their guests.

Route 3 provides the principal access to recreational opportunities in the western segment of the North Region (i.e., Dededo and Finegayan areas). Proposed improvements along Route 3 would include pavement strengthening, intersection improvements, road widening, and intersection improvements to MAPs. Recreational opportunities within this area are almost exclusively focused along the coast approximately 1.5 miles (mi) (2.4 kilometers [km]) from Route 3. One of the most popular tourist attractions within the North Region is Two Lovers Point. This tourist attraction can be accessed from Routes 1 or 3.

Routes 1 and 15 provide the principal access to recreational opportunities in the eastern segment of the North Region (i.e., Spring Hill Subdivision, Perez Acres, Gayinero, and Lupog). Proposed improvements along Routes 1 and 15 are limited to pavement strengthening and intersection improvements. Along Route 1, recreational activities are limited to a conservation reserve, golf course, and memorial park. Route 15 includes scenic vistas, historic/cultural attractions, and trails.

Temporary easements would be required along Routes 1, 3, 9, and 15 during the construction period. Temporary indirect impacts would result due to construction activities and may include traffic delays, lane closures, and rerouting of traffic. A Traffic Management Plan (TMP) would be developed for implementation during construction activities. The Guam Department of Public Works (GDPW) would closely coordinate with business and recreational facility owners to continuously provide them with information regarding construction schedules, anticipated traffic lane closures, and detour routes. The impacts are not considered adverse with incorporation of the TMP and coordination plan. Once the construction is completed, the availability of improved roadway conditions would help enhance these recreational opportunities in the North Region.

In addition to traffic delays and access obstruction, it is anticipated that indirect impacts on recreational resources could be derived from the increase in number of construction workers and indirect workers (such as workers in retail employment, hotel employment, and other service industries), which are anticipated to be over 35,000 during the peak construction period of the military facility expansion construction in 2013 (GDPW 2008). Most of these workers would come from off-island locations. The 2013 Construction Peak and 2015 Military relocation travel demand study prepared as part of the 2030 Guam Transportation Plan (GTP) traffic analysis (Appendix C of the GTP) assumed that off-island workers for construction-related jobs would live together at the area near the construction sites and would make trips only to the construction sites. These workers would be transported to the construction sites by

a fleet of passenger vans, shuttles, or buses. The travel demand study further assumed that off-island workers for indirect jobs (such as retail employment, hotel employment, and others) would not bring additional members of their families, but that they would actually live together forming households of various sizes to economize money. The analysis assumed that these workers would be responsible for their own transportation to and from their work locations and that they would make home-based other and non-home-based trips at the same rates as other Guam residents.

Construction of the proposed GRN projects would result in an increase in number of construction workers on a temporary basis, but would not result in the increase in the number of indirect workers. Using the same assumption as the GTP traffic analysis, the increase in number of construction workers during the peak construction year of the GRN project would not substantially affect the recreational and park facilities on Guam. Because these workers would return to their home base after the construction is completed, the indirect impact on recreational resources from construction workers is considered temporary and less than significant.

### *Central*

Road improvements within the Central Region would occur along Routes 1, 7, 8, 8A, 10, 15, 16, 25, 26, 27, and Chalan Lujuna Road. Most of the proposed improvements are pavement strengthening, with a few intersection improvements, road widening and road realignment.

There are no GRN projects that would result in either direct or indirect effects to recreational facilities on Navy Barrigada or Air Force Barrigada. These recreational facilities are located outside the area of the proposed GRN projects. In addition, access to these facilities is limited to installation personnel and their guests.

Route 1 provides the principal access to recreational opportunities in the western segment of the Central Region (i.e., Piti, Asan, Hagatna, Mongmong, and Tamuning). Proposed improvements along Route 1 include pavement strengthening, intersection improvements, bridge replacement, and intersection improvements to MAPs. Recreational opportunities along the western segment of the Central Region are largely comprised of beaches, trails, public parks, and scenic vistas. Portions of Route 1 are located immediately adjacent to or within close proximity to these recreational areas. Traffic congestion and travel delays could be expected during the peak construction year. A TMP would be developed for implementation during construction activities. The GDPW would closely coordinate with business and recreational facility owners to continuously provide them with information regarding construction schedules, anticipated traffic lane closures, and detour routes. The impacts are not considered adverse with incorporation of the TMP and coordination plan. Once the construction is completed, the availability of improved roadway conditions would help enhance the recreational opportunities in the Central Region.

Based on preliminary engineering design information, some minor parkland acquisition would be taken from three parks located along Route 1 to accommodate roadway construction, as summarized below.

- **Guam Seal Park** would be affected by GRN #3 (Agana Bridge Replacement) (see Figure 11.2-1). The bridge replacement limits are conceptual at this stage, and the affected land cannot be accurately estimated; however, based on the preliminary drawing, approximately 4,800 square feet (ft<sup>2</sup>) (1,463 square meters [m<sup>2</sup>]) or 0.10 acre (ac) (0.004 hectare [ha]) of land may be required.
- **Buffer Strip Park** would be affected by GRN #7 and GRN #6 intersection widening at Routes 1 and 27, and Routes 1 and 26 (see Figure 11.2-2). While the widening currently depicted can likely be adjusted to avoid most of the linear impact, the existing roadway at the

intersection with Route 27 appears to encroach on the park ROW by approximately 500 ft<sup>2</sup> (152 m<sup>2</sup>) or 0.010 ac (0.004 ha).

- **Chinese Park** would be affected by GRN #33 intersection widening at Routes 1 and 14 (see Figure 11.2-3). The existing ROW parcel line appears to indicate that the existing roadway is built partially inside the park ROW. Approximately 15,900 ft<sup>2</sup> (4,846 m<sup>2</sup>) or 0.36-ac (0.15-ha) of land would need to be acquired to correct this situation and to allow the intersection improvements.

The estimated acreage to be acquired at each of the above parks is subject to change during the detailed engineering design phase. Some design adjustment could also avoid impacts on the existing parkland. Any parkland acquisition would be coordinated between GDPW and GDPR. Because construction of the proposed improvement projects would be centered on the roadway intersection and corridor, no park closure is anticipated during the peak construction year. The impacts are not considered adverse with incorporation of the TMP and coordination plan described above. The use of public parks for transportation projects would be considered a use of Section 4(f) resources. Impacts on Section 4(f) resources are addressed in Volume 6, Chapter 21.

Routes 10 and 15 provide principal access to recreational opportunities in the eastern segment of the Central Region (i.e., Barrigada, Asbeco, and Adacao). Proposed improvements along Routes 10 and 15 include pavement strengthening, intersection improvements, roadway realignment, and intersection improvements at MAPs. As previously noted, recreational opportunities within this area are almost exclusively focused along the coast approximately 0.5 mi (0.8 km) to 1.5 mi (2.4 km) from Route 15.

Effects during construction in the Central Region would be similar to those described for the North Region. Once the construction is completed, the availability of improved roadway conditions would help enhance recreational opportunities in the Central Region.

#### *Apra Harbor*

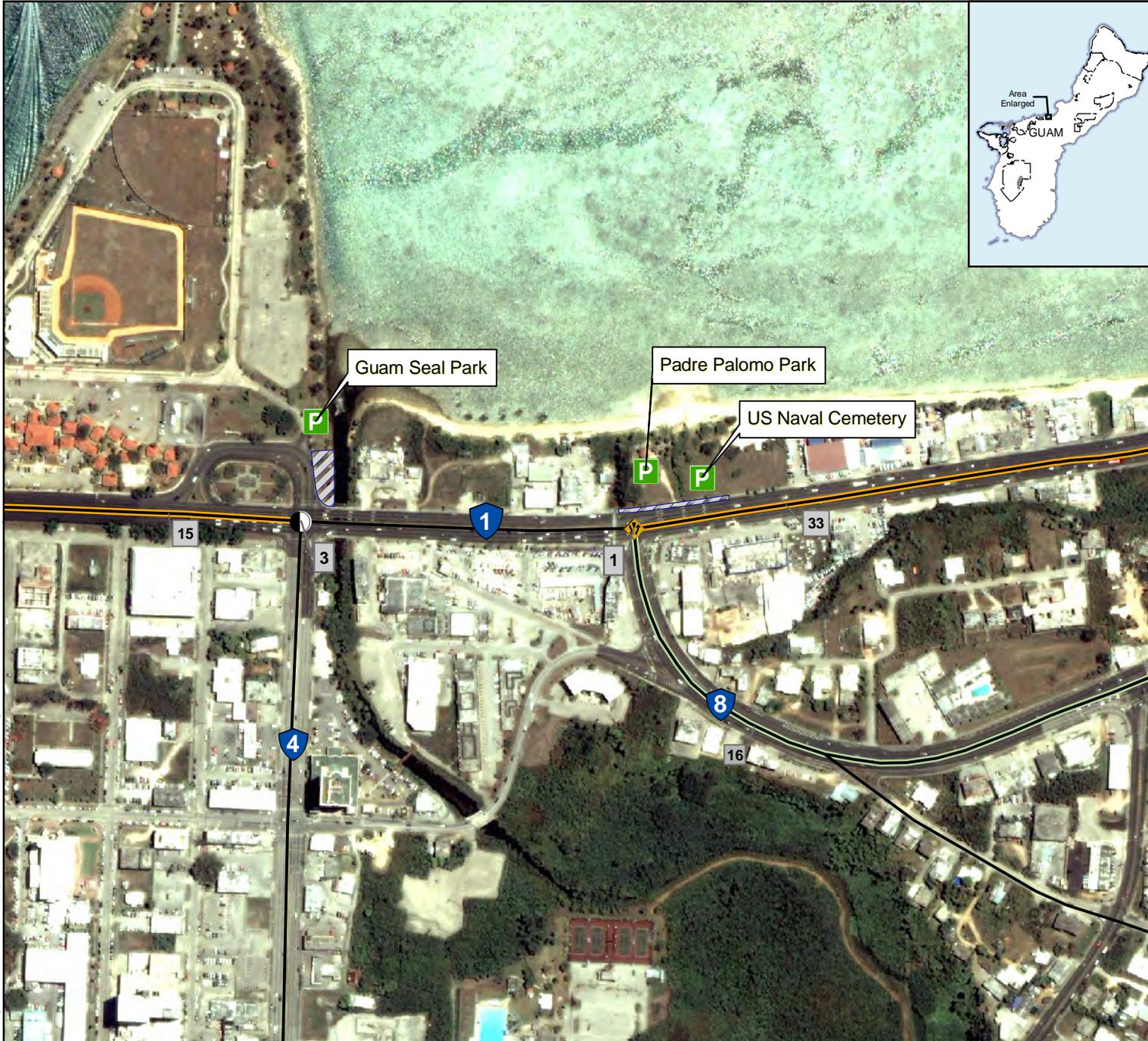
Road improvements within the Apra Harbor Region would occur along Routes 1, 2A, and 11. These improvements are limited to pavement strengthening, intersection improvements, and intersection improvements at one MAP.

There are no GRN projects that would result in either direct or indirect effects to recreational facilities within Naval Base Guam. These recreational facilities are located outside of the proposed GRN projects. In addition, access to these facilities is limited to installation personnel and their guests.

Routes 1 and 11 provide the principal access to recreational opportunities in the Apra Harbor Region (i.e., Piti). Proposed improvements along Route 1 include pavement strengthening, intersection improvements, rehabilitation, and a MAP at Naval Base Guam. Recreational opportunities in the Apra Harbor Region are largely limited to the Sasa Bay area and immediately northwest of Piti, which contains marine reserves and fishing areas. Portions of Routes 1 and 11 are located immediately adjacent to or within close proximity to these areas.

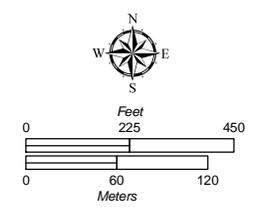
Effects during the construction period within the Apra Harbor Region would be similar to those described for the North Region. The impacts are not considered adverse with incorporation of the TMP and coordination plan described above. Once construction is completed, the availability of improved roadway conditions would help enhance the recreational opportunities in the Apra Harbor Region.

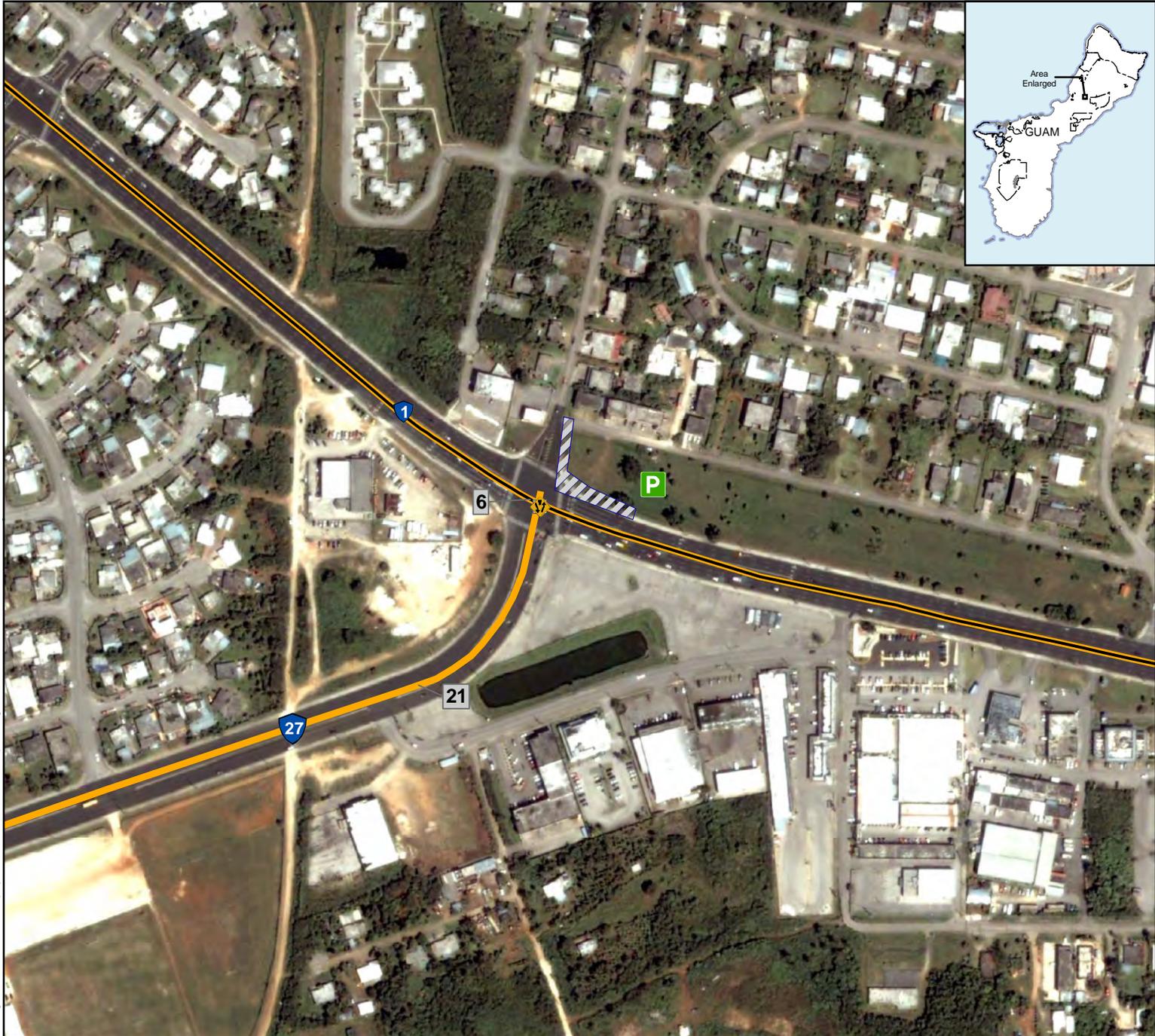
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**Figure 11.2-1**  
Potentially Affected  
Parkland in  
Central Region  
Sheet 1

- Legend**
-  Military Installation
  -  Route Number
  -  Project Locations and GRN#
  -  Bridge Replacement
  -  Intersection Improvement
  -  Pavement Strengthening
  -  Widening/Pavement Strengthening
  -  Park Locations
  -  Park Takes

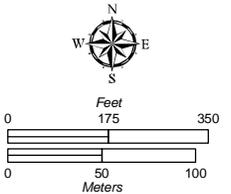




**Figure 11.2-2**  
Potentially Affected  
Parkland in  
Central Region  
Sheet 2

**Legend**

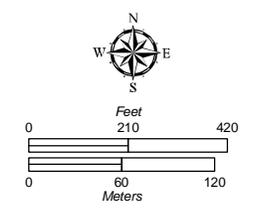
-  Military Installation
-  Route Number
-  Project Locations and GRN#
-  Intersection Improvement
-  Pavement Strengthening
-  Park Locations
-  Park Takes





**Figure 11.2-3**  
Potentially Affected  
Parkland in  
Central Region  
Sheet 3

- Legend**
-  Military Installation
  -  Route Number
  -  Project Locations and GRN#
  -  Widening/  
Pavement  
Strengthening
  -  Park Locations
  -  Park Takes



### *South*

Road improvements within the South Region include two pavement strengthening projects on Route 5, an intersection improvement on Route 2, and a MAP project at the Naval Munitions Site on Route 12 in the village of Santa Rita.

There are no GRN projects that would result in either direct or indirect effects to recreational facilities contained on the Naval Munitions Site. These recreational facilities are located outside the area of the proposed GRN projects. In addition, access to these facilities is limited to installation personnel and their guests.

Routes 2 and 17 provide the principal access to recreational opportunities in the South Region (i.e., Santa Rita, Agat, and Merizo). Proposed improvements along Route 2 are limited to intersection improvements. There are no improvements proposed for Route 17. Recreational opportunities in the South Region are largely limited to hiking trails, scenic vistas, and beaches/parks. Portions of Route 2 are located immediately adjacent to or within close proximity to these areas.

Effects during the construction period within the South Region would be similar to those described for the North Region. The impacts are not considered adverse with incorporation of the TMP and coordination plan described above. Once the construction is completed the availability of improved roadway conditions would help enhance the recreational opportunities in the South Region.

#### Proposed Mitigation Measures

- The GDPW would develop a TMP for implementation during construction activities. The TMP would identify and provide alternate traffic detour routes, construction materials hauling routes, bus stops, transit routes and operation hours, pedestrian routes, and residential and commercial access routes to be used during the construction period.
- The GDPW would develop an outreach program to keep residents, businesses, and any service providers within the area updated, and to inform surrounding communities about the project construction schedule, relocation plans and assistance programs, traffic-impacted areas and the TMP, and other relevant project information.
- To the extent applicable, engineering design would take into consideration avoidance of acquisition of public recreational facilities, such as parkland.

#### Year 2030

### *North*

As described previously, the proposed GRN improvements are largely public works-type projects that are designed to enhance and improve the roadway system of Guam. No land acquisitions or permanent access closures for either public or non-public facilities are proposed that would result in permanent adverse effects to recreational opportunities contained within the North Region. In certain instances, some roadway improvements may result in long-term beneficial effects where access may previously be limited or in poor condition.

### *Central*

As mentioned in the impact section under Year 2014, three public parks located along Route 1 would be affected by minor ROW acquisitions to accommodate the proposed intersection improvements and road widening; however, no permanent closure of these parks is anticipated. Land acquisition would be

required that would affect the existing three parks, however, the land to be acquired is less than 0.5 ac and would not affect the long-term use of the facilities.

#### *Apra Harbor*

Effects during the operation period within the Apra Harbor Region would be similar to those described for the North Region.

#### *South*

Effects during the operation period within the South Region would be similar to those described for the North Region.

#### Proposed Mitigation Measures

No mitigation measures would be required.

##### 11.2.6.2 Alternative 2 (Preferred Alternative)

The roadway projects that would be implemented for Alternative 2 are listed in Volume 6, Chapter 2, Table 2.5-3 with the exception of the following GRN projects: #38A (MAP), #39A (MAP), #41A (MAP), #47 (MAP), #48 (MAP), #49 (MAP), #49A (MAP), #63 (pavement strengthening), and #74 (pavement strengthening). Peak construction and long-term impacts on recreation resources under Alternative 2 would be similar to those described under Alternative 1 because the same projects are proposed under this alternative with the only difference being gate location for the MAP projects which have no impact on existing recreational resources. Best Management Practices as listed in Alternative 1 would be implemented.

#### Proposed Mitigation Measures

Mitigation measures would be similar to Alternative 1.

##### 11.2.6.3 Alternative 3

The roadway projects that would be constructed under Alternative 3 are listed in Volume 6, Chapter 2, Table 2.5-1 with the exception of the following GRN projects: #38A (MAP), #39A (MAP), #41 (MAP), #41A (MAP), #20 (pavement strengthening), #31 (pavement strengthening), and #124 (new roadway). Impacts on recreation from construction activities under Alternative 3 in 2014 during peak construction would be slightly less than Alternatives 1 and 2 because no new roadway (GRN #124) would be constructed under this alternative. However, beneficial impacts on recreational enhancement would be slightly less than Alternatives 1 and 2 due to unavailability of roadway to support the planned land-use development within the Dos Amantes Planning Area.

#### Proposed Mitigation Measures

Mitigation measures would be similar to Alternative 1.

##### 11.2.6.4 Alternative 8

The roadway projects that would be constructed under Alternative 8 are listed in Volume 6, Chapter 2, Table 2.5-1 with the exception of the following GRN projects: #38 (MAP), #39 (MAP), #41 (MAP), #47 (MAP), #48 (MAP), #49 (MAP), #63 (pavement strengthening), and #74 (pavement strengthening). In general, the MAP and pavement strengthening projects would not cause significant impact to recreational facilities. Therefore, impacts on recreation under Alternative 8 in 2014 during peak construction would be similar to those described under Alternative 1 because the same projects are proposed under this

alternative with the exception of GRN# 49A, which is a MAP project. In the long-term beneficial impacts on recreation facilities under Alternative 8 would be similar to Alternatives 1 and 2.

#### Proposed Mitigation Measures

Mitigation measures would be similar to Alternative 1.

##### 11.2.6.5 No-Action Alternative

#### 2009

Under the no-action alternative, only some roadway improvements would be constructed by the Government of Guam to support normal growth within the island. Because the no-action alternative would include no roadway improvement project in year 2009 (baseline year), construction impacts on recreational facilities under this alternative would be less than significant compared with each of the build alternatives described above.

#### 2014

Construction activities for improvement projects to be completed by the Government of Guam would be typical of public works maintenance projects, as listed in Volume 6, Chapter 2, Table 2.5-10. Because the no-action alternative would include only seven roadway improvement projects (compared to the number of GRN projects) to be constructed by the year 2014, construction impacts on recreation facilities under this alternative would be less than the level to be incurred under each of the build alternatives described above. Under the no-action alternative, minor parkland acquisition could be required for some roadway improvement projects, but the acquisition is not anticipated to be a greater impact than the proposed GRN project. Therefore, the impacts on recreational facilities under the no-action alternative would be less than significant.

#### 2030

Under the no-action alternative, an additional 20 roadway improvements would be phased for construction over the period between 2014 and 2030 (Volume 6, Chapter 2, Table 2.5-10). Construction activities of the improvement projects would be typical of public works projects. Under the no-action alternative, minor parkland acquisition could be required for some roadway improvement projects, but the acquisition is not anticipated to be a greater impact than the proposed GRN project. Therefore, impacts on recreation facilities under the no-action alternative would be less than significant.

#### Proposed Mitigation Measures

Mitigation measures would be similar to Alternative 1 for each roadway improvement project proposed to be constructed.

##### 11.2.6.6 Summary of Impacts

Table 11.2-5 summarizes the potential impacts of each alternative.

Implementation of the proposed roadway improvement projects would result in disruption of recreational opportunities situated along the roadway corridors during the construction period. This impact would be temporary and would cease after the construction activity is complete. To accommodate the proposed improvements, some parkland along certain roadway corridors would be subject to acquisition, but none of the improvements would result in severe disruption of recreational opportunities or permanent closure of any parkland. Roadway improvements around the island would essentially enhance long-term recreational opportunities on Guam.

**Table 11.2-5. Summary of Potential Impacts on Recreational Resources – Roadway Project**

<i>Potentially Impacted Resource</i>	<i>Alternative 1</i>	<i>Alternative 2*</i>	<i>Alternative 3</i>	<i>Alternative 8</i>
Disruption of recreational opportunities during peak construction	SI-M	SI-M	SI-M	SI-M
Disruption of long-term recreational opportunities	LSI	LSI	LSI	LSI
Enhancement of long-term recreational opportunities	BI	BI	BI	BI

*Legend:* BI = Beneficial impact; LSI = Less than significant impact; SI-M = Significant impact mitigable to less than Significant. \*Preferred Alternative.

11.2.6.7 Summary of Proposed Mitigation Measures

Table 11.2-6 summarizes the proposed mitigation measures for roadway projects impacts on recreation.

**Table 11.2-6. Summary of Proposed Mitigation Measures for Roadway Projects Impacts on Recreation**

<i>Phase</i>	<i>Mitigation Measure</i>
Construction	<p>Engineering design to consider avoidance of acquisition of public recreational facilities.</p> <p>Traffic Management Plan to identify/provide alternate:</p> <ul style="list-style-type: none"> <li>• Traffic detour routes</li> <li>• Construction material haul routes</li> <li>• Bus stops</li> <li>• Transit routes and operating hours</li> <li>• Pedestrian routes</li> <li>• Residential/commercial access routes</li> <li>• Outreach Program to inform residents, businesses, service providers, and communities of:</li> <li>• Project construction schedules</li> <li>• Relocation plans</li> <li>• Assistance programs</li> <li>• Areas affected by traffic</li> <li>• Other relevant information</li> </ul>
Operation	None

Implementation of the adaptive program management and force flow mitigation measures could further reduce roadway projects impacts on recreation by lowering peak population levels during construction. See Volume 7 for a full description of these two mitigation measures.

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