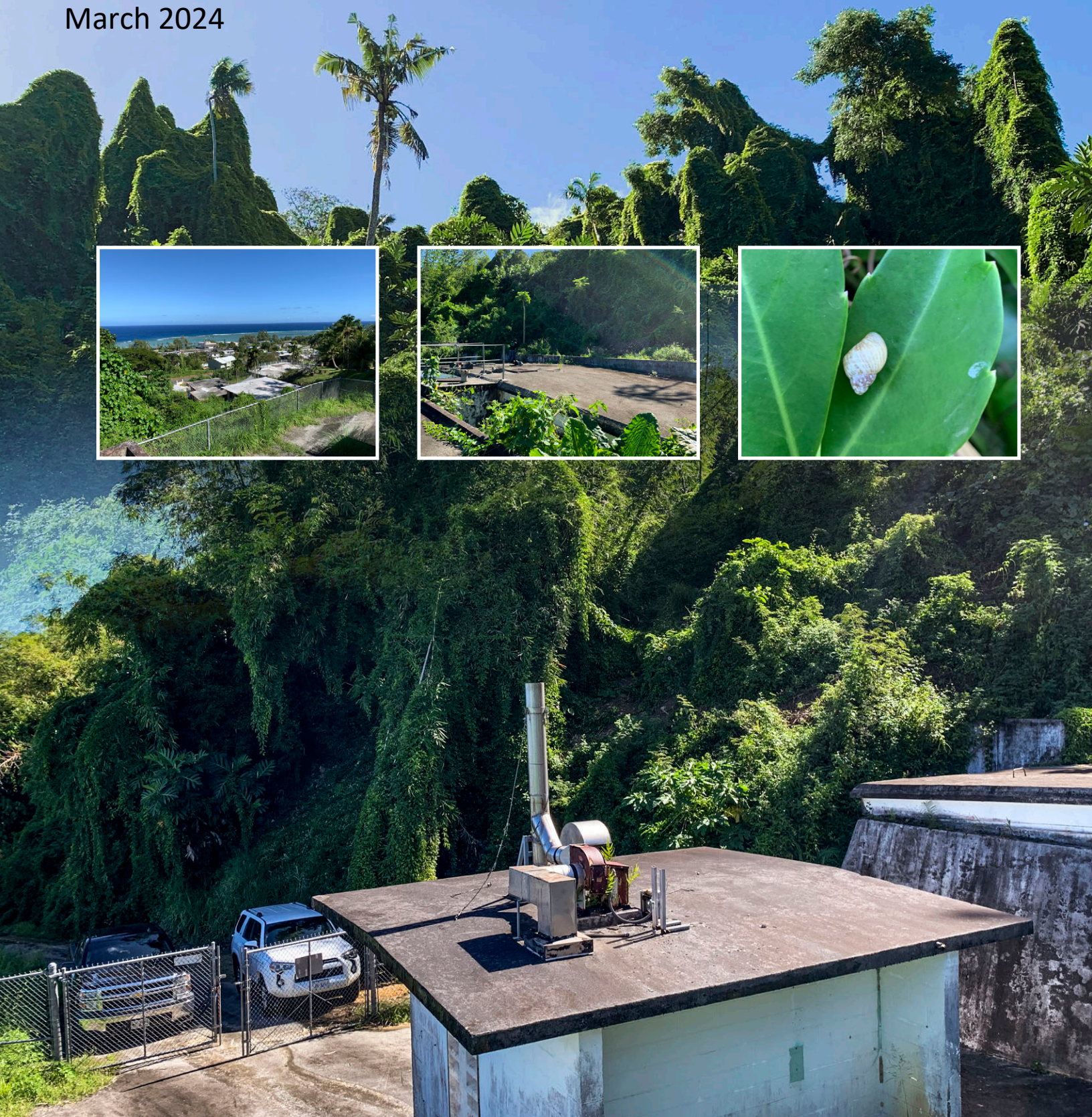




Restore Asan Springs Water Supply Facility

Environmental Assessment

March 2024



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CHAPTER 1: PURPOSE AND NEED

1.1 INTRODUCTION

The Guam Waterworks Authority (GWA), the project proponent, is proposing to restore the Asan Springs Water Supply Facility to increase input to the Agana-Asan-Piti Integrated Water Supply and Storage System to meet water supply demands. GWA Project No. W11-003-BND was established for the restoration project and was originally funded with a grant from the U.S. Department of the Interior for the initial design for the rehabilitation of the Asan Springs Site. The grant was closed after partly being used for design, and the remainder of the project is being funded by GWA bonds.

The National Park Service (NPS) is reviewing a request by GWA to restore the Asan Springs Water Supply Facility, which is partially on NPS lands in the village of Asan in west-central Guam. The project would involve rehabilitation and replacement of existing components, and installment of new components to collect, treat, and distribute potable water to the village of Asan (the Project). The Asan Springs Site and proposed NPS right-of-way (the Project Area) are located on a steep slope between Asan and Nimitz Hill and is partially on land owned by the NPS within the Asan Inland Unit of the War in the Pacific National Historical Park (the Park). The NPS is the lead federal agency for approval of the Project. The Asan Springs water supply system consists of several buildings surrounded by a fence enclosure. Figure 1 shows the Project Area near Asan, and Figure 2 shows the surface portion of the system. The Project Area is 1.08 acres, and the property is owned by GWA and NPS.

The Asan Springs Reservoir has been a key component of the water system of Asan and the surrounding area on the Island of Guam. The concrete reservoir (the impoundment structure with roof shown in the expanded inset image in Figure 2) was constructed by the U.S. Navy in February 1916 to impound the flow from Asan Springs. A concrete overflow spillway along the front retaining wall of the reservoir drains to an open-top collection basin that routes the overflow water into a buried storm drainage pipe extending northeast. By the late 1950s to early 1960s, the gravity fed system was changed to a pump system. Around 1972, a pump house building with a chlorinator room was constructed. Around 1994, a new pump house building and separate chlorinator building were constructed, replacing the demolished former pump house. The Agana-Asan-Piti Integrated Water Supply and Storage System project, constructed around 1982, installed a new 6-inch-diameter water line from the Asan Springs Site to a new water reservoir.

The system was eventually transferred to GWA and operated until 2004. Then the system was shut down due to bacterial contamination and inadequate chlorination to treat the water. Infiltration in the impoundment structure led to contamination of the water supply. A Notice of Violation and Compliance Order from the Guam Environmental Protection Agency (GEPA) was issued on January 28, 2004, which decreed that the system would be closed until the contamination deficiency was corrected. Samples had identified the presence of total and fecal coliform bacteria at the distribution system, with the absence of the required chlorine residual. Although the potable water system has been shut down, water seeping from Asan Springs continues to be collected in the impoundment structure and drains through existing storm drainage piping in Asan, with discharge as stormwater to the Asan River and then to the Philippine Sea.

PURPOSE AND NEED





GUAM WATERWORKS AUTHORITY

EXISTING FACILITY CLOSE-UP ASAN SPRINGS WATER SUPPLY FACILITIES

FIGURE 2

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1.2 PURPOSE OF AND NEED FOR ACTION

As lead federal agency overseeing the Project, the NPS's purpose is to respond to the right-of-way request (and associated facility upgrades on NPS lands) for the Project and meet the NPS's legal mandate under 54 United States Code § 100902(a) and park-specific enabling legislation, as applicable. The NPS's need is to determine the option for the project proponent that would have the least damaging and non-significant impacts to NPS resources.

GWA's purpose of the Project is to restore the Asan Springs Water Supply Facility to increase input to the Agana-Asan-Piti Integrated Water Supply and Storage System to meet water supply demands in the villages of Hagåtña, Asan-Ma'ina, and Piti. GWA's need for the Project is to provide a clean, dependable water source that meets drinking water quality standards and corrects deficiencies previously documented by GEPA. Additionally, this Project would provide a sustainable resource for the villages to support an elemental community and human need for a dependable water resource. The restored system would reduce the need for additional infrastructure (wells and pumping systems) to deliver water from the north side of the island to this area. Alternatively, there would be a need to purchase water from the U.S. Navy to be supplied to the villages that would have received water from Asan Springs.

1.3 ISSUES AND CONCERNS AND IMPACT TOPICS

Issues are "problems, concerns, conflicts, obstacles, or benefits that would result" if either the no-action alternative or the proposed action is implemented (NPS 2015). Impact topics are resources of concern that could be affected, either beneficially or adversely, by implementing the proposed action.

1.3.1 Issues and Concerns

During the scoping process, specific issues and concerns were identified as critical to this Project. Along with the purpose of and need for the proposed action, these issues and concerns guided the development of alternatives and contributed to the selection of impact topics analyzed in detail in this environmental assessment (EA). Some issues and concerns were raised during scoping that were dismissed from detailed analysis because it was determined they were not central to the proposed action, the resource does not occur in the area, a detailed analysis is not required to choose an alternative, the resource is not a big point of contention among the public or resource agencies, or there would be no measurable change to the resource. The issues and concerns that were identified are discussed in the following sections.

Cultural Resources

Asan Springs is a component of the Asan Village Site (Guam Historic Property Inventory [GHPI] number 66-01-0153), a historic district that is eligible for listing in the National Register of Historic Places (NRHP) as an area of early habitation. The Asan Springs Reservoir (GHPI number 66-01-2898) was also determined eligible for listing in the NRHP (including the reservoir, buildings, and associated infrastructure), and was reviewed for recordation purposes in Historic American Engineering Record (HAER) No. GU-10 (Ruzicka 2016). The Asan Springs Water Supply Facility is also encompassed by the Asan Ridge Battle Area (GHPI number 66-01-1056), listed in the NRHP (NRHP # 75001916) as a military historic district associated with World War II. Although there are no documented archaeological sites in the Area of Potential Effects (APE), an Archaeological Monitoring and Discovery Plan (AMDP) for the Project was prepared and provided to the Guam State Historic Preservation Office (GSHPO), and was previously accepted. Coordination with GSHPO in December 2021 indicated that because some recent projects had not done the required monitoring, NPS makes sure that a construction contractor works with a qualified archaeologist on site with protocols to ensure execution of the AMDP.

Protected Species

Coordination was conducted in March 2021 with the U.S. Fish and Wildlife Service (USFWS) and June 2021 with the Guam Department of Agriculture regarding threatened and endangered species potentially occurring within and near the Project Area. Per section 7 regulations, the Action Area, is defined as “all areas to be affected directly or indirectly by the Federal Action and not merely the immediate area involved in the action.” *Partula radiolata* (Guam tree snail; federally listed as endangered and Guam listed) has been observed within the Action Area. The following federally listed species have not been observed in the Action Area, but were considered to have the potential to occur within or near the Action Area: *Bulbophyllum gamense* (Cebello halumtano; threatened), *Cycas micronesia* (Fadang; threatened), *Dendrobium guamense* (no common name given; threatened), *Nervilia jacksoniae* (no common name given; threatened), *Solanum guamense* (Berenghenas halomtano; endangered), *Tinospora homosepala* (no common name given; threatened), *Tuberolabium guamense* (no common name given; threatened), *Partula gibba* (humped tree snail; endangered), *Samoana fragilis* (fragile tree snail; endangered), and *Pteropus mariannus mariannus* (Mariana fruit bat; threatened). Coordination with USFWS and the Guam Department of Agriculture identified the need to prepare and submit a Biological Assessment (BA) to address potential impacts on the Guam tree snail and Mariana fruit bat. The other species were evaluated and determined to not have the potential to occur in the Action Area. Consequently, through coordination with USFWS and Guam Department of Agriculture, the other species were eliminated from further analysis. The proposed action would have no effect on these other species. Many species in Guam do not have a common name. For the purposes of this EA, species are referred to by their common name when possible; however, species without a common name are referred to by their scientific name.

Water Resources

The Project is needed to address water supply and water quality issues regarding the previous potable water recovered, stored, and treated from Asan Springs.

Hazardous Materials

The water treatment process uses hazardous materials, including chlorine for purifying water and eliminating harmful bacteria, and diesel fuel for generators as back-up power to maintain the water treatment system during power outages.

1.3.2 Impact Topics Retained for Analysis

Based on the issues and concerns discussed in Section 1.3.1, four impact topics are analyzed, with subtopics included for each. The impact topics retained for analysis are cultural resources, protected species, water resources, and hazardous materials, as discussed in the following sections.

Cultural Resources

Following NPS guidance on resource types, cultural resources are discussed as the subtopics of archaeological resources (that is, remnants of human presence), historic structures (that is, examples of human productive ability and artistic sensitivity), and cultural landscapes (that is, settings humans have created in the natural world) (NPS 1998). Cultural landscapes address the vista of the War in the Pacific and the Asan Springs Water Supply Facility. The proposed action would occur within the Asan Ridge Battle Area, which is listed in the NRHP, and the Asan Village Site, a historic district that is eligible for listing in the NRHP.

Protected Species

One protected threatened and endangered species—the federally listed endangered Guam tree snail—is present in the Action Area. The proposed action would potentially affect areas of vegetation within 10 meters of several locations where Guam tree snails have been observed. The Mariana fruit bat, which is federally listed as threatened, has the potential to occur within the Action Area based on the presence of

suitable habitat. Future maintenance activities would include vegetation clearing to prevent encroachment within the facility boundaries. Per coordination with and approval by USFWS in consideration of species for detailed evaluation, a BA was prepared to address potential impacts on the Guam tree snail and Mariana fruit bat. A BA focuses on species that may be affected by the Project. Only one protected species, the Guam tree snail, was observed. Tree species were present that have been recorded being used for Mariana fruit bat foraging and roosting. Consequently, the BA was developed solely for those two species.

Water Resources

Given that the proposed action is for capturing, treating, and providing water, water resources is an impact topic retained for analysis, both in consideration of water quantity and water quality. Short-term localized impacts on water quality are possible from increased sediment loads during construction and vegetation clearing. In accordance with NPS *Management Policies* (2006), best management practices (BMPs) would be used for all phases of construction activity, including pre-construction, construction, and post-construction.

Wetlands and other waters of the United States (waters of the U.S.) were not evaluated because the Project would not modify the character, scope, or size of the original fill of a Water of the U.S. Through coordination with USACE, a Section 404 permit would not be required (see Chapter 4).

Implementation of required erosion and sediment controls would minimize impacts on water quality during construction. The erosion and sediment controls would be designed as part of the Stormwater Pollution Prevention Plan, which would be required for the National Pollutant Discharge Elimination System permit.

Hazardous Materials

The proposed action would involve the use of hazardous materials during construction, including fuels for vehicles transporting workers, fuels for construction equipment, paint, and other miscellaneous construction materials. Operation of the Asan Springs water supply system would involve treatment of the water with chlorine gas stored in gas cylinders, and emergency generator use with diesel fuel on an occasional basis.

1.3.3 Impact Topics Dismissed from Further Analysis

The following topics have been dismissed from further analysis of impacts based on the rationale provided for each in consideration of the NPS NEPA Handbook (NPS, 2015). BMPs addressing applicable resource topics are included in Appendix A, Resource Protection Measures.

Air Quality

Short-term, localized emissions would be generated from construction activities and equipment, but the impacts would be minor. There are no air quality issues in or near the Project Area. Consequently, air quality was dismissed from further review in this EA. BMPs for protecting air quality (such as maintenance of construction equipment and not allow extended idling) would be implemented (see Appendix A).

Sound (Noise Impacts)

Short-term, localized construction noise would cause minor adverse effects on residents and visitors in the typically quiet areas of the Asan Inland Unit. BMPs, including mufflers on construction equipment, would be implemented to limit noise. Night construction would not occur as part of this Project, and construction would end at least 30 minutes before sunset. Sound (noise impacts) was dismissed from further review in this EA (see Appendix A).

Vegetation

Vegetation clearing is required for construction and maintenance of the proposed facility improvements. Because vegetation can provide habitat for threatened and endangered species, a biological survey was conducted within a 30 meter buffer of the Project Area, identified the vegetation, and confirmed suitable habitat was present for two protected species. A total of 21 plant, 2 bird, 1 reptile, 5 insect, and 2 mollusk

species were observed during the field survey, but only one species (Guam tree snail) was listed as endangered by USFWS and protected by the Endangered Species Act. (HDR 2021). The protected species and their habitat were carried forward for detailed evaluation, as indicated in Section 1.3.2.

Vegetation clearing activities would follow applicable BMPs (see Appendix A). No protected species of vegetation was detected in the project area during a biological survey for the Project. Vegetation will be cleared for construction of the concrete swale. All disturbed areas would be revegetated with grass or native vegetation as appropriate and necessary (NPS 2022b). A 20-foot-wide buffer around the concrete swale would be maintained as low grass through regular mowing. Mowing is expected to be required every month at a minimum. Vegetation management has been incorporated into the conservation measures for threatened and endangered species for the proposed action. The BMPs and conservation measures discussed in the 2022 Biological Assessment for Asan Springs Water Supply Facility Rehabilitation would be implemented prior to, concurrent with, and following construction (see Appendix A) (NPS 2022b). Vegetation was dismissed from further review in this EA.

Invasive Species

Invasive species were not identified as an issue or a concern. Invasive species would be addressed as part of BMPs during construction and through the revegetation plan. Therefore, this impact topic was dismissed from further review in the EA. Revegetation with grass or a native species mix, and BMPs within reconstructed lands are described as part of the proposed action (see Chapter 2) and addressed in Appendix A.

Migratory Birds

Although a biological survey did not identify the presence of migratory birds in the survey area, migratory birds are present on Guam and would be addressed as part of BMPs to avoid harming nesting birds during construction (see Appendix A). Therefore, this impact topic was dismissed from further review in the EA.

Unique Ecosystems or Important Fish or Important Wildlife Habitat

The site does not contain ecological critical areas or unique natural resources. Therefore, the Project would not affect these resources as referenced in the Wild and Scenic Rivers Act, NPS *Management Policies* (2006), 40 Code of Federal Regulations (CFR) 1508.27, or the 62 criteria for national natural landmarks (36 CFR 62.5). Unique ecosystems and important fish and important wildlife habitat is dismissed from further review.

Geology

Minimal new subsurface disturbance would be required for the proposed action. Excavation to a depth of approximately 6 feet would be required for installation of a new underground chlorine contact time 30-inch pipe. Several existing facilities would be demolished and reconstructed, but the extent of disturbance would occur primarily within the previously disturbed area and to previously disturbed depths. No known contamination exists in soils from past operation of the facilities, or demolition from previous structures. Therefore, geology is dismissed from further review.

Lightscaapes

At the existing facility, the lighting that was used in the past is not currently used. A similar extent of lighting is proposed for the restored facility. Exterior lighting for the facility would be provided through exterior lights attached to the chlorination and the pump buildings above the doorways and below the soffit of the buildings, providing dark night protection. Of the building exterior lighting, there is only one fixture on each the pump building and new chlorination building that would be within NPS property. Consequently, the lightscape would be improved comparable to the past situation, and the topic of lightscaapes is dismissed from further review. BMPs for more modern lighting and dark night protection are included in Appendix A.

Viewsheds

The existing facility is on a hillside above the village of Asan. Due to heavy vegetation and the slope of the hillside, the facility is difficult to observe from Asan. Other than the addition of the swales to capture seepage, the facility area would be comparable. Given the slope and heavy vegetation present in the Project Area, the viewshed would change negligibly and is dismissed from further review.

Socioeconomics

Based on the small Project Area, and limited scope for this Project, there would not be disproportionately high and adverse human health or environmental effects to minority or low-income populations as a result of a proposed project. The proposed action would involve construction for approximately 12 months, involving employment of a construction contractor. The Project would generate local income during construction through construction contractor employment, and possibly during operation if additional staff are needed to operate and maintain the facility in addition to all the other facilities being operated and maintained by GWA. Based on the limited duration and extent of the Project, and minimal staff to operate the facility, socioeconomics is dismissed from further review.

Visitor Use and Experience

A component of the Asan Springs facility is within land owned by NPS but does not include any developed visitor use areas in the park such as the Piti Guns Unit and Asan Bay Overlook. When previously active, the Asan Springs facility itself was not designated for visitor use, and the proposed action would not modify the facility for visitor use. Consequently, visitor use and experience are dismissed from further review.

Recreational Resources

The current facility does not include any recreational resources, and the projected footprint of the restored facility would not include any recreational resources. No current or planned recreational resources are adjacent to the Project. Therefore, recreational resources are dismissed from further review.

Land Use

The current land use of the Project Area includes jungle, the existing GWA Asan Springs Facility, and residential area with streets. A component of the land of the Asan Springs Facility, as well as some other land needed for upgrading the facility, is within the boundaries of the Park property owned by NPS. The proposed action would cause a negligible change in land use in the Project Area. An electrical conduit would be placed underground through a parcel north of the facility, and the facility would undergo improvements for water capture adjacent to the existing improvements. Land previously used for past water supply capture, treatment, and distribution would be used similar to past use. Therefore, land use is dismissed from further review.

CHAPTER 2: ALTERNATIVES

2.1 INTRODUCTION

This chapter describes the alternatives that were considered for the Project. A range of alternatives were identified, and a screening process was used to eliminate alternatives due to environmental, engineering, and cost considerations. The proposed action was developed to address the purpose of and need for the Project. The no-action alternative is also considered. The required mitigation measures to be incorporated into the proposed action are found in Appendix A.

2.2 ALTERNATIVES

2.2.1 No-Action Alternative

Under the no-action alternative, which represents the status quo, the Asan Springs water supply system would not be restored, and the community would continue to use the existing supply system. GWA would continue to maintain the facility by maintaining distribution lines passing through the site and clearing vegetation within the fenceline. There is no power at the site, and thus no lighting or maintenance of power or lighting occurring. Water seeping from Asan Springs would continue to be collected in the impoundment structure and drain through existing storm drainage piping in the village of Asan, with discharge as stormwater to the Asan River and then to the Philippine Sea. The village of Asan is not close to any existing source water location currently being used to deliver safe drinking water. Consequently, Asan customers would continue to have reduced reliability due to any failure that may occur along the distribution system. GWA would continue to purchase potable water from the U.S. Navy to supplement any deficiencies that it may encounter with its existing distribution system. The purchase price of U.S. Navy-supplied water is higher than the current costs for GWA to pump and deliver water, ultimately leading to rate increases for the customers to cover those additional costs. The NPS does not currently conduct any land, vegetation, or other management or maintenance activities in the location of the proposed project, and does not plan to change those practices in the future. GWA would continue to perform vegetation clearing within the fenceline and maintain pipelines within the facility that are connected to the water distribution system.

Although the no-action alternative would not meet the project proponent's purpose and need, it is carried forward for evaluation in this EA. Under the no-action alternative, the NPS purpose of responding to a right-of-way request would not be applicable. The no-action alternative would result in environmental resource and cost impacts, and serves as a benchmark for comparing impacts of the proposed action.

2.2.2 Proposed Action (NPS Preferred)

The proposed action would rehabilitate the existing impoundment structure by removing and replacing in-kind the plaster finish that was installed on the original exterior front face wall of the impoundment structure. The structural concrete deficiencies inside the impoundment structure would be repaired by applying epoxy bonding materials. Additional modifications would be made to the roof structure. The modifications include sealing unnecessary roof penetrations that were used for pumping operations and adding safety features such as a stainless-steel railing and manhole ladders to access the internal features of the structure. Figure 3 shows the location of the Asan Springs facility and the features of the proposed improvements.

These water supply system improvements include abandoning and installing a new concrete electrical duct bank from the north side of Lot 7, Block 9 from an existing transformer to the Asan Springs Site. Figure 3 shows the location of Lot 7, north and downgradient of the Asan Springs facility. It is anticipated that Lot 7 would have limited vegetation clearing for installation of the duct bank; however, Lot 7 is anticipated to

possibly have greater vegetation clearing in areas to accommodate staging and large vehicular access, such as concrete trucks. The total area within the potential vegetation clearing boundary is approximately 0.3 acres.

These system improvements do not include installation of new water distribution piping to Asan. This modification of the system would connect to an existing water line inside the Asan Springs Site, with no planned modifications to the water line outside the Asan Springs Site that serves Asan.

Because of the lack of as-built information on the original structure, it is unknown what original piping may still exist within the site, including underground. During construction, some of these original pipes may be encountered, but it is assumed that they have all been abandoned in place. If further information reveals that these pipes were not properly abandoned, then field modifications would be made to properly abandon these pipes in place.

Proposed Demolition

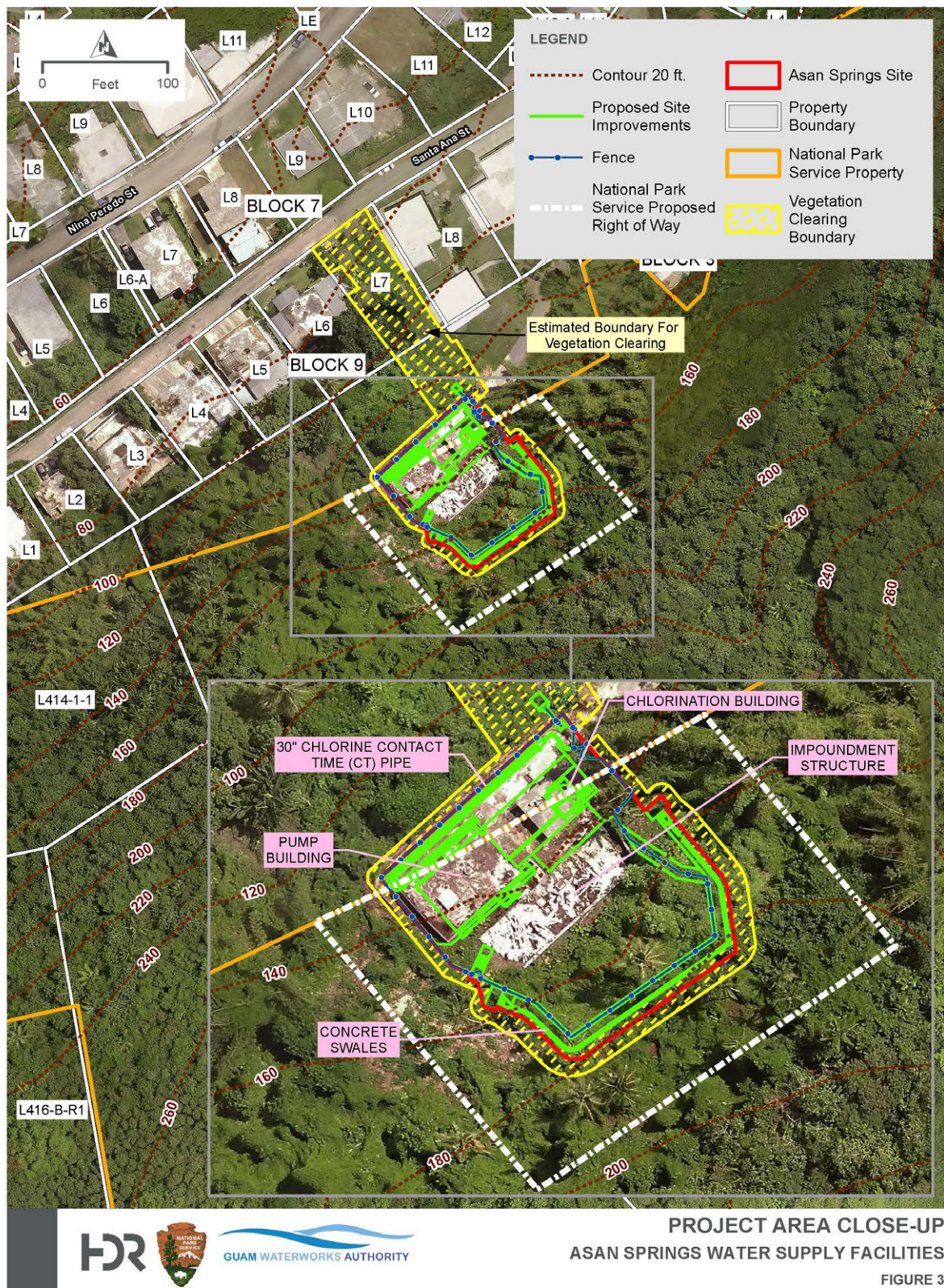
The following items would be removed during demolition activities:

- The 8-inch-diameter piping that supplies water to the water booster pump station building from the outlet structure
- The chlorine building structure and foundation
- The roof appurtenance at the water booster pump station
- The 8-inch-diameter water line and associated gate valves outside of the pump station building and exiting the Asan Springs Site
- The piping, valves, and concrete box adjacent to the chlorination building
- The water level appurtenance
- Three vents at the water booster pump station
- Asphalt and three concrete pads adjacent to the chlorination building and water booster pump station
- Concrete riprap adjacent to the chlorination building
- The gate and fence surrounding the Asan Springs Water Supply Facility
- An electrical handhole near the fence
- All dirt debris, rock rubble, pipe debris, fence debris, and other debris from the top of the concrete water storage reservoir roof
- All trees and roots that could impact the concrete water storage reservoir

Removal of mature as well as young trees would be needed for access to construct the improvements, and within the area of the storage reservoir to limit the potential for root growth affecting the reservoir.

An existing pipe and valve system is partially buried. It is assumed that the pipe system could be connected to a floor drain system in the impoundment structure. If the components are not connected to the current system, the pipe would be plugged, and all remaining pipes and valves would be removed.

Demolition activities would primarily occur within and adjacent to the existing fence, in an area approximately 0.2 acre in size. The depth of demolition activities would vary from above surface removal of features to a depth of up to approximately 8 feet.



Proposed Construction

The following facilities would be constructed primarily within the same footprint as the existing Asan Springs Water Supply Facility:

- A chlorination building with a new underground chlorine contact time 30-inch-diameter pipe
- Water lines connecting to the existing 8-inch-diameter water supply line
- Concrete pads adjacent to the existing water booster pump station
- An impoundment water line connecting to the existing pump station facility
- A new electrical duct bank and wiring within Lot 7, Block 9
- An 8-foot-high fence surrounding the facility with an access gate off the existing access road and a pedestrian gate with concrete stairs leading to the new facilities

A concrete drainage swale (ditch) would be constructed surrounding the upgradient limits of the facility and diverting drainage away from the reservoir, with rock riprap at each end of the swales. This would expand the existing footprint of the facility from approximately 0.2 acre to 0.3 acre. Approximately 0.24 acre of vegetation disturbance would occur.

In addition, all disturbed areas would be revegetated with grass or native vegetation, as appropriate. Grass seed and native vegetation would be acquired from local sources.

Proposed Operations

The Asan Springs Water Supply Facility would collect, store, treat, and distribute potable water. Once operational, the facility would be regularly monitored and maintained by GWA. Facility maintenance activities would occur entirely within the developed, fenced perimeter, except for vegetation maintenance activities. Vegetation maintenance would occur around the fenced perimeter, as well as the added concrete drainage swales within an area of approximately 0.3 acre. GWA would access the site daily to take water samples, check chlorination feed systems, and perform general maintenance activities. GWA would access the site at approximately weekly intervals to exchange empty chlorine gas cylinders with full chlorine gas cylinders. Exterior lighting for the facility would be provided through exterior lights attached to the chlorination and the pump buildings above the doorways and below the soffit of the buildings. Of the building exterior lighting, there is only one fixture on each the pump building and new chlorination building that will be within NPS property. A 20-foot-wide buffer around the concrete swale would be maintained as low grass through regular mowing. Mowing is expected to be required every month at a minimum.

2.3 ALTERNATIVES CONSIDERED BUT DISMISSED

Other alternatives considered included rehabilitation and restart of the existing system, closure of the existing system with installation of a new well and pumping system, and abandonment of the existing system with installation of a new well and pumping system accessing groundwater.

Rehabilitation and restart of the existing system would not provide adequate disinfection time prior to the first customer and would not address the Notice of Violation and Compliance Order; therefore, it was eliminated from further consideration. In addition, the alternatives that included installation of a new well and pumping system to provide potable water for replacement of the former contribution from Asan Springs were eliminated from further consideration for the following reasons:

- The cost of identifying a groundwater well system location, acquiring land, developing the system (wells, pumps, and piping), and connecting the well system to the existing distribution system
- The disturbance of new ground (requiring ground clearing, drilling, and other construction activities) associated with a new recovery and distribution system
- The overall operational and maintenance costs for the pumping systems required to provide the same reliability and level of service that the Asan Springs Site can provide

2.4 RESOURCE PROTECTION MEASURES

To minimize impacts related to the proposed action, NPS would implement mitigation measures whenever feasible. Subject to the final design and approval of plans by relevant agencies, mitigation measures would include, but would not be limited to, the items in Appendix A.

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CHAPTER 3: EXISTING ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 INTRODUCTION

This chapter describes the affected environment and the environmental consequences associated with the no-action alternative and the proposed action. The required mitigation measures to be incorporated into the proposed action, as well as proposed best management practices, are found in Appendix A. The topics addressed in this chapter include cultural resources, protected species, water resources, and hazardous materials.

3.1.1 Assessing Impacts of the Alternatives

In accordance with the Council on Environmental Quality's Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR 1500–1508), the environmental consequences analysis considers impacts and their duration, intensity, type, and context; cumulative impacts; and measures to mitigate impacts. Methods used for assessing the impacts in terms of the intensity, type and duration of each impact topic are outlined. The intent is to provide an analytical basis for comparing the alternatives and the impacts that would result from implementing these alternatives. The Project Area is where direct effects on biological and water resources would occur.

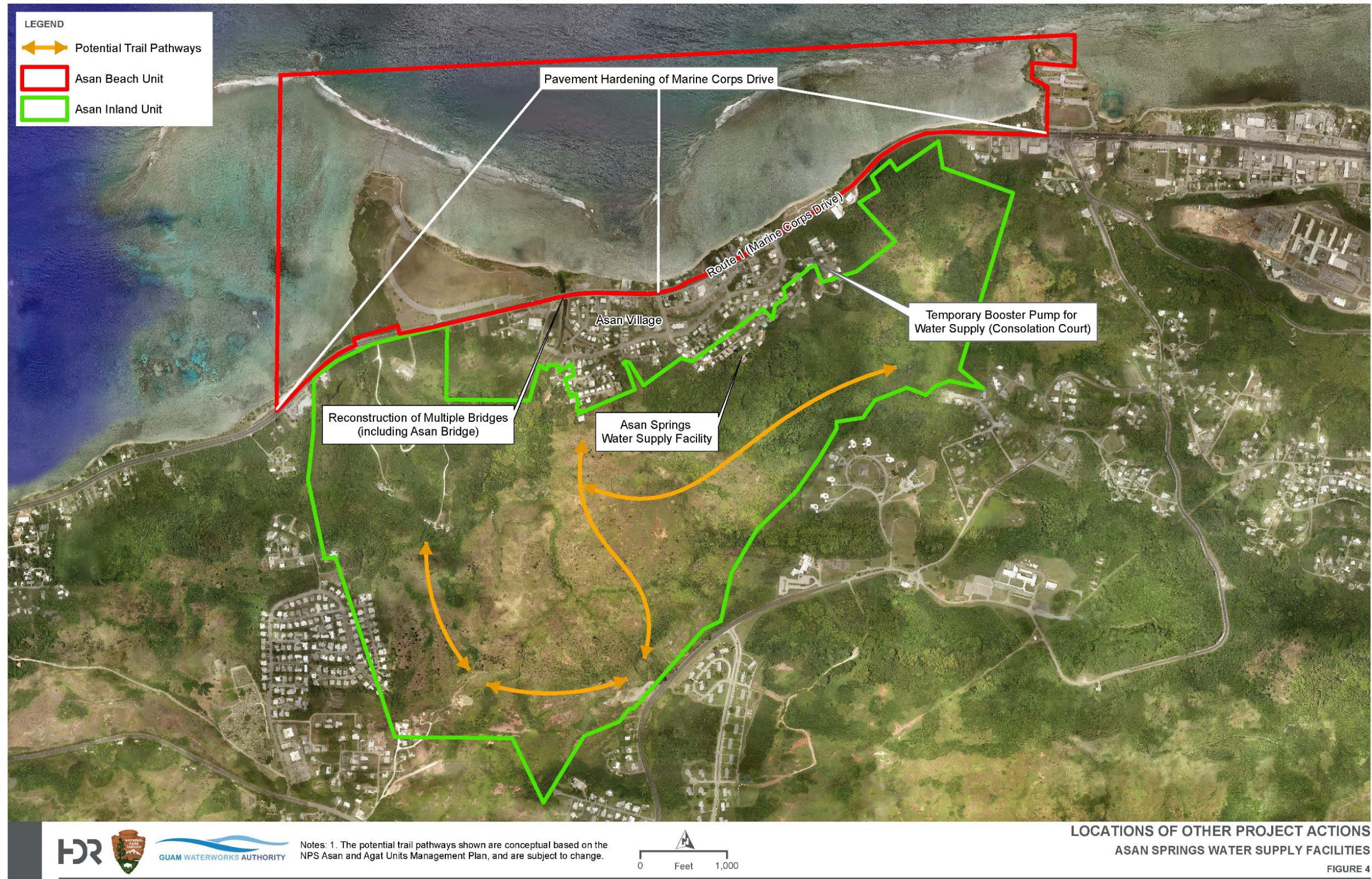
The analysis of potential impacts on cultural resources, vegetation, protected species, water resources, and hazardous materials includes an evaluation of the impacts of implementing either the no-action alternative or the proposed action. The approaches used to assess potential impacts are based on a review of pertinent literature and studies; information provided by on-site experts and other agencies; professional judgment; recent field site assessment; and NPS and GWA staff knowledge and insight.

3.1.2 Assessing Cumulative Impacts

Cumulative impacts were assessed by considering the impacts of the proposed action in addition to impacts associated with other past, present, and reasonably foreseeable future actions in and near the Project Area. To support this analysis, information was gathered on current and future actions. Because some of the future projects are in an early planning phase, the evaluation of cumulative impacts is qualitative. Past, current, and future foreseeable actions that have the potential to have a cumulative effect in conjunction with the proposed action are discussed in the following paragraphs. Figure 4 shows the locations of the actions described in this section and the location of the Asan Springs Water Supply Facility.

Past Actions. As stated in Section 1.1, development of the area in and downgradient of the Project Area occurred in the past. Occupation in the area of the village of Asan is estimated to have begun more than a thousand years before present, with various construction activities occurring until present time. The Asan Springs Site was established in 1916 through the construction of a reservoir as a concrete basin that impounded the waters of Asan Springs. Water treatment and distribution systems have been added to the site since its establishment more than a century ago. World War II resulted in impacts on the surrounding area. The park was established in 1978 and includes a portion of the Asan Springs facility within the Asan Inland Unit.

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Current Actions. NPS is conducting a planning process to develop a Unit Management Plan for the Asan and Agat Units of the park, including the Asan Beach and Asan Inland Units. The Asan Springs facility is located within the Asan Inland Unit and overlooks the Asan Beach Unit. The Unit Management Plan will address new or improved visitor opportunities, facility needs in consideration of resource preservation, and how NPS will proactively manage climate change impacts. NPS issued a newsletter, held three public meetings, and is using public comments to develop the Unit Management Plan. The draft Unit Management Plan and associated EA was released for public review in January 2024. Figure 4 shows the Asan Beach and Asan Inland Units locations and conceptual trail pathways under consideration. The actual trail alignments will be determined after further study and input.

Future Foreseeable Actions. NPS will be implementing actions developed through the Unit Management Plan for the Asan and Agat Units of the park. Implementation of individual projects in the Unit Management Plan may take more than 20 years and will depend on availability of funding and the packaging of projects.

GWA is researching a low-pressure water supply issue noted in the village of Asan to determine if it is related to system choking and/or leakage. In 2024, GWA plans to install a temporary booster pump near Consolation Court in the eastern portion of the village of Asan. GWA anticipates that the proposed action would assist in addressing the low-pressure issue by providing a nearby higher elevation water source. If the proposed system were implemented, the booster pump would likely be phased out over time and removed.

Two other projects proposed in the village of Asan are associated with the transportation system:

- Replacement of the Asan Bridge along Marine Corps Drive (Route 1) as part of the Guam Department of Public Works' Reconstruction of Multiple Bridges (Hagåtña to Piti) GU-DAR-0001(131) Project that covers multiple locations. The project is planned for construction during mid-2024 through 2026. The timeframe for construction at Asan Bridge is not known at this time.
- Pavement Hardening of Marine Corps Drive (Route 1) through the village as part of the Department of Public Works' Under Pavement Infrastructure Retrofit GU-DAR-1000(113) Project. The project is planned for construction in 2025.

3.2 CULTURAL RESOURCES

Cultural resources are aspects of a cultural system that are valued by or significantly representative of a culture, or that contain significant information about a culture. As previously noted in Chapter 1, for the purposes of this EA, the subtopics of archaeological resources, historic structures, and cultural landscapes were evaluated.

3.2.1 Archaeological Resources

Every trace of past human activity is an archaeological resource. These non-renewable resources are often the only tangible evidence of the passage or occupation of human groups that have disappeared or been displaced.

Existing Environment

Asan Springs is a component of the Asan Village Site (GHPI number 66-01-0153), a historic district that is eligible for listing in the NRHP as an area of early habitation. The Asan Village Site is a former habitation site with areas of residential midden and agricultural exploitation near the beach and marine resources. Figure 5 shows the approximate historic boundary of the Asan Village Site. Previous archaeological work indicated that the Asan area has been inhabited from the Pre-Latte phase, about 3,500 BP, on through historic time. Work performed within the western boundary of the village of Asan produced artifacts and skeletal remains, suggesting that additional cultural materials and burials may be present closer to Marine Corps

Drive and the northern and eastern edges of the site. Other archaeological fieldwork performed has yielded rich cultural discoveries (Guam Housing and Urban Renewal Authority 1983).

The information gained from the archaeological artifacts at the Asan Village Site covers the following:

- The nature of the transition between the Pre-Latte and the Latte phases in development of the Mariana Islands determines where latte stones were used for structures.
- The patterns of subsistence, the activities, and the changes in these through time help provide a basis for understanding the relationships of the ancient Chamorros to their environment and provide evidence of how the Chamorro developed these relations to suit local conditions.
- The specific patterns that can be documented as Asan would give a good base for comparisons to sites in other areas of Guam and a means to investigate island-wide patterns of social and economic interaction.
- The immediate contact and post-contact periods can be assessed in terms of trade items, technological substitutions, and changes in subsistence patterns.

Overall, the previous archaeological work indicates that the Asan Village Site retains its integrity and could yield information of importance to the pre-history of the area (Guam Housing and Urban Renewal Authority 1983).

The Asan Springs Water Supply Facility is encompassed by the Asan Ridge Battle Area (GHPI number 66-01-1056, NRHP # 75001916), listed in the NRHP on July 18, 1975, as a military historic district associated with World War II. The Asan Ridge Battle Area is located immediately inland of the village of Asan and Asan Bay between Asan and Adelup Points on the U.S. Geological Survey Agana Quadrangle Map. Specific dates of historical significance of the Asan Ridge Battle Area are July 21–26, 1944. Given that the Asan Springs Water Supply Facility was constructed post early habitation and pre-World War II, the facility would be non-contributing to the Asan Ridge Battle Area and Asan Village Site historic districts. Figure 6 illustrates the boundary of the Asan Ridge Battle Area, the approximate boundary of the Asan Village Site, and the APE of the Project.

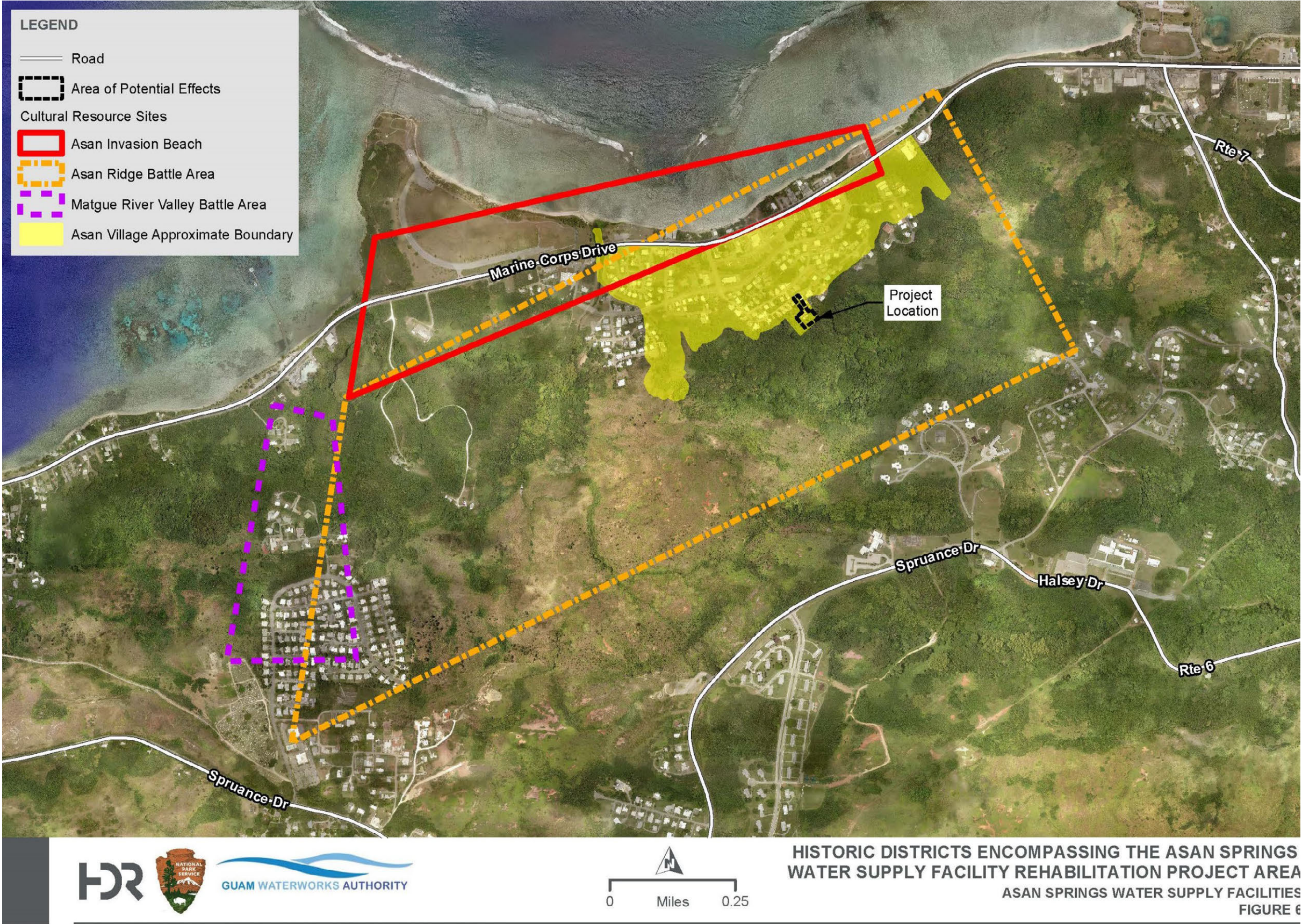
The NPS does not currently conduct any land, vegetation, or other management or maintenance activities in the location of the proposed project and does not plan to change those practices in the future. GWA is currently maintaining water lines through the current site and clearing vegetation within the fenceline and does not plan to change those practices in the future.

Environmental Consequences

No-Action Alternative

Under the no-action alternative, there would be no impacts on the Asan Village Site or the Asan Ridge Battle Area. The NPS does not currently conduct any land, vegetation, or other management or maintenance activities in the location of the proposed project, and does not plan to change those practices in the future. GWA would continue to perform vegetation clearing and maintain pipelines within the facility that are connected to the water distribution system. The Asan Springs Water Supply Facility would continue to degrade, but it is a non-contributing component of the Asan Village Site and the Asan Ridge Battle Area. No significant impacts are projected to occur.





Proposed Action

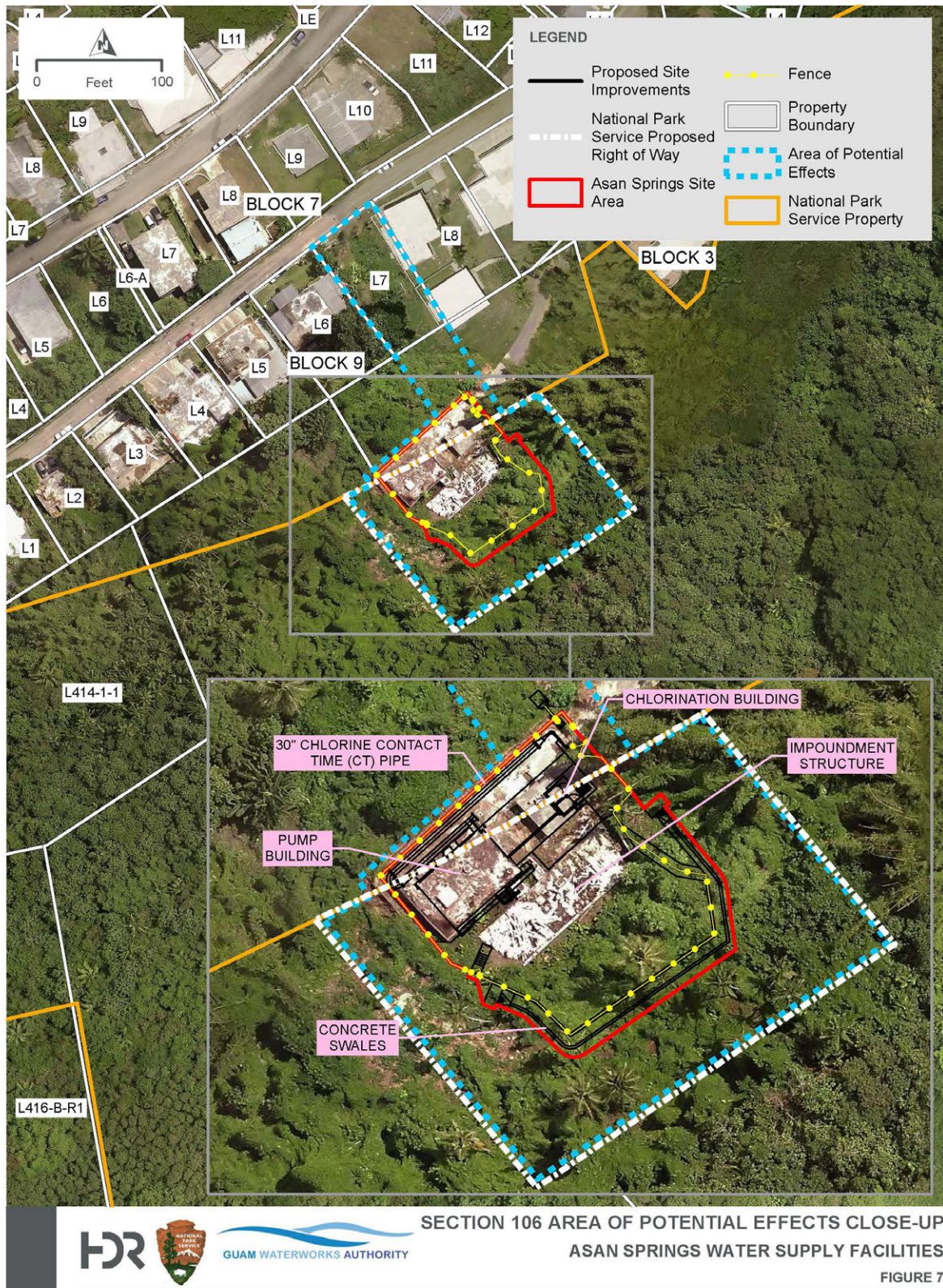
There are no documented archaeological sites in the APE. Asan Archaeological Site (GHPI number 66-01-0154) is near but not within the APE of the Project. Figure 7 shows a close-up view of the APE of the Project and the proposed improvements, but does not show the location of GHPI 66-01-0154 because the specific location is restricted from public distribution.

The Project would largely involve repairs and in-kind replacement of the impoundment structure and ground disturbance associated with connecting to an existing water line and abandonment of pipes in place. Excavation to a depth of approximately 6 feet would be required for installation of a new underground chlorine contact time 30-inch-diameter pipe. The pipe would be installed within the confines of the existing fenced facility. The construction disturbance is not expected to affect the integrity of the Asan Village Site (GHPI number 66-01-0153) or the Asan Ridge Battle Area (GHPI number 66-01-1056, NRHP # 75001916). Further, previous disturbance at the location likely removed or severely impacted any prehistoric archaeological resources in the immediate vicinity. There is no expected effect on archaeological resources because none have been identified in the APE.

As part of the previous consultation on the Project, GSHPO and GWA agreed that archaeological monitoring of ground-disturbing activities related to the Project would be performed and an AMDP would be prepared and submitted to GSHPO (GSHPO 2015). The AMDP was completed and submitted to GSHPO in January 2019. On January 23, 2019, GSHPO indicated acceptance of the AMDP and approval to proceed with the Project (GSHPO 2019).

After the previous consultation, the scope evaluated in the AMDP changed. Instead of requiring installation of a sewer line for the Project, an electrical line was needed through an existing conduit or new conduit. NPS consulted with GSHPO via a letter on October 19, 2021, notifying GSHPO of the slight project change (NPS 2021a). The letter also indicated that NPS reviewed the Project activities and concluded that the Project would have no adverse effect on historic properties, conditional that archaeological monitoring would be appropriate for ground-disturbing activities.

GSHPO responded via a letter on December 28, 2021 (GSHPO 2021), that the AMDP requires stipulations included in the methodologies and reporting documentation. The stipulations include providing a map showing GHPI sites within a 0.25 mile radius of the Project site prior to the start of construction. Additionally, GSHPO required that detailed soil descriptions be provided in areas to be trenched in accordance with the U.S. Department of Agriculture Soil Survey Manual. GSHPO indicated that because some recent projects had not done the required monitoring, NPS needs to make sure that a construction contractor works with a qualified archaeologist on site with protocols to ensure execution of the AMDP. With those stipulations in place, GSHPO made a determination of no historic properties affected. Consequently, the AMDP (SEARCH, 2023) was revised to address GSHPO comments and was resubmitted to GSHPO on May 2, 2023. GSHPO responded on November 8, 2023 requesting minor modifications to the AMDP, indicating that if the proposed methods are followed, GSHPO will accept the discovered materials. They also indicated that in their December 28, 2021 response, the effect finding should have been No Adverse Effects. No significant impacts are projected to occur.



Cumulative

The NPS Unit Management Plan could result in impacts on archaeological resources because of the proposed improvements, but the impacts would not occur near the Asan Springs Water Supply Facility and would not be expected for several years after rehabilitation of the Asan Springs Water Supply Facility. The GWA booster pump station to be installed near Consolation Court could potentially disturb archaeological resources but would not disturb the same area as the rehabilitation project and would be installed prior to the rehabilitation project. The Asan Bridge and Marine Corps Drive transportation system improvements would likely occur primarily within the construction footprint of their previous construction, with a limited potential to disturb archaeological resources. Although these transportation projects could occur approximately at the same time as the rehabilitation project, disturbance impacts would be minor and would not affect the same ground. The construction at the Asan Springs Water Supply Facility would be done under the requirements of an AMDP. Consequently, cumulative impacts on archaeological cultural resources in the area of the Asan Springs Water Supply Facility are not anticipated.

Conclusion

There would be no archaeological impacts on the Asan Village Site or the Asan Ridge Battle Area under the no-action alternative. Through Section 106 consultation, GSHPO indicated that there would be no archaeological historic properties affected under the proposed action with the stipulation that the construction contractor work with a qualified archaeologist on site with protocols to ensure execution of the AMDP. No significant impacts are projected to occur under either the no-action alternative or the proposed action.

3.2.2 Historic Structures

NPS defines a historic structure as a constructed work consciously created to serve some human activity. Historic structures are usually immovable, although some have been relocated and others are mobile by design. They include buildings and monuments, dams, millraces and canals, nautical vessels, bridges, tunnels and roads, railroad locomotives, rolling stock and track, stockades and fences, defensive works, temple mounds and kivas, ruins of all structural types, and outdoor sculpture (NPS 1998).

Existing Environment

The Asan Springs Reservoir is a concrete basin that impounds the waters of Asan Springs. The reservoir is a component of the Asan Springs Water Supply Facility that is located at an elevation of about 110 feet on the ocean-facing (north) slope of a steep ridge south of the coastal village of Asan. Figure 7 shows the impoundment structure and associated facilities.

The Asan Springs Reservoir site (GHPI number 66-01-2898) was determined eligible for listing in the NRHP (including the reservoir, buildings, and associated infrastructure). GSHPO determined that the site was eligible; no nomination form documenting contributing elements to the site is available. The Asan Springs Reservoir, while not a contributing facility to the Asan Ridge Battle Area and Asan Village Site historic districts, was a significant component of the water system of Hagåtña and the surrounding area on the Island of Guam. The Asan Springs system was installed at Asan Springs in 1915 and 1916 to supply Hagåtña with water. The 1916 construction included the uncovered concrete reservoir with an overflow spillway, and a perforated conduit extending into the hillside to collect spring water. By 1917, Asan Springs was an important source of dependable, high-quality water to Hagåtña. Improvements in the late 1950s and early 1960s included the installation of a concrete roof, and the replacement of the original gravity fed system with a pump system. In the 1990s, a pump house building was built to replace the earlier system, and a chlorinator building was constructed. The use of water from Asan Springs was discontinued in 2004 by GWA because of coliform bacteria present in the water and an inadequate chlorination system to treat it. Overall, the Asan Springs Reservoir was a consistent and dependable source of water for the area until its closure in 2004 due to bacterial contamination (Ruzicka 2016).

The NPS does not currently conduct any land, vegetation, or other management or maintenance activities in the location of the proposed project, and does not plan to change those practices in the future. GWA is currently maintaining water lines through the current site and clearing vegetation within the fenceline, and does not plan to change those practices in the future.

Environmental Consequences

No-Action Alternative

Under the no-action alternative, the Asan Springs Water Supply Facility would continue to be unused. The NPS does not currently conduct any land, vegetation, or other management or maintenance activities in the location of the proposed project, and does not plan to change those practices in the future. GWA would continue to perform vegetation clearing and maintain pipelines within the facility that are connected to the water distribution system. Over time, the structures could degrade and potentially cause a loss of historical context. No significant impacts are projected to occur.

Proposed Action

Under the proposed action, the Asan Springs Water Supply Facility would be rehabilitated to provide an important water resource to the surrounding villages. Impacts on the current structures would occur either through replacement or modification.

The plaster finish originally installed on the exterior wall of the reservoir impoundment structure would be removed and replaced. Structural concrete deficiencies inside the reservoir impoundment structure would be repaired by applying epoxy bonding materials. Modifications to the roof would include sealing unnecessary roof penetrations that were used for pumping operations. The chlorinator building structure and foundation, as well as asphalt, concrete riprap, and three concrete pads adjacent to the chlorinator building and water booster pump station, would be demolished. Additionally, the gate and fence surrounding the Asan Springs Water Supply Facility would be demolished. Following demolition, a new chlorination building, concrete pads, and fence would be constructed within essentially the same footprint as the existing facility.

Improvements to the Asan Springs Water Supply Facility would allow it to resume operation with ongoing maintenance. HAER No. GU-10 was prepared to document past construction and modifications of the Asan Springs Water Supply Facility, serving as a recordation document for mitigation of the impacts to the historic facility. HAER documentation was submitted in 2016 (HAER No. GU 10; Ruzicka 2016). The Project would largely involve repairs of the impoundment structure and ground disturbance associated with connecting to an existing water line and abandonment of pipes in place. The modifications would have no effect on the Asan Ridge Battle Area (GHPI number 66-01-1056, NRHP # 75001916). Although the reservoir was present during the battle timeframe, the supporting buildings are more recent. The minor changes to the reservoir and support facility would not affect the context of the historic district. The Asan Springs Reservoir NRHP-eligible site would be modified. NPS determined that the modifications to the site would result in No Adverse Effect, based on completion of the HAER No. GU-10 recordation document. GSHPO indicated that the recordation would serve to mitigate for the effect to the site, and that there would be no effect to historic properties. No significant impacts are projected to occur.

Cumulative

It is unknown if the NPS Unit Management Plan could result in impacts on historic structures as a result of the proposed improvements. However, in the event that any impacts would occur, they would not likely occur near the Asan Springs Water Supply Facility and would not be expected for several years after rehabilitation of the Asan Springs Water Supply Facility. The GWA booster pump station to be installed near Consolation Court would not be anticipated to affect any historic structures and would be installed prior to the rehabilitation project. The Asan Bridge and Marine Corps Drive improvements would likely occur primarily within the construction footprint of their previous construction, with a limited potential to disturb

historic structures. Although these transportation projects could occur approximately at the same time as the rehabilitation project, disturbance impacts would be minor and would not affect the same ground. Section 106 recordation has already occurred and been submitted to GSHPO. Consequently, cumulative impacts on historic structures in the area of the Asan Springs Water Supply Facility are not anticipated.

Conclusion

Overall, under the no-action alternative, the Asan Springs Water Supply Facility would potentially lose historical context due to continued deterioration. Under the proposed action, impacts on the Asan Springs Water Supply Facility would occur, but the integrity and historical context of the Asan Ridge Battle Area historic district that includes the complex would not be affected. No significant impacts to built-environment historic properties are projected to occur under either the no-action alternative or the proposed action.

3.3 PROTECTED SPECIES

Protected species include plant and animal species as well as the habitats that support those species.

3.3.1 Protected Species

As noted in Chapter 1, many species in Guam do not have a common name. For the purposes of this EA, species are referred to by their common name when possible; however, species without a common name are referred to by their scientific name. Coordination with USFWS led to their identification of a list of protected species with the potential to occur in the project area. Protected species for this EA include:

- *Cycas micronesica*
- *Bulbophyllum guamense*
- *Dendrobium guamense*
- *Tuberolabium guamense*
- *Nervilia jacksoniae*
- *Tinospora homosepala*
- *Solanum guamense*
- *Partula gibba* (humped tree snail)
- *Partula radiolata* (Guam tree snail)
- *Samoana fragilis* (fragile tree snail)
- *Pteropus mariannus mariannus* (Mariana fruit bat)

Existing Environment

In consideration of the protected species identified by USFWS, a biological field survey for the Asan Springs Water Supply Facility, with a focus on snails and birds and their habitat, was conducted in February 2021 within the Project Area and approximately 30 meters beyond the Project Area on GWA and NPS property. This included what was identified as the Action Area evaluated in the BA. The Action Area is shown in Figure 7, and included the following areas:

- Approximately 0.25 acre referred to as the “Asan Springs Site”.
- An additional 10 feet around the perimeter of the fence and 20 feet from the edge of the concrete swales of the Asan Springs Site and the full extent of Lot 7 that together comprise the 0.24-acre “Vegetation Clearing Boundary”.

- An additional 30 feet (0.39 acre) beyond the vegetation clearing boundary that approximately encompasses the extent where dust disbursement, potential erosion and sedimentation, and edge effects from removal of adjacent vegetation may affect federally listed snails, referred to as the “Action Area Extent for Snails”. The Action Area does not extend onto private, developed property on either side of Lot 7.
- A snail translocation site of approximately 0.50 acre that is approximately 150 feet to the southeast of the Asan Springs Site; this translocation site is on NPS property, is not planned for future development, and supports an existing population of *Partula radiolata*.

The total size of the Action Area is approximately 1.38 acre.

Occurrences and habitat for both federally and Guam-listed threatened and endangered species were recorded during the field survey.

A total of 21 plant, 2 bird, 1 reptile, 5 insect, and 2 mollusk species were observed during the field survey, but only one species protected by the Endangered Species Act (Guam tree snail) was identified. Small populations of the federally endangered and Guam-listed Guam tree snail were observed within the Action Area. The Guam tree snails were observed on *Tetrastigma pubinerve* vines, which may aid in movement to suitable host plant species. The vegetation in the Project Area has the potential to support other federally listed snail species, such as the humped tree snail and the fragile tree snail (HDR 2021). Although Mariana fruit bats were not observed and are not known to currently be roosting, feeding, or transiting within more than 150 meters of the Action Area, the limestone forests have the potential to provide suitable habitat for Mariana fruit bats (NPS 2022b).

No other protected flora or fauna species were identified within the Project Area. Federally listed flora species with the potential to occur in the Project Area are unlikely to be present because habitat for those species is of marginal quality due to the density of climbing vines, lack of canopy cover, and the presence of other non-native plant species. No birds protected under the Migratory Bird Treaty Act or other protected wildlife species were observed during surveys. Additionally, no nests were observed within the Action Area.

Although no protected reptile species and/or eggs were identified in the Action Area, the presence of non-protected skink and gecko species were observed within the Action Area, which demonstrates the habitat is likely suitable for protected reptile species based on the covered forest floor.

The NPS does not currently conduct any land, vegetation, or other management or maintenance activities in the location of the proposed project and does not plan to change those practices in the future. GWA is currently maintaining water lines through the current site and clearing vegetation within the fenceline and does not plan to change those practices in the future.

Environmental Consequences

No-Action Alternative

Under the no-action alternative, the NPS would not change their current practice of no maintenance or other activities in or near the Action Area. GWA would continue to perform vegetation clearing within the facility boundaries and maintain pipelines within the facility that are connected to the water distribution system. The vegetation clearing would help maintain a buffer of no vegetation within the facility boundary. There would be no new changes to the current protected species present within the Action Area. Therefore, there would be no impacts on protected species.

Proposed Action

NPS coordinated with USFWS regarding the findings of the Biological Survey Report and determined that a Biological Assessment (BA) would need to be prepared for the proposed action. On August 26, 2022, NPS

requested formal consultation with USFWS and provided the initial version of the BA. USFWS responded to NPS acknowledging formal consultation and assigned log number 2022-0089140 to the consultation. USFWS provided review comments, NPS updated and resubmitted the BA to address comments, and the final version of the BA was submitted to USFWS on October 11, 2022 (NPS 2022b).

The BA concluded that the proposed action may affect and is likely to adversely affect Guam tree snails. The proposed action may affect but is not likely to adversely affect Mariana fruit bats. The proposed action would have no effect on other threatened and endangered species with the potential to occur within the Action Area.

USFWS responded to the BA with a Biological Opinion (BO) dated December 23, 2022, to address commitments to implement for minimizing impacts on threatened and endangered species. The BO includes an incidental take statement, which states that USFWS anticipates that all Guam tree snails within the 0.24-acre vegetation clearing footprint would be taken in the form of capture during translocation activities or in the form of harm due to injury or death from exposure to crushing or trampling during vegetation clearing activities. USFWS concluded that the effect of the take is not likely to jeopardize the continued existence of the Guam tree snail in the wild. USFWS also concurred with NPS's determination that the proposed action may affect, but is not likely to adversely affect, the Marina fruit bat (USFWS 2022).

During construction, it may be necessary to clear vegetation or cause dust to settle on habitat that is occupied by the Guam tree snail. All the Guam tree snails within the 0.24-acre vegetation clearing footprint would be captured and translocated due to project vegetation clearing activities. The survey and relocation work would be conducted by an authorized biologist, with oversight per the provisions of the BO's biosecurity measures (see Appendix A). No Guam tree snails were found in the vegetation clearing area during the 2021 survey. However, there is no barrier to prevent their dispersal into the Action Area outside the current facility boundary that is maintained to be kept vegetation free. Snails are expected to be detected once the vegetation is cut and can be examined for snails. The Guam tree snails in the Action Area may be harassed by human disturbance, translocation, and vibrations from mechanical tools and vehicle use. However, although any Guam tree snail trampled by Project equipment and pedestrian traffic may be injured or killed, the species will persist in nearby and distant populations despite Project implementation (NPS 2022b). The number of Guam tree snails injured or killed during construction would be minimized by pre-disturbance surveys and translocation of individuals found. Figure 8 shows the area proposed for vegetation clearing and the proposed snail translocation area.

Translocated Guam tree snails are expected to have the same survival rates as they would have had in the absence of the proposed action. The injury or death of a small number of Guam tree snails at the Project site is not expected to affect the resilience, redundancy, or representation of the Guam tree snail. For these reasons, Project implementation is not likely to appreciably reduce the likelihood of both the survival and recovery of the Guam tree snail in the wild (NPS 2022b; USFWS 2023).

The Project's implementation of dust, erosion, and biosecurity measures would reduce the likelihood that the Project would result in habitat loss, degradation, or modification due to introduction of invasive species, dust, or erosion. Implementation of dust barriers and biosecurity measures, including inspection of all tools and materials, and the application of bleach solution to soles of shoes, would make it unlikely that introduction of a new invasive species would occur to change the makeup of the existing habitat (NPS 2022b). Appendix A includes measures to be implemented for protection of the existing habitat.

Effects on Guam tree snails would be mitigated through translocation and the implementation of BMPs and conservation measures from the BO listed in Appendix A. However, due to the proximity of the species to the action area, adverse effects from the proposed action are not discountable. Therefore, the proposed action may affect and is likely to adversely affect Guam tree snails (NPS 2022b).

Construction activity has the potential to startle or alarm roosting, foraging, and transiting Mariana fruit bats. Project construction would not occur within 150 meters of Mariana fruit bat roots, and when a

Mariana fruit bat is seen flying or foraging within 150 meters of construction activity, work would pause until the bat has left the area. Additional pre-construction biomonitoring surveys for Mariana fruit bats and bat roost sites would be conducted up to 1 week prior to the onset of vegetation clearing. Any pause in work beyond 7 days in vegetation clearing would trigger additional surveys. Because Mariana fruit bats are not known to occur in the Project Area and Project activity would cease if a Mariana fruit bat were detected within 150 meters of the Project activity, impacts on a Mariana fruit bat are expected to be extremely unlikely to occur. Therefore, USFWS concluded that there is a discountable potential for Mariana fruit bats to be adversely affected by physical disturbance, habitat loss, or degradation during the proposed action. The proposed action also includes BMPs, such as contractor education and training to promote awareness of bats, limiting work to daylight hours, and shielding of lights that would further reduce the potential for adverse effects. Appendix A includes protective measures to be implemented for the Project. Therefore, the proposed action may affect, but is not likely to adversely affect, Mariana fruit bats (NPS 2022b)(USFWS 2022).

Nesting birds would be protected during construction through surveys or monitoring (see Appendix A).

Cumulative

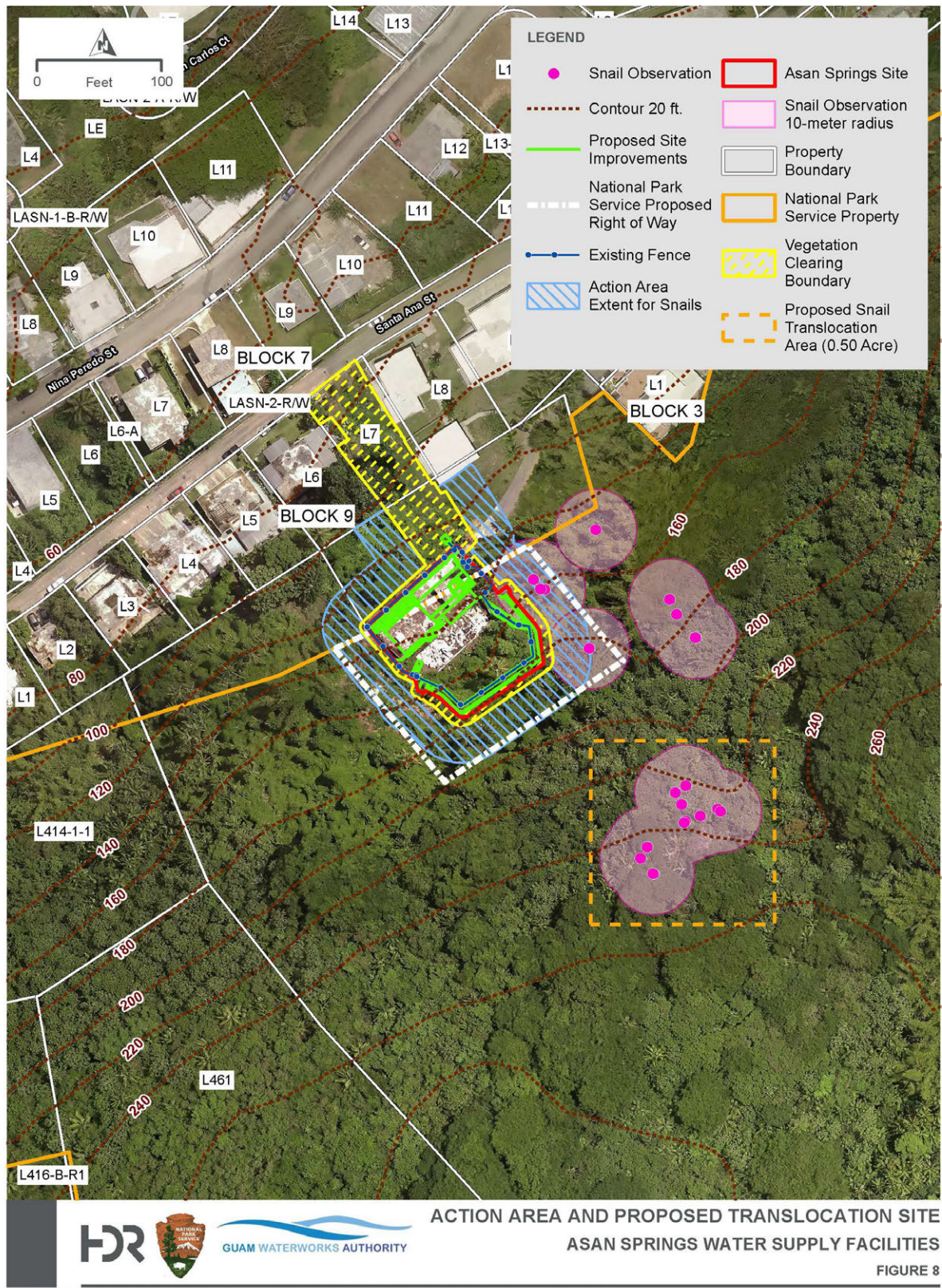
The NPS Unit Management Plan could result in impacts on protected species because of the proposed improvements, but the impacts would not occur near the Asan Springs Water Supply Facility and would not be expected for several years after rehabilitation of the Asan Springs Water Supply Facility. The GWA booster pump station to be installed near Consolation Court would not be anticipated to affect any protected species and would be installed prior to the rehabilitation project. The Asan Bridge and Marine Corps Drive improvements would likely occur primarily within the construction footprint of their previous construction, with a limited potential to disturb protected species. Although these transportation projects could occur approximately at the same time as the rehabilitation project, disturbance impacts would be minor and would not affect the same ground. Consequently, cumulative impacts on protected species in the area of the Asan Springs Water Supply Facility are not anticipated.

Conclusion

Under the no-action alternative, there would be no impacts on protected species. The NPS does not currently conduct any land, vegetation, or other management or maintenance activities in the location of the proposed project and does not plan to change those practices in the future. GWA is currently maintaining water lines through the current site and clearing vegetation within the fenceline and does not plan to change those practices in the future.

The proposed action is likely to adversely affect the Guam tree snail because this species has been observed within the action area and suitable habitat is present throughout the action area. The proposed action and construction activities may affect, but are not likely to adversely affect, the Mariana fruit bat because this species was not detected during field surveys, but habitat was deemed present. No designated or proposed critical habitat for either species occurs in the vicinity of the action area.

Mitigation measures have been developed through consultation with USFWS and preparation of a BA and BO. Implementation of those measures identified in the BO would result in a may affect, but not likely to adversely affect, determination for impacts on threatened and endangered species. In addition to the species-specific mitigation measures described, BMPs for migratory bird species, if found, would help protect birds from impact. Appendix A includes mitigation commitments and proposed BMPs.



3.4 WATER RESOURCES

Water resources issues include floodplains, wetlands and other waters of the U.S., water hydrology, water quality, marine/estuarine resources, and climate change / sea level. As noted in Chapter 1, for the purposes of this EA, water hydrology and water quality will be analyzed for impacts.

3.4.1 Water Hydrology

Water hydrology is the principle of the movement, distribution, and management of water in the surface and subsurface environments. Groundwater is subsurface water underground in soil or in pores or crevices of rock.

Existing Environment

Before its development, Asan Springs naturally gushed water from the limestone hills. Asan Springs was large and fed into the Hagåtña River (Ruzicka 2016). Following the construction of the Asan Springs Reservoir in 1916, Asan Springs became an important source of dependable water to Hagåtña. As stated in Section 1.1, the water supply, treatment, and distribution system derived from spring water was discontinued in 2004. Rainwater upgradient from the Asan Springs Water Supply Facility percolates into the ground, and groundwater discharges through Asan Springs. Although the potable water system has been shut down, water seeping from Asan Springs continues to be collected in the impoundment structure on site, and drains through existing storm drainage piping in Asan, with discharge as stormwater to the Asan River and then to the Philippine Sea.

A public meeting held April 19, 2022 regarding the Asan Springs Water Supply Facility included input on water running down Nino Perdido Street, with concern that this could be water from the facility running through the neighborhood, but GWA indicated that impact was due to a storm drain issue. Subsequent to the meeting, the water runoff issue was resolved.

The NPS does not currently conduct any land, vegetation, or other management or maintenance activities in the location of the proposed project and does not plan to change those practices in the future. GWA is currently maintaining water lines through the current site and clearing vegetation within the fenceline, and does not plan to change those practices in the future.

Environmental Consequences

No-Action Alternative

Under the no-action alternative, the Asan Springs Water Supply Facility would remain offline because it would fail to meet water quality criteria. There would be no changes to the current water hydrology present within the Project Area. Water seeping from Asan Springs would continue to be collected, drain through the existing storm drainage piping to the Asan River, and discharge to the Philippine Sea. The NPS does not currently conduct any land, vegetation, or other management or maintenance activities in the location of the proposed project and does not plan to change those practices in the future. GWA would continue to perform vegetation clearing and maintain pipelines within the facility that are connected to the water distribution system. Therefore, there would be no impacts on water hydrology.

Proposed Action

The proposed action would rehabilitate the Asan Springs Water Supply Facility to harness and use its maximum production potential. Most water currently discharging from the Asan Springs Water Supply Facility would be captured, then treated and distributed for potable water use. There would be less overall discharge to the Asan River and Philippine Sea, similar to levels that previously occurred when the system was operational. The project would also address a public concern of low water pressure that was discussed at the April 19, 2022 public meeting on the project. Restart of the Asan Springs Water Supply Facility would

improve water pressure based on more supply in the overall distribution system, as well as pumps being provided on site for the restored system.

Cumulative

The NPS Unit Management Plan could result in impacts on water resources because of the proposed improvements, but the impacts would not occur near the Asan Springs Water Supply Facility and would not be expected for several years after rehabilitation of the Asan Springs Water Supply Facility.

The GWA booster pump station to be installed near Consolation Court would be downgradient from the Asan Springs Water Supply Facility and would be installed prior to the rehabilitation project. After the new system would be online, the booster pump would likely be phased out over time and removed. The Asan Bridge and Marine Corps Drive improvements would likely occur primarily within the construction footprint of their previous construction, with a limited potential to affect water hydrology. Consequently, cumulative impacts on water hydrology in the area of the Asan Springs Water Supply Facility are not anticipated.

Conclusion

Under the no-action alternative, there would be no changes in impacts from the current water hydrology environment. Under the proposed action, Asan Springs Water Supply Facility and equipment improvements would occur to meet increasing water demands in the area. There would be less overall discharge to the Asan River and Philippine Sea, similar to levels that previously occurred when the system was operational.

3.4.2 Water Quality

Water quality can be thought of as a measure of the suitability of water for a particular use based on selected physical, chemical, and biological characteristics (U.S. Geological Survey 2018).

Existing Environment

Before its development, Asan Springs naturally gushed water from the limestone hills. Asan Springs was large and fed into the Hagåtña River (Ruzicka 2016). Following the construction of the Asan Springs Reservoir in 1916, Asan Springs was an important source of dependable, high-quality water to Hagåtña. The system was taken offline in 2004 by GWA because of coliform bacteria present in the water and an inadequate chlorination system to treat it (GWA 2017).

According to a Water System Sanitary Survey performed in 1988 by GEPA, the physical/chemical quality of the groundwater was generally good based on available analytical data (GEPA 1988). The major problem with respect to water quality at the Asan Springs Water Supply Facility was the potential for future contamination.

In 1988, monthly average total coliform and monthly average turbidity exceeded the maximum contaminant level occasionally. The annual average percentage of positive coliform counts for the Asan/Piti systems was 5.1 percent between 1983 and 1987. Additionally, five wells consistently pumped water with high chloride concentrations. The lack of regular line flushing programs may have caused the degradation of the water quality, especially the turbidity problems (GEPA 1988).

GWA summary reports for bacteriological deep well analysis for Asan Springs indicated that in 1991 and 1992 the water source was bacteriologically contaminated. In 1993 through 1995, Asan Springs was not in operation, with adjustments made to resume operation in 1996. In 1997, bacteriological test results indicated the absence of coliform bacteria.

In early 2004, test results from the distribution system served by the Asan Springs source revealed bacteriological contamination (both total and fecal coliform) in violation with the Guam Primary Safe Drinking Water Regulations. On January 28, 2004, GEPA issued a Notice of Violation and Compliance Order on the Asan Springs Water Supply Facility with stipulated conditions. The following excerpt of the Notice of

Violation and Compliance Order indicated that Asan Springs was impacted by an unidentified bacteriological contamination and that the water supply and distribution system could not be used until the deficiencies were corrected:

On January 21, 2004, five (5) water samples were collected from homes at Asan and Anigua areas, that are served by the Asan spring and A-series wells. Three (3) samples indicated the presence of total coliform and two (2) indicated a presence of total and fecal coliform bacteria at the distribution systems and with the absence of the required chlorine residual.

A review of historical records for the last 10 years has indicated that the “Asan spring well” that serves this part of the water system has a history of bacteriological contamination, including both total and fecal coliforms in source water (EMPSCO Engineering Consultants 2013).

The Asan Springs Water Supply Facility was taken offline as a water source at the GWA Central Water System in 2004. Since that time, the Asan Springs facility remains deserted and unused as a water source (EMPSCO Engineering Consultants 2013).

The NPS does not currently conduct any land, vegetation, or other management or maintenance activities in the location of the proposed project and does not plan to change those practices in the future. GWA is currently maintaining water lines through the current site and clearing vegetation within the fenceline, and does not plan to change those practices in the future.

Environmental Consequences

No-Action Alternative

Under the no-action alternative, the Asan Springs Water Supply Facility would remain offline because it would fail to meet water quality criteria. The NPS does not currently conduct any land, vegetation, or other management or maintenance activities in the location of the proposed project, and does not plan to change those practices in the future. GWA would continue to perform vegetation clearing and maintain pipelines within the facility that are connected to the water distribution system. There would be no changes to the current water quality present within the Project Area because treatment and distribution of potable from other sources would not change. Therefore, there would be no impacts on water quality.

Proposed Action

The proposed action would rehabilitate the Asan Springs Water Supply Facility to harness and use its maximum production potential as an economical and inexpensive source of quality water that would alleviate increasing water demand, especially during the dry seasons. Previous degradation of water quality would be improved through updated equipment and practices. Improvements to the Asan Springs Water Supply Facility would include a new chlorination building and equipment for water treatment, and a new pumping system to potable water distribution.

Following improvements, GWA would access the site daily to take water samples, check chlorination feed systems, and perform general maintenance activities. GWA would exchange empty chlorine gas cylinders with full chlorine gas cylinders approximately weekly. Water quality would be tested to confirm it is meeting water quality standards prior to distribution.

Cumulative

The NPS Unit Management Plan could result in impacts on water resources because of the proposed improvements, but the impacts would not occur near the Asan Springs Water Supply Facility and would not be expected for several years after rehabilitation of the Asan Springs Water Supply Facility. If a trail network would be constructed, the extent of disturbance would require a National Pollutant Discharge Elimination System (NPDES) general construction permit, with a stormwater pollution prevention plan (SWPPP) and measures to protect downgradient water quality. Given that any trails are not anticipated to be designed or

constructed near the Asan Springs Water Supply Facility, no adverse impacts on water quality from construction, use, and maintenance of the trail are anticipated.

The GWA booster pump station to be installed near Consolation Court would be downgradient from the Asan Springs Water Supply Facility and would be installed prior to the rehabilitation project. After the new system would be online, the booster pump would likely be phased out over time and removed. The Asan Bridge and Marine Corps Drive improvements would likely occur primarily within the construction footprint of their previous construction, with a limited potential to affect water quality. The improvements would include measures to protect water quality during construction. Although these transportation projects could occur approximately at the same time as the rehabilitation project, disturbance would be occurring downgradient of the Asan Springs Water Supply Facility and would not be occurring in the same area. Consequently, cumulative impacts on water quality in the area of the Asan Springs Water Supply Facility are not anticipated.

Conclusion

Under the no-action alternative, there would be no impacts on water quality. However, the Asan Springs Water Supply Facility would continue to fail minimum water quality standards. Under the proposed action, Asan Springs Water Supply Facility and equipment improvements would occur to maintain water quality standards and meet increasing water demands in the area. Once operational, the Asan Springs Water Supply Facility would be regularly monitored and maintained by GWA.

3.5 HAZARDOUS MATERIALS

Hazardous materials are substances or materials that, if released into the environment, could be potentially harmful to the public's health or welfare.

Existing Environment

The Project Area includes the Asan Springs Water Supply Facility and nearby surrounding vegetation, the access road to the facility, and a vacant, vegetated residential property downgradient from the facility. There is no known asbestos in the Project Area. The current buildings at the Asan Springs Water Supply Facility were built in approximately 1994, which is after lead-based paint was banned in 1978. There is no known lead-based paint on the facility structures. Hazardous materials previously used at the Asan Springs Water Supply Facility include chlorine gas to purify water, fuel to run a backup diesel fuel generator, and oils and lubricants to operate the water supply system. The former chlorine gas storage cylinders have been removed, but there is likely oil and lubricant residue in equipment.

GWA conducts manual bush-cutting maintenance at all operational water/wastewater facilities, including activities at the Asan Springs Water Supply Facility. The past use of pesticides or herbicides for groundskeeping at the complex is unknown.

The current buildings at the Asan Springs Water Supply Facility were built after regulations under the Resource Conservation Recovery Act, and subsequent amendments, were developed for proper handling of petroleum and other hazardous materials. There is no evidence of dumping of unused and used oils or other petroleum products at the Asan Springs Water Supply Facility. There are no records of gasoline or diesel contamination within the water system located at the Asan Springs Water Supply Facility. It is unknown whether existing fuel is within the generator fuel lines at the Asan Springs Water Supply Facility or in the day-tank and fuel tank (Diaz 2023).

If residual amounts of hazardous materials were present when past facilities were demolished decades ago, it is likely that they were in small quantities and have degraded over time. No known contamination is present on site.

The NPS does not currently conduct any land, vegetation, or other management or maintenance activities in the location of the proposed project and does not plan to change those practices in the future. GWA is currently maintaining water lines through the current site and clearing vegetation within the fenceline, and does not plan to change those practices in the future.

Environmental Consequences

No-Action Alternative

Under the no-action alternative, the Asan Springs Water Supply Facility would not be restored. The buildings and reservoir would continue to degrade and potentially introduce hazardous materials to the environment.

Proposed Action

The proposed renovation and construction at the Asan Springs Water Supply Facility would involve the use of hazardous materials such as fuels, oils, lubricants, paint, and other miscellaneous materials. The structural concrete deficiencies inside the impoundment structure would be repaired by applying epoxy bonding materials. The existing chlorinator building would be demolished after existing equipment is removed, and a new chlorination building would be constructed with new equipment. The pump station building would be modified by removing the existing generator, fuel system, and electrical system, and replacing them with new systems. The fuel lines, day-tank, and storage tank could contain diesel fuel that would be drained and stored by the construction contractor for proper disposal off site. The ventilation openings would be removed and replaced. The water piping entering and exiting the building would also be removed and replaced. Hazardous materials brought onsite for reconstructing the system would be removed daily by the construction contractor.

The system would be operated via an electrical connection from the village of Asan, but a diesel-powered emergency generating system would be relied on when electrical power is out. The Guam Power Authority would maintain the electrical system via a Memorandum of Agreement with GWA. GWA would test the emergency generator on a regular basis, likely quarterly. The water treatment system would include two 150-pound chlorine gas cylinders. GWA would access the site daily to take water samples, check chlorination feed systems, and perform general maintenance activities. Containers of lubricants, oils, cleaning materials, and other miscellaneous materials to maintain the system would be brought on site for use and removed after use. GWA would exchange empty chlorine gas cylinders with full chlorine gas cylinders approximately weekly. The chlorine gas quantities would be below threshold quantities of concern for a release that would present a public health risk. The treatment system would include alarm and venting systems.

Under the proposed action, a construction contractor would demolish and remove several components of the system and would repair other components. Adverse hazardous material impacts from construction are not anticipated. The construction contractor would follow construction specifications (including spill prevention and other BMPs) and safe handling of hazardous materials requirements. Operation of the restored system would be conducted in compliance with hazardous materials handling requirements, including use of chlorine gas for water treatment.

Cumulative

The NPS Unit Management Plan could result in impacts on or from hazardous materials because of the proposed improvements, but the impacts would not occur near the Asan Springs Water Supply Facility and would not be expected for several years after rehabilitation of the Asan Springs Water Supply Facility. A trail pathway shown in the NPS Unit Management Plan Newsletter (NPS 2022a) is only conceptual and would not likely be developed near the Asan Springs Water Supply Facility. Creation of the trail network would involve construction equipment and vehicles (which use fuel and other hazardous materials). Given

the anticipated distance from the Asan Springs Water Supply Facility, no adverse cumulative hazardous materials impact from construction, use, and maintenance of the trail are anticipated.

The GWA booster pump station near Consolation Court downgradient from the Asan Springs Water Supply Facility would be installed prior to the rehabilitation project. After the rehabilitation project is complete, the booster pump would likely be phased out and removed. Minor amounts of hazardous materials (such as oils, lubricants, and cleaners) would be used for installation and operation of the pump. The Asan Bridge and Marine Corps Drive improvements would occur primarily within the previous construction footprint. Construction equipment and vehicles (which use fuel and other hazardous materials) would be used for the transportation projects. Although these transportation projects could occur approximately at the same time as the rehabilitation project, the use of the hazardous materials would be occurring downgradient of the Asan Springs Water Supply Facility, use impacts would be minor, and would not affect the same ground. Consequently, cumulative impacts on or from hazardous materials in the area of the Asan Springs Water Supply Facility are not anticipated.

Conclusion

Under the no-action alternative, the Asan Springs Water Supply Facility would not be restored. The potential exists for system degradation and potential release of diesel fuel, oils, and other lubricants. Under the proposed action, a construction contractor would demolish and remove several components of the system and would repair other components. Adverse hazardous materials impact from construction are not anticipated. The construction contractor would follow construction specifications and safe handling of hazardous material requirements. Operation of the restored system would be conducted in compliance with hazardous materials handling requirements, including use of chlorine gas for water treatment. Appendix A includes BMPs for construction and operation of the restored system.

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CHAPTER 4: CONSULTATION AND COORDINATION

NPS coordinated with resource agencies and members of the public to allow an opportunity for input. The agency and public scoping process conducted in conjunction with the construction design document and EA development allows NPS to incorporate any substantive comments into the design and EA.

NPS sent scoping letters to agencies with a resource interest or permitting authority related to the Project. The letter detailed the Project purpose and need, described the Project components, and requested input on the Project. The following agencies received notice of the Project and responded. Table 2 provides the date of the letter to a specific agency and a summary of the key points of the response.

TABLE 1. AGENCY COORDINATION ON THE ASAN SPRINGS REHABILITATION PROJECT

Date	Correspondence	Correspondence Summary	Agency Summary
8/12/19	NPS letter to GWA	NPS asked GWA to review their application for a ROW permit to ensure that the most current information is provided, to provide a legal description and map of the ROW boundary, and to develop an EA with NPS as lead agency. NPS also asked GWA to verify ownership of the existing structures to be rehabilitated.	GWA coordinated with NPS to understand what is needed for the ROW permit to understand the NPS purpose and need of reviewing the application, identified ownership of existing structures, and developed an EA with NPS as lead agency.
1/30/20	U.S. Army Corps of Engineers email to GWA	The U.S. Army Corps of Engineers provided information on Clean Water Act Section 404(f) exemptions. If the Project does not modify the character, scope, or size of the original fill of a Water of the U.S., a permit is not required. Any modification to the location, type, or amount of fill used for the Project would require a permit.	GWA has determined that a Section 404 permit would not be required based on Section 404(f) exemptions.
3/16/21	NPS letter to USFWS	NPS requested a list of endangered, threatened, and candidate species and any critical habitat in the vicinity governed by Section 7 of the Endangered Species Act for the GWA rehabilitation project.	USFWS provided feedback in correspondence dated 4/15/21. Further coordination between NPS and USFWS continued through completion of a Biological Assessment and Biological Opinion.
6/22/21	NPS letters to Guam Department of Agriculture (DOAG), Aquatic and Wildlife Resources, Forestry and Soil Resources; and GEPA	NPS provided a Project update and requested feedback from the agencies. DOAG Aquatic and Wildlife Resources oversees federal- and state-listed protected resources. DOAG Forestry and Soil Resources conserves, protects and enhances Guam's vegetative environment. GEPA oversees protection of air, water, and land resources on Guam.	DOAG, Aquatic and Wildlife Resources provided feedback in correspondence dated 7/1/21; and GEPA provided feedback in correspondence dated 8/10/21.
10/19/21	NPS letter to GSHPO	NPS provided a Project update and requested feedback from GSHPO concerning Section 106 of the National Historic Preservation Act.	GSHPO provided feedback via correspondence dated 12/28/21.

CONSULTATION AND COORDINATION

Date	Correspondence	Correspondence Summary	Agency Summary
4/15/21	USFWS letter to NPS	USFWS provided a list of listed threatened and endangered species and noted that birds protected under the Migratory Bird Treaty Act may be present in the Project Area. USFWS also noted that there is no proposed or designated critical habitat in the Project Area.	GWA conducted a biological field survey to review listed species, documented the species found, and provided a survey report to NPS and DOAG. NPS provided the report to USFWS during informal consultation.
7/1/21	DOAG, Aquatic and Wildlife Resources letter to GWA	A biological survey, completed by a certified biologist, is required at the site to determine the absence or presence of listed threatened and endangered species. DOAG listed six species that may be present at the Project site. There is no proposed critical habitat at the Project site. Vegetation removal must be minimal. Prior to any vegetation removal, the Division of Aquatic and Wildlife Resources must be notified and authorized to conduct a survey for the presence of protected species.	GWA conducted a biological field survey to review listed species, documented the species found, and provided a survey report to NPS and DOAG. GWA also coordinated with NPS, DOAG, and USFWS, and confirmed that preparation of a BA was warranted to review the potential for adverse effects on protected species. A BA was prepared and identified methods for survey of protected species prior to construction activities.
8/10/21	GEPA letter to GWA	In response to the NPS letter to GWA requesting an EA, GEPA determined that the proposed Project is not likely to have a significant impact on the environment if BMPs are followed during construction. GEPA had further comments regarding the design of the stormwater system meeting stormwater management and erosion and sediment control regulations, diversion of upstream stormwater runoff, and disinfection of water facilities.	The GWA Project is being designed for the capture of upstream stormwater and spring runoff, and proper disinfection of water from the upgraded facilities. GWA would meet stormwater management and erosion and sediment control regulations, and would follow BMPs during construction and operation of the upgraded and restored facilities.

Date	Correspondence	Correspondence Summary	Agency Summary
12/28/21	GSHPO letter to NPS	<p>GSHPO indicated that the Project is within the NRHP-listed Asan Ridge Battle Area (GHPI number 66-01-1056). The Asan Springs Reservoir (GHPI number 66-01-2898) is eligible for listing in the NRHP. The Project is also next to the NRHP-listed Asan Archaeological Site (GHPI number 66-01-0154). GSHPO requested the acreage of the APE, an update of the AMDP and incorporation of stipulations into the methodologies and reporting documentation, and a map showing the GHPI sites within 0.25 mile of the site. GSHPO indicated that there needs to be exceptional execution of the AMDP, and that the contractor needs to be working with a qualified archaeologist on site and protocols set up to ensure execution of the AMDP.</p> <p>GSHPO concurred with a No Historic Properties Affected determination with the aforementioned stipulations in place.</p>	GWA is updating the AMDP and will provide GSHPO with the updated AMDP, APE acreage, and a map of GHPI sites within 0.25 mile of the proposed Project improvements. Requirements of the AMDP would be implemented during construction activities.
9/26/22	NPS letter to USFWS and DOAG	NPS transmitted a BA to USFWS and DOAG to address potential impacts of the proposed project on the Mariana fruit bat and Guam tree snail.	NPS, USFWS, and DOAG held coordination meetings in advance of the BA completion. Input from USFWS and DOAG was considered in drafting the BA.
9/27/22	USFWS letter to NPS	USFWS acknowledged receipt of a BA for the Mariana fruit bat and Guam tree snail and has all information necessary to initiate formal consultation for the Project.	USFWS reviewed the BA; provided comments to NPS, which were resolved; and provided a BO with requirements and guidance to follow to not adversely affect the threatened Mariana fruit bat. The BO determined that the proposed action is not likely to jeopardize the continued existence of the Guam tree snail. GWA will follow the USFWS requirements and BMPs regarding protections for the Mariana fruit bat and Guam tree snail.
5/2/23	NPS letter to GSHPO	NPS transmitted an updated AMDP to GSHPO in response to GSHPO letter on 12/28/21.	Per GSHPO request, the updated AMDP included a defined area of potential effect, detailed soil descriptions in areas to be trenched, and a map showing GHPI sites with a ¼ mile radius of the project site.
11/8/23	GSHPO letter to NPS	GSHPO responded to NPS letter of 5/2/23	GSHPO provided comments requesting modifications to the AMDP, indicating that if the proposed methods are followed, GSHPO will accept the discovered materials. They also indicated that in their December 28, 2021 response, the effect finding should have been No Adverse Effects.

NPS issued a press release on March 29, 2022, soliciting input from the public on the proposal to restore the Asan Spring Water Supply Facility. NPS's public scoping period was open from March 29 to April 30, 2022. The scoping period was advertised through the press release and posted on NPS's Planning, Environment & Public Comment (PEPC) website

(<https://parkplanning.nps.gov/projectHome.cfm?projectId=99430>). The website contains the press release, an Asan Springs Restoration Background Information document, the Historic American Engineering Record for Asan Springs, and the Biological Survey Report for Asan Springs.

A public meeting was held on April 19, 2022, at the mayor's office in the village of Asan. The materials available at the meeting included a PowerPoint presentation, a sign-in sheet, and a comment form. The meeting started with an NPS presentation on the Project and the processes that will be needed to allow construction and operation of the updated and restored facility. Following the presentation, the public asked questions, and NPS and GWA attendees responded to the questions. The public had the option of leaving comments at the public meeting, submitting comments via the NPS PEPC website, or sending comments by mail to the superintendent.

A summary of key comments (in italics) and responses to the comments follows:

- *A commenter indicated that water was running down Nino Perdido Street and creates a slippery road.* GWA responded that it wasn't a water supply issue associated with the proposed Project, but a storm drain issue that was the responsibility of the Department of Public Works. GWA also stated that the storm drain system receives overflow water from the Project site since the shutdown of the facility. Restart of the facility would capture and thus remove that overflow water from entering the storm drain system. The water runoff problem has subsequently been resolved.
- *A commenter from the village of Asan indicated that the water supply system has an issue with low water pressure, and some residents have installed their own pumps.* GWA responded that there is a known water pressure issue that has been reported. Water is currently coming from further north of the village of Asan, and pressure drops can be seen during the peak demand. There are plans to provide a booster pump separate from the Project to help increase the water pressure. Restart of the facility would provide an additional water source in the village of Asan and would additionally improve water pressures. Pumps would be on site for the restored system and would provide better pressure in the village.
- *A commenter indicated that the water system provided great water in the past, and understands why the system had to be shut down. What is the biggest stumbling block to restarting the system?* GWA responded that various environmental actions are required, and then the ROW easement is needed from NPS to be able to construct and operate the water supply, treatment, and distribution system.
- *A commenter asked why was there a transfer of land to NPS?* NPS responded that in preparing land for transfer to establish the park, a portion of the facility around the spring was inadvertently included. The survey was done via desktop, not an actual boundary survey in the field. Currently, NPS is surveying lands throughout their holdings and are finding other areas of encroachment.
- *A commenter stated that the time frame to get the system operational in October 2024 seems long.* NPS indicated that a number of processes are required with various agencies, including addressing threatened and endangered species with DOAG and USFWS, and cultural resources through GSHPO.

Subsequent to the public meeting, no additional comments were received.

This EA will be available for access on the NPS PEPC website to facilitate public review and comment during a 30-day period following publication of the EA. Hard copies will also be available for review. Comments and other input will be summarized in the resulting decision document.

Coordination with the resource agencies will continue, as needed, prior to and during construction of the Project.

CHAPTER 5: LIST OF PREPARERS

The preparers of and contributors to the EA are identified below.

National Park Service: Tim Clark, Cultural and Natural Resources Manager; Barbara Alberti, Superintendent

Guam Water Authority: Brett Railey, P.E., Water Engineering Supervisor; Ryan Diaz, Project Engineer;
George Watson, Project Engineer

HDR: Nick Manley, P.E., Project Manager; Brian Goss, NEPA Lead; Becky Ralston-Hawkins, Lead Biologist;
Jennifer Abrincia, Biologist; Randy McCart, Senior Scientist; Shannon McKinley, Scientist; Kelly Farrell, QC
Reviewer; Rebecca Baker, QC Reviewer; Kim Gust, Editor

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APPENDIX A

1.0 RESOURCE PROTECTION MEASURES FOR THE ASAN SPRINGS WATER SUPPLY FACILITY RESTORATION PROJECT

The measures listed in Table A-1 will be implemented as best management practices (BMPs) to avoid or minimize environmental impacts of the Asan Springs Water Supply Facility restoration project. Specific measures to minimize, avoid, and conserve protected species are addressed in Sections 2.0 and 3.0 of this appendix.

TABLE A-1. RESOURCE PROTECTION MEASURES

Resource Category/Action	Responsible Party
General	
Clearly state all resource protection measures in the construction specifications and instruct workers to avoid conducting construction activities outside the Project Area. Clearly indicate areas of concern on construction drawings.	Guam Waterworks Authority (GWA)
Hold a preconstruction meeting to inform contractors about sensitive areas, including natural and cultural resources, and provide procedures for identifying and addressing any unanticipated discoveries of natural and cultural resources.	GWA
Delineate construction zones outside existing disturbed areas with flagging and confine all surface disturbance to the construction zone.	GWA
Site staging and storage areas for construction vehicles, equipment, materials, and soils in previously disturbed or paved areas approved by the National Park Service (NPS). These areas will be clearly identified in advance of construction.	GWA
Remove all tools, equipment, barricades, signs, and surplus materials from the project area upon completion of the project.	Construction contractor
An accident prevention plan, including a job hazard analysis for applicable hazards, will be required for construction. The plan will address the following: <ul style="list-style-type: none"> • Fires • Slides • Floods • The nature of construction work • Site conditions • Required project inspections • Safety meetings 	Construction contractor
Air and Noise	
To reduce noise and air quality impacts, Require contractors to properly maintain construction equipment and use mufflers to minimize noise, and do not allow construction vehicle engines to idle for extended periods.	GWA
Heavy equipment use would primarily occur during normal weekday business hours	Construction contractor
Project construction will proceed in compliance with Guam mandated requirements on air quality including Chapter 1-1130, Visible Emissions Regulation; Chapter 1-1126, Open Burning; and Chapter 1-1128, Control of Fugitive Dust.	Construction contractor
Biological	
To avoid harming nesting birds (including migratory birds), surveys or monitoring during construction will be conducted; areas where active nests are found will be avoided; and/or other measures will be taken to avoid harming any birds, nests, or eggs. During construction, a biological monitor will conduct spot checks of daily activities.	Construction contractor
The Project will follow requirements of the U.S. Fish and Wildlife Biological Opinion and related requirements included in Sections 2, 3, and 4 of this appendix.	GWA and construction contractor

Resource Category/Action	Responsible Party
Archaeological	
The construction contractor will work with a qualified archaeologist on site with protocols to ensure execution of an NPS- and GSHPO-approved Archaeological Monitoring and Discovery Plan (AMDP).	Construction contractor, qualified archaeologist
Vegetation	
All vegetation waste will be removed from the site and disposed at a Guam Environmental Protection Agency (GEPA)-approved disposal facility.	Construction contractor
All disturbed areas will be revegetated with grass or native vegetation as appropriate and necessary.	Construction contractor
A 20-foot-wide buffer around the concrete swale will be maintained as low grass through regular mowing. Mowing is expected to be required every month at a minimum.	GWA
Water Quality	
Following improvements, GWA will access the site daily to take water samples, check chlorination feed systems, and perform general maintenance activities throughout the operation of the facility. GWA will exchange empty chlorine gas cylinders with full chlorine gas cylinders approximately weekly. Water quality will be tested to confirm it is meeting water quality standards prior to distribution.	GWA
Hazardous Materials	
The existing fuel lines, day-tanks, and storage tanks could contain diesel fuel that, if present, will be drained and stored by the construction contractor for proper disposal off site.	Construction contractor
Hazardous materials brought onsite for reconstructing the system will be removed daily by the construction contractor.	Construction contractor
The construction contractor will follow construction specifications (including spill prevention and other BMPs) and safe handling of hazardous materials requirements.	Construction contractor
Workers would be required to wear protective gear such as ear protection, steel-toed boots, hard hats, gloves, and other appropriate safety gear.	Construction contractor
Contractors will be required to establish and maintain health and safety programs for their employees.	Construction contractor
If contaminated soils are discovered during construction activities, all activities will be stopped, and appropriate remedial measures will be implemented.	Construction contractor
Contractors and GWA staff will be properly trained on chemical, physical, and biological hazards as well as ergonomic stressors associated with construction and operations.	Construction contractor and GWA
Containers of lubricants, oils, cleaning materials, and other miscellaneous materials to maintain the system will be brought on site for use and removed after use.	GWA
GWA will exchange empty chlorine gas cylinders with full chlorine gas cylinders approximately weekly throughout the operation of the facility. The chlorine gas quantities will be below threshold quantities of concern for a release that would present a public health risk. The treatment system will include alarm and venting systems.	GWA
Operation of the restored system will be conducted in compliance with hazardous materials handling requirements, including use of chlorine gas for water treatment.	GWA

2.0 THREATENED AND ENDANGERED SPECIES MINIMIZATION, AVOIDANCE, AND CONSERVATION MEASURES FROM THE USFWS BIOLOGICAL OPINION

The following measures will be implemented to minimize or avoid and conserve the Guam Tree snail. These measures include general BMPs and Guam tree snail survey and translocation measures that will be taken should one or more Guam tree snails be detected in the project area. One of the measures applies solely to Mariana fruit bat and is noted in *italics*. The Asan Springs Water Supply Facility project is located within the Village of Asan, Guam (Figure 1).

2.1 GENERAL SITE BEST MANAGEMENT PRACTICES

1. Prior to site entry for site preparation, demolition and construction, or operations, GWA staff and contractors will be trained about proper avoidance measures for protected species, including any pre-disturbance survey requirements, unique flagging used, prohibitions against unauthorized clearing of vegetation, and biosecurity BMPs.
2. GWA will require their construction contractor to follow a biosecurity plan to avoid introduction or spread of new invasive plant or animal species to or from the site. The biosecurity measures are listed under the heading "Biosecurity Measures."
3. Construction activities will be conducted during the day: between 30 minutes after sunrise and 30 minutes before sunset.
4. Personnel working on site will be prohibited from burning of trash, disposing of excess soil, green waste, or solid and sanitary waste in unauthorized locations, or refueling of vehicles and equipment.
5. Storage of hazardous substances or petroleum products will not occur on-site other than designated areas with proper spill protection.
6. Dust suppression through sprinkling water and/or dust barriers will occur throughout the site when conditions warrant.
7. A line of demarcation will be established and clearly visible along the edge of the vegetation clearing boundary prior to any demolition or construction-related vegetation clearing.
 - a. People and equipment will be prohibited from movement past the line of demarcation into adjacent properties outside of the limits of vegetation clearing. General site access control will be enforced.
8. A dual-purpose physical barrier will be utilized to accomplish work separation from Guam tree snail (*Partula radiolata*) clusters as well as for dust mitigation. These barriers will be free standing (rebar anchored) along the edge of the vegetation clearing boundary. Barriers will be approximately 10 ft (3 m) high. Barrier material proposed is high-density polyethylene, polyetherimide with ultraviolet protection, shade rate of 30-90 percent, weight of 55-240 g/m², high strength, and easy fixing. The barrier will remain until the vegetation clearing, construction of the concrete swale, installation of the perimeter fence is complete, and any revegetation is re-established. Removal of the barriers will then be completed.
9. To avoid potential impacts to limestone forest plant pollinators and seed dispersers, outdoor lighting will be minimized, and construction work will not occur within 150 m (492 ft) of a Mariana fruit bat roost and when a Mariana fruit bat is seen flying or foraging within 150 m (492 ft) of construction activity, work will pause until the bat has left the area. The GWA will implement a contractor education program to ensure that construction contractor personnel are shown how to identify, respond, and report a Mariana fruit bat sighting. A dusk biomonitor survey will be done by an Authorized Biologist following JRM protocol (USFWS 2009).
10. The qualifications for an Authorized Biologist for the Guam tree snail include the following:
 - a. A bachelor's degree with an emphasis in botany, horticulture, ecology, or a related science
 - b. At least 100 documented hours of experience conducting translocation and monitoring of the species or a closely related species
 - c. Applicant must provide contact information of three references familiar with their work related to number 10.b

2.2 TREE SNAIL SURVEY, AVOIDANCE, AND TRANSLOCATION MEASURES

GWA and NPS will designate, with USFWS's approval, an Authorized Biologist(s) to serve as the environmental compliance monitor with the authority to schedule and perform any required surveys, coordinate installation of any physical avoidance and minimization features (e.g., silt, dust, and snail barriers), coordinate work stoppages/resumptions, conduct awareness training, and complete appropriate reporting. The environmental compliance monitor will be present when planning and conducting ad hoc or updated surveys and installing and removing environmental controls. The environmental compliance monitor will be on site monitoring for the duration of work that includes vegetation clearing or potential vegetation disturbance. The qualifications for the Authorized Biologist for the Guam tree snail are as described in number 10 above.

The Authorized Biologist(s) will conduct pre-impact tree snail surveys over the biological survey area (see Figure 2) as close as possible but no more than five days prior to the start of any site preparation or demolition and construction activities that require vegetation clearing. If vegetation clearing is localized, the pre-impact survey will be limited to the area within 30 ft (10 m) from the area where the work will occur. Vegetation clearing and construction personnel and equipment access at the Asan Springs Water Supply Facility will be strictly limited to that which is required for project completion and will be marked by a line of demarcation. Vegetation to be removed shall be inspected by the environmental compliance monitor for the presence of federally listed tree snails both one week prior to and the same day immediately prior to clearing activities. To date, tree snails have not been detected within the project vegetation clearing footprint. However, because tree snail survey detection probability may be low, and tree snails are mobile, there is a potential for tree snails to be found when vegetation is cut and closely examined during project activities.

If any Guam tree snails are detected in these surveys, the following additional measures will be taken:

1. Where tree snails are observed outside of the vegetation clearing project footprint, specific-colored flagging tape will be used to mark a 30 ft (10 m) buffer around the tree snails and construction personnel will not enter the tree snail buffer area.
2. After all visible tree snails are removed, branches, tree limbs, and vines will be removed manually from areas within 30 ft (10 m) of snail observation using hand tools and small powered equipment such as bush cutters. The limbs will be placed on the ground and searched by the monitor for snails. The green waste will be searched again the next day to ensure all snails are translocated before the green waste is removed. After the second search of green waste, the green waste will be removed from the site and disposed of at a GEPA-approved disposal facility. Immediately following vegetation removal, a biologist will inspect branches, limbs and vines for snails that may not have been visible during ground surveys. Any snails that are found in downed vegetation will be translocated.

2.3 TRANSLOCATION METHODS

The following translocation methods will be followed to minimize impacts on the tree snails. These have been derived from similar, recent translocation efforts with this species:

1. Prior to commencing Guam tree snail translocation, NPS will submit the statement of qualifications to USFWS notifying USFWS of the selection of an Authorized Biologist, defined above, for tree snail translocation. USFWS will review the individual's qualifications and will respond within 30 days with any concerns regarding the Authorized Biologist applicant.
2. Prior to vegetation clearing or construction activities, the Authorized Biologist will survey for and assess a tree snail translocation area with up to three release trees near the project site, where Guam tree snails continue to be present. A snail translocation site of approximately 0.50 ac (0.20 ha) is approximately 150 ft (46 m) to the southeast of the Asan Springs Site; this translocation site is on NPS property, is not planned for future development, and supports an existing population of the

Guam tree snail. The Authorized Biologist will conduct a tree snail survey of the translocation site and record the baseline number of individuals detected, the presence of ground shells and/or snails, the host plant that snails are observed on, the condition of overall vegetation density for snail suitability, and signs of tree snail predators.

3. Tree snails salvaged from within the vegetation clearing boundary will be collected and will be placed in a 32-ounce plastic ventilated insect cup for holding with no more than 10 tree snails (both juvenile and adult sized) per cup. Each cup will be partially filled with suitable vegetation from the salvage site and moistened with water (bottled water if rainwater is not available) to provide a resting surface for the snails. The tree snail species, GPS location of the home plant, and home plant species will be recorded. Each tree snail salvaged will be marked with a black dot using a non-toxic paint pen.
4. Salvaged tree snails will be translocated the same day; no tree snails will be held overnight. Snails will be transported by hand (no vehicles required) to an approved translocation area and placed on a pre-selected recipient tree.
5. Salvaged tree snails will be inventoried, then prudently transferred by hand along with its respective vegetation into a second 32-ounce plastic insect cup to allow the tree snails to disperse autonomously. The second cup will be considered as the “release cup” and it will be secured approximately 4.9 ft (1.5 to 2 m) above ground level on the recipient tree using an aluminum craft wire that serves as a bungee to hold the cup in place. Placing translocated snails 4.9 ft (1.5 to 2 ft) above ground level should minimize attraction of Manokwari flatworms in the short-term during release and is the greatest distance easily reached without climbing or use of a ladder.
6. If conditions are dry at the time of release, the interior of the release cup may be lightly misted with a spray bottle of water to encourage movement and dispersal from the release cup. The release cup will be perforated to allow drainage in the event of rain and placed in a shaded location.
7. Release cup(s) will be checked every day until all snails have left the cup(s), then the cup(s) will be removed.
8. Tree snails released at the translocation recipient site will be monitored twice a month during the course of vegetation clearing and for an additional 6 months once vegetation clearing, surface disturbance, and dust-generating activities are complete (as identified in Best Management Practices). Monitoring surveys will follow the methods of Lindstrom and Benedict (2014). A circular quadrat with a diameter of eight meters (50 square meters) centered on the trunk of the recipient tree(s) will constitute the monitoring area. Vegetation in the monitoring area will be searched for one person hour. If necessary, binoculars may be used to observe upper tree canopy areas in the monitoring area. The number of marked and un-marked tree snails will be recorded.
9. In addition, the ground in the quadrat will be searched for tree snail ground shells and the number of marked and unmarked ground shells recorded. All ground shells will be removed from the monitoring quadrat when the first salvaged tree snails are released, and ground shells will be removed following each monitoring survey. Shells removed from the quadrat will be deposited within the tree snail population area, but away from the monitoring quadrat. The temperature, humidity, precipitation, and wind speed and direction will also be measured at the start of each monitoring survey.

2.4 GUAM TREE SNAIL PROJECT MONITORING REPORTS

The environmental compliance monitor will provide daily monitoring reports (including photographic record) during activities that involve vegetation clearing or disturbance. Monitoring will include inspection, maintenance, and reinforcement of restrictions when necessary relative to all avoidance measures.

The Authorized Biologist will prepare and NPS will submit a final report of salvage and translocation activities to USFWS. The report shall include details on the type of activities conducted (e.g., salvage, translocation, monitor), photographs, a comparison of baseline and final population numbers at the translocation site, and recommendations or lessons learned.

2.5 AMOUNT OR EXTENT OF TAKE ANTICIPATED

Based on the USFWS analysis presented in their Biological Opinion, the Service anticipates the following take may occur as a result of the proposed action:

1. USFWS anticipates all Guam tree snails within the 0.24 ac (0.1 ha) will be taken in the form of capture during translocation activities or in the form of harm due to injury or death from exposure to crushing or trampling during vegetation clearing activities.

2.6 EFFECT OF THE TAKE

In the accompanying biological opinion, USFWS determined that this level of anticipated take is not likely to jeopardize the continued existence of the Guam tree snail in the wild.

2.7 REASONABLE AND PRUDENT MEASURES

USFWS believes the following reasonable and prudent measure(s) are necessary and appropriate to minimize impacts of incidental take of the Guam tree snail:

1. Ensure that where practicable, field crews salvage any injured, dying, or freshly dead individuals of the Guam tree snail they are made aware of.
2. Monitor and report on the level of take of the Guam tree snail.

2.8 TERMS AND CONDITIONS

In order to be exempt from the prohibitions of Section 9 of the Endangered Species Act, the NPS must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

2.8.1 Monitoring and Reporting

Report to the Pacific Islands Fish and Wildlife Office Field Supervisor in Honolulu Hawaii, the number and locations of any Guam tree snails detected during field work. If practicable include GPS points.

Report to the Pacific Islands Fish and Wildlife Office Field Supervisor in Honolulu Hawaii, all known instances of injury or death of a Guam tree snail. If practicable include GPS points and photos.

2.8.2 Salvage of Species

The National Park Service shall inform the Field Supervisor of USFWS's Pacific Islands Fish and Wildlife Office in Honolulu, Hawaii, in writing of take of any federally listed species within three (3) working days. In case of injury or mortality of listed species for which take has occurred, please contact Guam Department of Agriculture, Division of Aquatics and Wildlife Resources (DAWR) at (671) 735-0294. Individuals found with serious injuries that will likely compromise their survival or subject them to undue pain and suffering may be humanely euthanized based on review and approval from a licensed veterinarian or State licensed and/or a federally permitted wildlife rehabilitation facility. Euthanasia must follow American Veterinary Association Guidelines available at <https://www.avma.org/KB/Policies/Documents/euthanasia.pdf>.

Dr. Kevin Malakooti is currently the only veterinarian identified under DAWR's permit to assess and treat listed Threatened and Endangered species in Guam. Dr. Malakooti's clinic number is (671) 637-8387. In the event that an individual is euthanized, PIFWO must be notified within 24 hours at (671) 989-6743 or (808)792-9400.

2.8.3 Designated Repositories

Department of Agriculture, Division of Aquatics and Wildlife Resources, 163 Dairy Road, Mangilao, Guam 96913 (telephone: (671) 735-0294).

Bernice Pauahi Bishop Museum, Vertebrate Collection Manager, 1252 Bernice Street, Honolulu, Hawaii 96817 (telephone: (808) 847-3511).

If the DAWR is not able to receive dead specimens, please contact the Bernice Pauahi Bishop Museum. If the Bernice Pauahi Bishop Museum does not wish to accession the specimens, USDA APHISWS should contact USFWS's Division Office of Law Enforcement in Honolulu, Hawaii (telephone: 808/861-8525; fax: 808/861-8515) for instructions on disposition.

Inform the Field Supervisor of USFWS's Pacific Islands Fish and Wildlife office in writing within three (3) working days of any injured threatened or endangered species found and the actions taken as well as any disposition of dead listed species. Care must be taken in handling any dead or injured specimens of proposed or listed species to preserve biological material in the best possible state. In conjunction with the preservation of any dead specimens, the finder has the responsibility to ensure that evidence intrinsic to determining the cause of death of the specimen is not unnecessarily disturbed. The finding of dead or injured specimens does not imply enforcement proceedings pursuant to the ESA. This reporting requirement enables USFWS to determine if take is reached or exceeded and to ensure that the terms and conditions are appropriate and effective.

USFWS believes that no more than 240 Guam tree snails will be incidentally taken as a result of the proposed action. The reasonable and prudent measures, with their implementing terms and from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of this consultation and review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of such taking and review with USFWS the need for possible modification of the reasonable and prudent measures.

2.9 MARIANA FRUIT BAT AVOIDANCE AND MINIMIZATION MEASURES

Because the action area includes suitable habitat for the Mariana fruit bat, the project design incorporates the Service's standard recommended measures to reduce the likelihood the project may affect this sensitive species. Construction work will not occur within 150 m (492 ft) of a Mariana fruit bat roost and when a Mariana fruit bat is seen flying or foraging within 150 m (492 ft) of construction activity, work will pause until the bat has left the area. GWA will implement a contractor education program to ensure that construction contractor personnel are shown how to identify, respond, and report a Mariana fruit bat sighting.

Additional pre-construction biomonitor surveys for Mariana fruit bats and bat roost sites will be conducted up to one week prior to the onset of vegetation clearing. Any pause in work beyond seven days in vegetation clearing will trigger additional surveys. These surveys will follow JRM protocols (USFWS 2009).

All construction and maintenance work are expected to occur during daytime hours. Although GWA does not expect night work to occur the following conservation measures will be implemented should unforeseen night construction or exterior maintenance work be required:

- A dusk biomonitor survey following JRM protocol (USFWS 2009); and
- When installing permanent lights, and if appropriate for antiterrorism force protection or airspace safety criteria, GWA will use downward facing, shielded or full cut-off lens lights (with the lowest

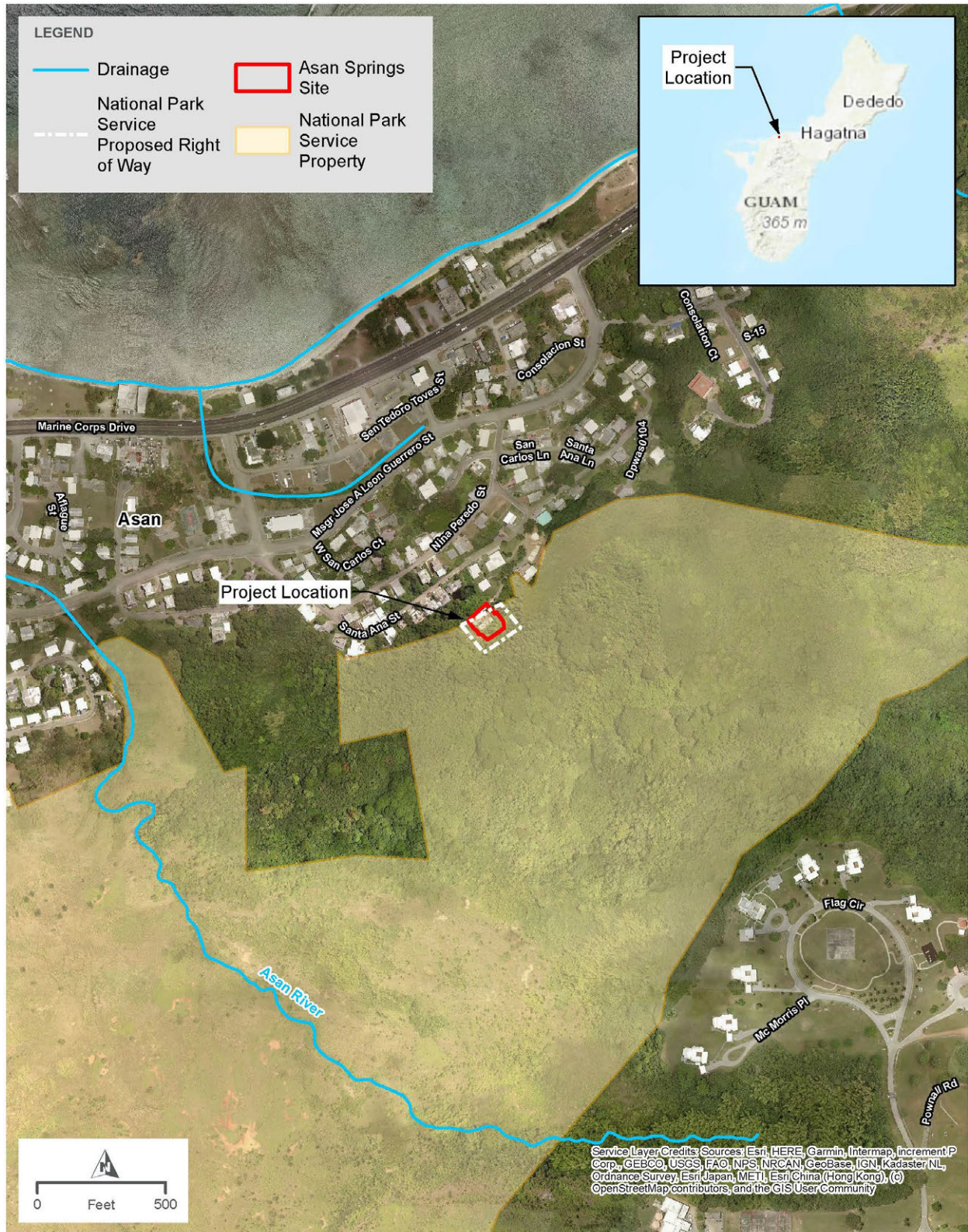
lumens necessary). Properly shielded or full-cutoff lens illumination can only be seen below the horizontal plane at the fixture height. To avoid vertical glare and illumination of forest habitats, should temporary lighting be needed for nighttime work, only downward-facing, full cutoff-off lens lights or fully-shielded lights will be used.

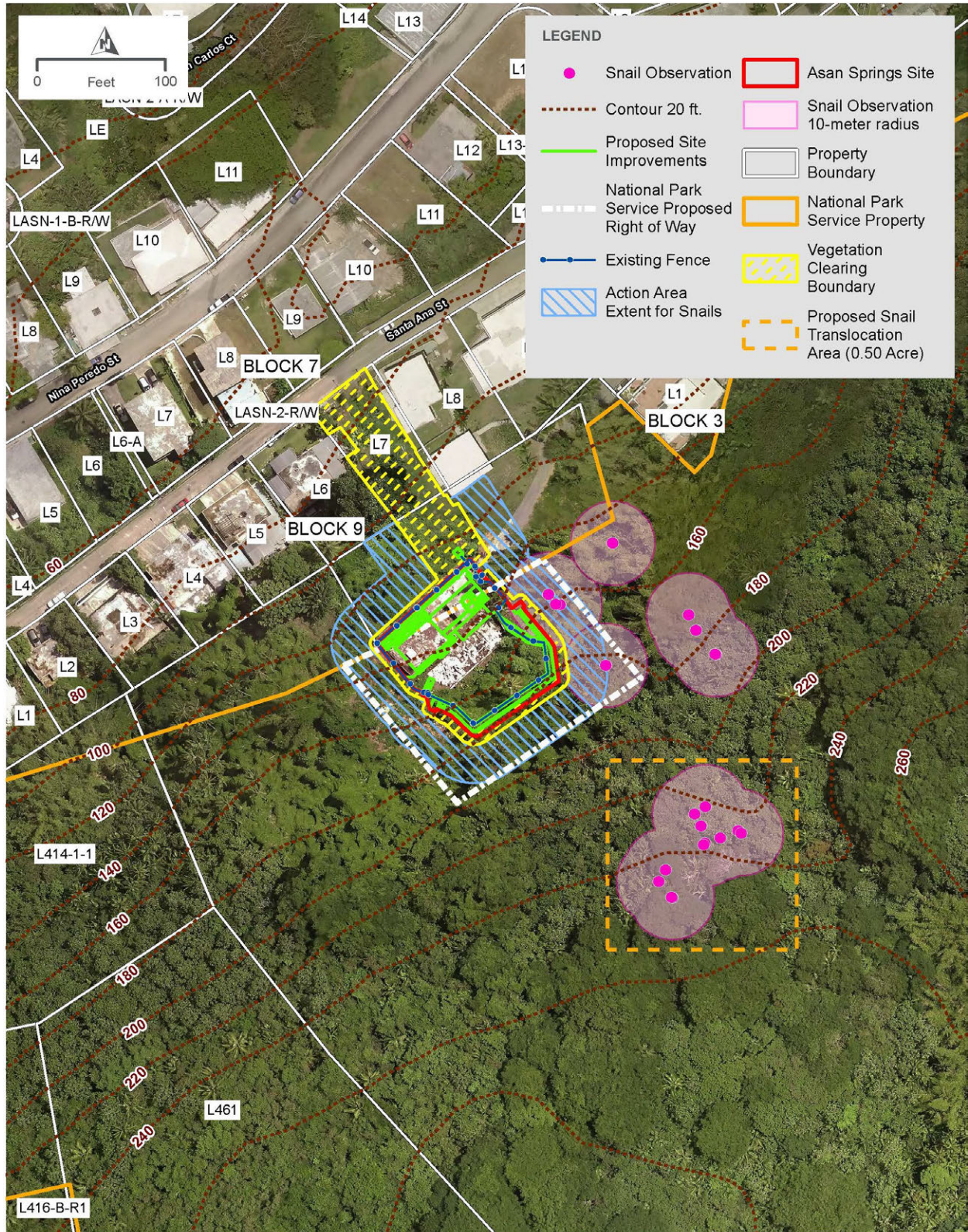
2.10 CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species.

Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

USFWS does not offer any additional conservation recommendations as all USFWS recommendations have been incorporated into the project design.





**ACTION AREA AND PROPOSED TRANSLOCATION SITE
ASAN SPRINGS WATER SUPPLY FACILITIES**

FIGURE 2

PATH: Z:\PROJECTS\GUAM\110043639_ASAN_SPRINGS\MAP_DOCS\IDRAFT\MAP_0X11_FIGURE_4_PROPOSED SNAIL TRANSLOCATION AREA.MXD - USER: AIBITOYE - DATE: 4/8/2023

3.0 BIOSECURITY MEASURES

To minimize the risk of introducing harmful species of animals and plants the following biosecurity measures will be adhered to. Implementation of the plan is developed to preclude the movement and establishment of undesirable species. In addition, measures listed here, some of which exceed those in the plan, will be fully implemented:

- All construction personnel will read the entirety of the plan prior to going to the work site.
- All observations of nonnative species of concern (e.g., rodents, shrews, predatory flatworms) will be reported to Guam DAWR and USFWS within 24 hours.
- The materials, tools and machinery will be inspected by an authorized biologist for signs of flatworms, rodent or snake activity and additional biosecurity risks such as seeds prior to entry of equipment to the project site. Rodent sign includes droppings, gnawed equipment and wiring and food caches. Brown tree snake (BTS) signs include snakeskin sheds.
- To the greatest extent possible, equipment will remain on site for the duration of the project to minimize contamination with other sites.
- Regular trash will be removed daily or sealed tight to prevent spillage or animal access.
- Each personnel entering the project site will come with clean field clothing and footwear, thoroughly cleaned of all potential seeds, spores, ants, or other invasives. Soles of shoes will be sprayed with a diluted bleach solution and scrubbed with a brush prior to entering the site. Any personnel entering the project site from another project site the same day, where clothing has been subjected to potential biosecurity risks, will maintain a separate set of clean field clothing to use for the project site.

3.1 WILDLIFE AWARENESS TRAINING

- DAWR personnel or an authorized biologist will conduct on-site training prior to the commencement of field work in order to provide specific details for wildlife recognition, avoidance measures, and precautions to field personnel.
- Field personnel will be trained (via field orientation conducted by DAWR personnel or an authorized biologist) to identify endangered species and signs of presence (nests, trails, habitat, etc.).
- DAWR or an authorized biologist will also conduct regular pre-activity surveys during the course of the field effort, after which they will provide applicable updates to field personnel based on wildlife sightings, nests, weather, etc.

3.2 BIOSECURITY MEASURES FOR INVASIVE SPECIES

- Several invasive species are of primary concern for this project:
- Flatworms – Flatworms are a direct threat to the tree snails and should be monitored for and equipment cleaned prior to entering the work site to prevent the spread.
- Rats – Rats remain a potential threat via inadvertent transport from machinery and improper waste collection.
- Coconut rhinoceros beetles – The coconut rhinoceros beetle has been attacking coconut trees on Guam since it was first discovered on the island in 2007.
- Little fire ants – Little fire ants are widespread on Guam and are a potential threat to the work site via inadvertent import from other infested locations.

- Brown tree snake –There are currently cooperative effort between the USDA-APHIS Wildlife Services, DAWR, U.S. Geological Survey, USFWS, and Iowa State University for brown tree snakes. Check equipment before entering the site and follow instructions below if a brown tree snake is found.

3.3 INITIAL DAWR AND USDA-APHIS INSPECTIONS FOR INVASIVE SPECIES

- All equipment being mobilized to the work site will be thoroughly inspected for brown tree snakes and other invasive species prior to commencing work. This includes heavy equipment, vehicles, small equipment, and personal items (backpacks, bags, buckets, etc.).

3.4 PRE-WORK CLEANING AND INSPECTION OF EQUIPMENT, SUPPLIES, AND MACHINERY

- All vehicles, machinery, boots, and equipment will be cleaned, inspected by its user, and found free of mud, dirt, debris, seeds, and invasive species prior to entering the work site or re-entering the site.
- Vehicles, machinery, and equipment will be washed by the rental agency before delivery to the project. Project personnel will inspect and confirm it is clean prior to acceptance. Areas of particular concern on vehicles and equipment include bumpers, grills, hood compartments, areas under the battery, wheel wells, undercarriage, cabs, and truck beds, where debris or material may have accumulated.
- The interior and exterior of vehicles, machinery, and equipment will be free of rubbish and food, and vehicle interiors will be vacuumed clean.

3.5 GREEN WASTE

- To prevent the spread of the coconut rhinoceros beetle (*Oryctes rhinoceros*), green waste or soil should not be transported except to designated waste sites. Designated green waste disposal sites should be managed with coconut rhinoceros beetle traps.
- All waste generated from the Asan Springs project site will be packed off after a period of no longer than two (2) weeks and will require daily application of a gill net to prevent coconut rhinoceros beetle from entering the green waste.

3.6 RESPONSE AND REPORTING FOR INVASIVE SPECIES

3.6.1 What To Do if Coconut Rhinoceros Beetles are Found

- Contact Guam’s Department of Agriculture, Biosecurity Division Invasive Species Hotline at: (671) 475-7378, or biosecurity@doag.guam.gov.
- If green waste is found to be infested, trapping should be used to prevent coconut rhinoceros beetles from spreading and damaging palm trees.
- A gill net with a 1-inch mesh measured knot to knot, made from 0.25-mm nylon monofilament, should be laid over piles of green waste.
- If the green waste site is within or adjacent to chain link fencing, the use of the DeFence trap is recommend. These are simply constructed with a 12-foot piece of tekken netting, folded in half, and secured onto a fence line using zip ties. In the middle of the net, attach a solar powered ultraviolet LED light, and a coconut rhinoceros beetle pheromone lure protected in a red Solo cup. This trap is currently the most effective because it does not require many materials and uses the least amount of space on the property. For more information on coconut rhinoceros beetles, visit <https://dlnr.hawaii.gov/hisc/info/invasive-species-profiles/coconut-rhinoceros-beetle/>.

3.6.2 What To Do if Little Fire Ants are Found

- Contact Guam's Department of Agriculture, Biosecurity Division Invasive Species Hotline at: (671) 475-7378, or biosecurity@doag.guam.gov.

3.6.3 What To Do if Brown Tree Snakes are Found

- Call (671) 777-HISS (4477) for snake sightings.
- If possible, the field crew will attempt to capture or kill any brown tree snake that is found using the following procedures:
- Place a bucket over the head of the snake and allow a small space for the snake's body to follow the head until the entire snake is underneath the bucket.
- Once the snake is completely under the bucket, press the bucket down and use a heavy weight, such as a cement block, to keep it in place. This method works only on a firm, flat surface.