NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT FACT SHEET

April 1, 2025

Permittee Name:	U.S. Naval Base Guam
Facility Name:	Apra Harbor Wastewater Treatment Plant and Collection System
Mailing Address:	PSC 455 Box 152 FPO AP, Guam 96540-199
Facility Location:	Apra Harbor U.S. Naval Base Santa Rita, Guam 96915
Contact Person(s):	Ramon Camacho, Hydrologist U.S. Naval Base Guam, Apra Harbor Wastewater Treatment Plant (671) 339-3711, ramon.camacho@fe.navy.mil David Weakley, DZSP21, LLC (Operator) (671) 339-1794, david.weakley.ctr@fe.navy.mil
NPDES Permit No.:	GU0110019

I. STATUS OF PERMIT

The U.S. Navy ("the permittee") permittee is currently discharging under National Pollutant Discharge Elimination System (NPDES) permit GU0110019, issued on March 13, 2017, with an effective date of May 1, 2017. The permit authorizes the discharge of treated effluent from Apra Harbor Wastewater Treatment Plant and collection system to Tipalao Bay, located in the Philippine Sea of the Pacific Ocean.

The permit expired on April 30, 2022. The permittee timely submitted its application for renewal on October 27, 2021. The terms of the existing permit are administratively extended until the issuance of a new permit pursuant to 40 CFR §122.6.

EPA Region 9 developed this permit and fact sheet pursuant to §402 of the Clean Water Act, which requires point source dischargers to control the pollutants discharged to waters of the United States according to the provisions of an NPDES permit.

This permittee is classified as a major discharger.

II. SIGNIFICANT CHANGES TO PREVIOUS PERMIT

Permit Condition	Previous Permit (2017 – 2022)	Re-issued permit	Reason for change
Best Management Practices ("BMPs")	None	Standard BMP language for small utilities	40 CFR §122.44(k)(4)
Asset Management Program ("AMP")	None	Standard asset management requirement for small utilities.	40 CFR §122.41(e)
Mass-based limits for BOD_5, TSS	No mass-based limits included	Limits of 1,076 lbs/day (30-day limit) and 1,614 lb/day (7-day limit)	40 CFR §122.45(f)(1)
Sanitary Sewer Overflow ("SSO") and Bypass	Reporting required; hardcopy accepted	Standard SSO language for small utilities added, including clarification that 24-hr reporting applies to SSOs, CSOs and Bypass events; reporting via NeT	Consistency with EPA Region 9 policy and recently issued permits
Definitions	Collection system implicit in facility definition	Added explicit facility definition clarification	Clarifies that the facility explicitly includes the collection system
Enterococci	Monthly monitoring required	Weekly monitoring required	More samples per month to determine geomean value for compliance.
Nitrate-Nitrogen	No effluent limit	Daily maximum effluent limit: 0.20 mg/L	Reasonable potential to exceed criteria
Orthophosphate	No effluent limit	Daily maximum effluent limit: 0.05 mg/L	Reasonable potential to exceed criteria
Chromium (III)	No effluent limit	Daily maximum effluent limit: 50 µg/L	Reasonable potential to exceed standards
Chlordane	No effluent limit	Daily maximum effluent limit: 0.004 µg/L; monthly maximum effluent limit 0.09 µg/L	Reasonable potential to exceed standards
Chlorodibromomethane	No effluent limit	Daily maximum effluent limit: 21 µg/L	Reasonable potential to exceed standards
Aluminum, Copper, Nickel	Effluent limits included	Monitoring only	No reasonable potential to exceed criteria with dilution factor*
Chronic Toxicity (WET)	Effluent limit included	Monitoring only	No reasonable potential to exceed standards

*As approved by Guam EPA.

III. GENERAL DESCRIPTION OF FACILITY

The permittee owns and operates a wastewater treatment facility located on the Apra Harbor U.S. Naval Base, on the island of Guam, which collects domestic and nondomestic wastewaters from Naval Base Guam. Nondomestic wastewater sources include three bilge oily wastewater pretreatment units and a fuel reclamation unit. The Apra Harbor WWTP serves a domestic population of approximately 6,000-8,000 people and base housing of 5,000-6,000 residents.

The Apra Harbor WWTP is a secondary sewage treatment plant with rated design and peak capacities of 4.3 MGD (million gallons per day) and 6.0 MGD, respectively. According to the operators, flows are typically about 1.8 MGD during the dry season and 2.5 MGD the rest of the year, with a typical maximum of 3.0 MGD.

Two parallel treatment trains provide pre-aeration, grit removal, primary sedimentation, trickling filter biotreatment, dissolved air flotation, activated sludge solids contact, and secondary clarification. Each treatment train has a 4.3 MGD design capacity.

The final effluent is disinfected with chlorine and is dechlorinated prior to discharge through a combined outfall shared with the Guam Waterworks Authority's Agat-Santa Rita WWTP (NPDES Permit GU0020222). Effluent is discharged to the ocean through the submerged Tipalao Bay outfall. The outfall terminates at a diffuser located approximately 1,845 feet from shore, at a depth of 120 feet. The diffuser is a single riser/dual port configuration with two ports parallel to the ocean. The coordinates for discharge Outfall 001 are: 13° 24' 48" N, 144° 38' 30" E.

Waste activated sludge and gravity-thickened primary sludge feed two anaerobic digesters. Digested sludge is centrifuged or dried in sludge drying beds. Grit and dewatered sludge are trucked offsite for disposal at the Navy landfill.

The facility and outfall locations are shown in attachments to the permit.

IV. DESCRIPTION OF RECEIVING WATER

The permittee discharges out a joint deep ocean outfall (Outfall 001) to Guam EPA Category M-2 (Good) receiving waters to Tipalao Bay of the Philippine Sea. The outfall is shared with Guam Water Authority (GWA) Agat-Santa Rita WWTP, which operates under NPDES permit GU00200222.

V. DESCRIPTION OF DISCHARGE

Recent Discharge Data (2016-2021)

The facility discharges from a single location, Outfall 001. Table 1 shows effluent data for Outfall 001 from the permittee's NPDES renewal application, Discharge Monitoring Reports (DMRs) during the previous permit period (May 2017 through September 2021), and supplemental data. Pollutants that were not detected in the effluent are not included in the table. If data from the application show higher values than the DMR data, the application data are noted in the table. Additional information is available on Enforcement and Compliance History Online ("ECHO") at https://echo.epa.gov/detailed-facility-report?fid=GU0110019.

Daily discharge flow rates during the previous permit period (May 2017 through September 2021) ranged from 2.4 MGD to 5.0 MGD, with a monthly average of 2.6 MGD and a daily average of 3.6 MGD. The two data sets from the application and the DMRs are occasionally inconsistent, and the differences are not explained by the discharger. Compliance information can be found in Section VI.B.5. below.

Table 1. Effluent Data for Outfall 001 from May 2017-September 2021

Parameters	Units	Permit Effluent Limitations			Effluent Data			
		Average Monthly	Average Weekly	Max Daily	Highest Average Monthly	Highest Average Weekly	Highest Maximum Daily	Monitoring Frequency
Flow Rate	MGD	4.3	--	6.0	3.6 (10/2017)	--	5.0 (8/2018)	Metered
Ammonia (as N)	mg/L	-- (1)	--	-- (1)	0.47 (12/2017)	--	10.6 (09/2017)	Monthly
Ammonia Impact Ratio (AIR)	Ratio	1.0 (2)	--	1.0 (2)	0.1 (02/2021)	--	0.29 (02/2021)	Ratio, calculated

Parameters	Units	Permit Effluent Limitations			Effluent Data			
		Average Monthly	Average Weekly	Max Daily	Highest Average Monthly	Highest Average Weekly	Highest Maximum Daily	Monitoring Frequency
Nitrate-Nitrogen	mg/L	-- [1]	--	-- [1]	--	--	**9.11** (03/2021) **51** (app)	Quarterly
Orthophosphate	mg/L	-- [1]	--	-- [1]	--	--	**0.896** (06/2021)	Quarterly
Biochemical Oxygen Demand 5-day (BOD_5)	mg/L	30	45	--	16 (03/2020)	24 (03/2020)	27.8 (app)	Weekly
	% Removal	>85% minimum [4]			**lowest = 38%** (10/2017)			Weekly
Total Suspended Solids (TSS)	mg/L	30	45	--	12 (08/2017)	15 (08/2017)	26.6 (app)	Weekly
	% Removal	>85% minimum [4]			**lowest = 63%** (08/2017)			Weekly
Chlorine, total residual (TRC)[5]	µg/L	7.5	--	12.3	7.5	--	4.2 5 (app)	Monthly
Oil and grease, total recoverable	µg/L	10	--	15	5.4 (06/2020)	--	5.4 (06/2020)	Monthly
Enterococci	CFU/100 mL	35	--	104	**712** (07/2021)	--	**712** (07/2021)	Monthly
pH	S.U.	6.5 to 8.5 (min-max)			6.7 (06/2021) –8.2 (05/2021) **6.25-8.63** (app)			Weekly
Temperature	°C	-- [1]	--	-- [1]	30.6 (05/2019)	--	33.1 (05/2019)	Weekly
Hardness (as $CaCo_3$)	µg/L	--	--	--			800 (app)	
Aluminum[3]	µg/L	--	--	7,390	--	--	154 (04/2020)	Monthly
Arsenic[3]	µg/L	36	--	69	7.9 (08/2021)	--	7.9 (08/2021)	Monthly
Copper[3]	µg/L	--	--	111	--	--	67.5 (07/2020)	Monthly
Nickel[3]	µg/L	--	--	307	--	--	26 (08/2020) 34.2 (app)	Monthly
Lead[3]	µg/L	8.1	--	210	8 (09/2019)	--	8 (09/2019)	Monthly
Mercury[3, 6]	µg/L	0.025	--	2.1	0.07 (05/2017)	--	0.0078 (08/2021)	Monthly
Zinc[3]	µg/L	86	--	95	65 (04/2020)	--	**111** (04/2020)	Monthly
Dioxin (2,3,7,8-TCDD)	µg/L	--	--	1.4×10^{-8}	--	--	**0.0000241** (12/2017)	Semi-annually
Bromoform	µg/L	--	--	360	--	--	210 (12/2017)	Semi-annually
Chlordane	µg/L	--	--	--[1]	--	--	**0.022** (12/2020)	Once
Chromium, trivalent	µg/L	--	--	--[1]	--	--	3.04 (12/2020) 304 (app)[8]	Once
Chlordane	µg/L	--	--	--[1]	--	--	210 (12/2017)	Once
Chlorodibromomethane	µg/L	--	--	--	--	--	**32** (app)	Once
Chloroform	µg/L	--	--	--	--	--	1.2 (app)	
Di-n-butyl phthalate	µg/L	--	--	--[1]	--	--	2.5 (12/2018)	Once

Parameters	Units	Permit Effluent Limitations			Effluent Data			
		Average Monthly	Average Weekly	Max Daily	Highest Average Monthly	Highest Average Weekly	Highest Maximum Daily	Monitoring Frequency
Dibromochloromethane	µg/L	--	--	--(1)	--	--	20 (12/2018) 4.9 (app)	Once
Dichlorobromomethane	µg/L	--	--	--(1)	--	--	2.4 (12/2018) 4.9 (app)	Once
Whole Effluent Toxicity (WET), Chronic	Pass (0) or Fail (1)	--	Pass (0) (7)	--	--	--	Pass (0)	Annually

(1) No effluent limits were set but monitoring and reporting were required.
(2) When monitoring for total Ammonia (as Nitrogen), pH and temperature monitoring must be concurrent. The Ammonia Impact Ratio (AIR) is calculated as the ratio of the Ammonia value in the effluent and the applicable ammonia from the chronic criteria in the Guam EPA WQS. See Attachment E in the permit for a sample log to help calculate and record the AIR values. The AIR is the ammonia effluent limit and must be reported in the DMRs in addition to the Ammonia-N and pH effluent values.
(3) All limitations for metals are applied as total recoverable.
(4) Both the influent and the effluent were to be monitored.
(5) TRC measurements were required monthly, only when permittee utilized chlorine in disinfection process. Highest value shown here was reported with the Priority Pollutant Scan.
(6) Effluent data as reported in DMRs. Note that the highest maximum daily discharge would normally be higher than the highest average monthly, which suggests that the DMR values are reported incorrectly for mercury, and the highest maximum daily may be 0.07 µg/L. Neither value exceeds the limit.
(7) The application noted 4 WET tests, but only 3 results were reported.
(8) Application lists this value as 304, which may be reported incorrectly.

VI. DETERMINATION OF NUMERIC EFFLUENT LIMITATIONS

EPA developed effluent limitations and monitoring requirements in the permit based on an evaluation of the technology used to treat the pollutant (e.g., "technology-based effluent limits," or "TBELs," in Section VI.A., below) and the water quality standards applicable to the receiving water (e.g., "water quality-based effluent limits," or "WQBELs," in Section VI.B., below). EPA established the most stringent of applicable technology-based or water quality-based criteria in the permit, as described in Section VI.C, below.

VI.A. Technology-Based Effluent Limitations (TBELs)

Federally Owned Wastewater Treatment Works (FOTWs)

Secondary Treatment Regulations

40 CFR §133 establishes the minimum levels of effluent quality to be achieved by secondary treatment. Because the facility is a federally owned treatment works (FOTW), secondary treatment requirements that would apply to a non-federal publicly owned treatment works (POTW) are not directly applicable. However, 40 CFR §125.3 allows the development of case-by-case technology-based effluent limitations (TBELs) if effluent limitations guidelines (ELGs) have not been developed for non-publicly owned treatment works. EPA has not promulgated ELGs for FOTWs. Pursuant to 40 CFR §125.3, EPA is exercising its discretion to develop TBELs on a case-by-case basis based on "Best Professional Judgment" (BPJ) under Clean Water Act (CWA) §402.

The facility is a FOTW that treats wastewater of similar quality to POTWs and includes similar treatment processes as POTWs. Since the operation of the facility is comparable to a POTW, EPA, based on BPJ and the considerations required in 40 CFR §125.3(d), finds that application of the secondary treatment standards is appropriate given the costs, age and type of facility, engineering aspects, processes, and environmental impacts. Accordingly, secondary standards have been implemented based on BPJ, except where more stringent limitations are required by other applicable plans, policies, or regulations. The secondary treatment standards were also included in the previous permit as TBELs and are therefore retained in this permit.

The minimum levels of effluent quality attainable by secondary treatment for Biological Oxygen Demand (BOD_5), Total Suspended Solids (TSS), and pH, as defined in the implementing regulations at 40 CFR §133.102, are listed below. Mass limits, as required by 40 CFR § 122.45(f), are included for BOD_5 and TSS.

BOD_5

Concentration-based Limits

30-day average: 30 mg/L
7-day average: 45 mg/L
Removal Efficiency: 85% minimum

Mass-based Limits (based on 4.3 MGD design capacity)

30-day average – (30 mg/L)(4.3 MGD)(8.345 conversion factor) = 1,076 lbs/day
7-day average – (45 mg/L)(4.3 MGD)(8.345 conversion factor) = 1,614 lbs/day

TSS

Concentration-based Limits

30-day average – 30 mg/L
7-day average – 45 mg/L
Removal efficiency: 85% minimum

Mass-based Limits (based on 4.3 MGD design capacity)

30-day average – (30 mg/L)(4.3 MGD)(8.345 conversion factor) = 1,076 lbs/day
7-day average – (45 mg/L)(4.3 MGD)(8.345 conversion factor) = 1,614 lbs/day

pH

Instantaneous Measurement: 6.5 – 9.0 standard units (S.U.)

VI.B. Water Quality-Based Effluent Limitations

Water quality-based effluent limitations (WQBELs) are required in NPDES permits when the permitting authority determines that a discharge causes or has reasonable potential to cause or contribute to an excursion above any water quality standard (40 CFR §122.44(d)(1)). Per 40 CFR §122.44(d)(1)(ii), in making this determination, EPA uses procedures that account for:

- Existing controls on point and non-point sources of pollution, including Guam EPA WQS and EPA Water Quality Criteria (EPA 2013, EPA 2015);
- Variability of the pollutant or pollutant parameter in the effluent;
- Sensitivity of species to toxicity testing (when evaluating whole effluent toxicity); and, where appropriate,
- Dilution of the effluent in the receiving water, where applicable and approved by Guam EPA.

EPA also evaluated the reasonable potential to discharge toxic pollutants according to guidance provided in the *Technical Support Document for Water Quality-Based Toxics Control* (TSD) (EPA 1991) and the *U.S. EPA NPDES Permit Writers' Manual* (EPA 2010). These factors include:

1. Applicable standards, designated uses, and impairments of receiving water
2. Applicable Ocean Discharge Criteria
3. Dilution in the receiving water
4. Type of industry
5. History of compliance problems and toxic impacts
6. Existing data on toxic pollutants for a Reasonable Potential Analysis

VI.B.1. Applicable Standards, Designated Uses, and Receiving Water Impairments

EPA approved the most recent revision of Guam Water Quality Standards (WQS) (GEPA 2015) on March 7, 2018. Guam WQS establish water quality criteria for marine waters around the discharge point. Tipalao Bay and the Philippine Sea in the vicinity of the discharge outfall are classified as Category M-2 ("Good"). The classification also includes designation of uses: M-2 waters must be of sufficient quality to allow for the propagation and survival of marine organisms, particularly shellfish and other similarly harvested aquatic organisms, corals and other reef-related resources, and whole-body contact recreation. Other important and intended uses include mariculture activities, aesthetic enjoyment, and related activities.

All Guam waters are required to be free from "substances, conditions or combinations thereof attributable to domestic, commercial and industrial discharges or agricultural, construction and land-use practices or other human activities that: (1) cause visible floating materials, debris, oils, grease, scum, foam, or other floating matter which degrades water quality or use; (2) produce visible turbidity, settle to form deposits or otherwise adversely affect aquatic life; (3) produce objectionable color, odor or taste, directly or by chemical or biological action; (4) injure or are toxic or harmful to humans, animal, plants or aquatic life; or (5) induce the growth of undesirable aquatic life." (GEPA 2015)

Tipalao Bay is listed as impaired according to the 2020 CWA Section 303(d) List of Water Quality Limited Segments for PCBs in fish tissue. The marine waters of Orote Peninsula to the north are also listed as impaired for PCBs. To the south, Agat Bay is listed as impaired for PCBs, dioxins, and pesticides. No TMDL has yet been developed for any of these impairments (Guam EPA 2020). Table 1 lists all pollutants that were detected in the facility's effluent; no PCBs were detected, although both dioxin and chlordane were detected.

Many Guam beaches are impaired for enterococcus bacteria. Bacteria TMDLs for Guam's southern beaches were finalized in December 2013 (GEPA 2013) and approved by EPA on February 20, 2015. The closest beaches to the facility included in the TMDLs are two to three miles to the southeast: Togcha Beach-Namo, Togcha Beach-Agat Bay, and Togcha Beach-Beach at Southern Christian Academy. These are found along Agat Bay. The TMDL includes waste load allocations ("WLAs") for all permitted wastewater treatment facilities in Guam. For facilities discharging into M-2 waters, WLAs for enterococcus are 35 CFU/100mL geometric mean and 104 CFU/100mL instantaneous maximum. The Margin of Safety discussion in the TMDL establishes an assumption of no mixing for this parameter (GEPA 2013).

VI.B.2. Applicable Ocean Discharge Criteria

EPA's Ocean Discharge Criteria establish guidelines for the issuance of NPDES permits for discharges into territorial seas, the contiguous zone, and the ocean (40 CFR §125.120). Territorial seas are defined as the waters between the shore and three nautical miles offshore. Ocean Discharge Criteria are applicable because

the permit authorizes discharge into a territorial sea. Ocean Discharge Criteria establish that point source discharges into territorial seas may not cause unreasonable degradation to the marine environment (40 CFR §125.123). Discharges that are consistent with Sections 301(g), 301(h), or 316(a) variance requirements, or with State water quality standards, are presumed to be consistent with Ocean Discharge Criteria (40 CFR §125.122(b)). This discharge is consistent with Guam EPA WQS, which indicates that the discharge complies with Ocean Discharge Criteria.

VI.B.3. Dilution in the Receiving Water

Guam WQS §5104(c) outlines requirements for mixing zones on a case-by-case basis, which was followed for the 2017 permit. The area or volume of the mixing zone must be limited to minimize impacts on uses, and WQS must be met outside the boundaries. Mixing zones are allowed in M-2 waters when criteria are met. The permittee requested, on March 15, 2023, that the mixing zone be continued in this permit, and submitted the 2015 Discharge Characterization Study and excerpts from the "SPAWAR" study in support of the request. The analysis utilized CORMIX to estimate a mixing zone based on discharge geometry, effluent data, ambient conditions, discharge characteristics, and mixing zone requirements consistent with Guam WQS (USN 2015). The model incorporated 10^{th} percentile current (3.5 cm/sec) with the maximum wet weather peak flow through the outfall (13.3 MGD). In accordance with Guam WQS, the calculated mixing zone was constrained to a cylinder that is 36 meters deep and 73.2 meters wide, centered on the discharge, resulting in a dilution factor of 39.2:1. In the 2017 permit, Guam EPA approved this dilution factor for copper, nickel and aluminum, ammonia, and chronic toxicity. The dilution factor was used for calculating effluent limitations for the Apra Harbor discharges for pollutants where receiving water data is available.

The findings of the dilution and resulting effluent limitations are subject to mixing zone and CWA §401 certification approval by Guam EPA (see Section X.F). Guam EPA approved the resubmitted mixing zone request for aluminum, copper, nickel, ammonia, and chronic toxicity, for Outfall 001, with a dilution factor of 39.2:1, on September 15, 2023 (Lastimoza 2023a).

VI.B.4. Type of Industry

Typical pollutants of concern in treated and untreated domestic wastewater include ammonia, nitrate, oxygen demand, pathogens, temperature, pH, oil & grease, and solids. Chlorine may also be of concern since this facility chlorinates and dechlorinates its effluent. The SIC code for this facility is 4952 (Sewerage Systems). Nondomestic wastewater sources include three ship's bilge oily wastewater pretreatment units and a fuel reclamation unit, which may also contribute other pollutants to the discharge.

VI.B.5. Compliance History and Toxic Impacts

Review of DMR data from May 2017 to September 2021 showed the facility had the following effluent violations (**bolded in Table 1**; water quality criteria exceedances for parameters without limits are also **bolded**):

- pH minimum and maximum (1 violation of each identified in the application data).
- BOD_5 % removal average monthly concentration (43 violations out of 53 monitoring events through February 2021, or 81% of monitoring values): lowest removal was 38%. No violations occurred after February 2021, when facility upgrades were implemented.
- TSS % removal average monthly concentration (13 violations out of 53 monitoring events, or 25% of monitoring values): lowest removal was 63%. No violations occurred after April 2021, when facility upgrades were implemented.

- *Enterococci* monthly average and daily average of 712 CFU/100 mL exceeded both the daily and monthly limits in July 2021.
- Zinc concentration was measured at 111 µg/L, exceeding the daily maximum limit, in April 2020.
- Dioxin concentration of 0.0000241(2.4×10^{-5}) µg/L exceeded the permit limit of 1.4×10^{-8} µg/L in August 2021.

EPA issued a Finding of Violation (CWA 309(a)-09-002) on November 24, 2008, covering the discharge from the Apra Harbor WWTP and stormwater management from Naval Base Guam. The Finding of Violation cited ongoing permit violations for copper, nickel, aluminum, BOD percent removal, and TSS percent removal, as well as occasional violations for enterococci, zinc, and residual chlorine.

EPA and the Navy entered into a Federal Facilities Compliance Agreement ("FFCA") on March 25, 2011. The FFCA required multiple upgrades to the WWTP and collection system; additional monitoring, including a fate and transport study for metals; implementation of a discharge certification program for non-domestic users; and submittal of quarterly reports to EPA.

The Navy investigated the source of the December 2017 dioxin exceedance and were unable to determine the source but implemented protocols for the bilge oily water treatment units (BOWTs) to prevent additional dioxin discharges, including only accepting oily waste composed of less than 5% oily waste and not accepting oily waste from foreign flagged ships. BOWTs were being upgraded to provide additional pretreatment. The BOWT pretreatment unit utilizes two 40,000-gallon storage tanks, a filter, oil/water separator, chemical addition, and dissolved air flotation (DAF) headworks, followed by a polishing oil/water separator (EPA 2023).

Sewer collection upgrades were completed in the summer of 2021. Prior to the 2021 collection system upgrade, the WWTP was non-compliant with the required removal rate for both BOD_5 and TSS, primarily due to inflow and infiltration to the sewer collection system (EPA 2020). Since then, effluent BOD_5 has improved to under 3 mg/L from the previous 10-15 mg/L range. During the inspection, operators stated that influent BOD_5 and TSS concentrations have increased to approximately 116 mg/L BOD_5 and 200 mg/L TSS, which indicates successful upgrades to the sewer collection system, significantly reducing inflow and infiltration. Prior to these improvements, 43 of 55 monitoring events from 2017 through the 2021 data period did not meet the minimum removal requirements for BOD_5. Removal rates for BOD_5 have since increased to approximately 98%, which meets effluent limits (EPA 2023). Removal rates for TSS have also since improved, meeting effluent limits.

On February 22, 2023, EPA completed its most recent inspection of the facility. The inspection report (EPA 2023) describes sufficient progress on the required upgrades to the plant and collection system. The report also noted that the sewer discharge certification program, which functioned similarly to a pretreatment program, was fully implemented, with 33 facilities currently included in the program. Each facility is inspected quarterly. The Navy continues to conduct comprehensive inspections of regulated facilities and is fully documenting compliance with the discharge certificate program.

VI.B.6. Existing Data and Reasonable Potential Analysis

For pollutants with effluent data available, EPA conducted a reasonable potential ("RP") analysis based on statistical procedures outlined in EPA's *Technical support Document for Water Quality-based Toxics Control,* hereinafter referred to as EPA's TSD (EPA 1991). These statistical procedures result in the calculation of the projected maximum effluent concentrations based on monitoring data to account for effluent variability and a limited data set. The projected maximum effluent concentrations were estimated

by calculating an effluent coefficient of variation (CV), or assuming a CV of 0.6 for pollutants and the confidence interval of the 99th percentile if the CV could not be calculated, based on an assumed lognormal distribution of daily effluent values (Section 3.3.2 Table 3-1, and Section 5.5.2 of EPA's TSD). EPA calculated the projected maximum effluent concentration for each pollutant using the following equation:

Projected maximum concentration = C_e × *reasonable potential multiplier factor*,
where "C_e" is the reported maximum effluent value, and the multiplier factor is obtained from Table 3-1 of the TSD.

Results are summarized in Table 2.

Table 2. Reasonable Potential Statistical Analysis (WQBELs)

Pollutant Parameter (1)	Units	Maximum Observed (2)	*n*	CV	RP Mult.	Projected Maximum Effluent Conc.	Dilution Factor	Proj. Max. Mixed Conc.	Most Stringent Water Quality Criterion	RP? (3)
Enterococcus	CFU/ 100 mL	**712** (DMR)(2)	53	5.67	5.83	**4,151**			35 monthly 104 daily	**Yes**
Chlorine	µg/L	7.5	53	0.75	1.88	**14.1**			7.5	**Yes**
Ammonia Impact Ratio (AIR)(4)		0.29	17	3.39	12.9	**3.74**	39.2	3.74	1	**Yes**
Orthophosphate (PO4-P)	mg/L	**0.896**	17	0.24	1.46	**1.31**			0.05	**Yes**
Nitrate-Nitrogen (NO3-N)	mg/L	**51** (app)(2)	17	0.23	1.44	**13.12**			0.20	**Yes**
pH	S.U.	**6.26-8.63**	--	--	--	--			6.5-8.5	**Yes**
Arsenic, total recoverable(5)	µg/L	7.9	53	5.24	5.61	**44.3**			36	**Yes**
Chromium (III), total recoverable(2,5)	µg/L	304 (app)(2)	3	0.6	5.6	**1,702**			50	**Yes**
Lead(5)	µg/L	8 (DMR)(2)	53	7.28	2.32	**18.6**			8.1	**Yes**
Mercury(5)	µg/L	0.07 (app)(2)	53	5.60	5.80	**0.406**			0.025	**Yes**
Zinc(5)	µg/L	**111**	53	0.87	2.03	**225.3**			86	**Yes**
Copper(5)	µg/L	**67.5**(6)	53	0.67	1.78	**120.5**	39.2	3.07(6)	3.1	No(6)
Nickel(5)	µg/L	**26**(6)	53	0.82	1.97	**51.2**	39.2	1.31(6)	8.2	No(6)
Aluminum(5)	µg/L	154 (DMR)(2)	53	1.04	2.24	**345**	39.2	8.80(6)	200	No(6)
Bromoform	µg/L	210 (app)(2)	3	0.6	5.6	**1,176**			120	**Yes**
Chlorodibromo-methane	µg/L	**32** (app)	3	0.6	5.6	**179.2**			21	**Yes**
Chloroform	µg/L	1.2 (app)(2)	3	0.6	5.6	4.93			2,000	No
Dichlorobromo-methane	µg/L	4.9 (app)(2)	3	0.6	5.6	27			27	No
di-n-butyl-phthalate	µg/L	2.5	3	0.6	5.6	14.0			30	No
Asbestos	Fibers /L	<0.180	3	0.6	5.6	<1.01			7,000,000	No
2,3,7,8-TCDD (Dioxin)	µg/L	**0.00000241**	8	0.6	5.6	**0.0000135**			0.000000014	**Yes**

Pollutant Parameter (1)	Units	Maximum Observed (2)	*n*	CV	RP Mult.	Projected Maximum Effluent Conc.	Dilution Factor	Proj. Max. Mixed Conc.	Most Stringent Water Quality Criterion	RP? (3)
Chlordane	µg/L	**0.022**	3	0.6	5.6	**0.123**			0.004	**Yes**
Dibromochloromethane	µg/L 3	20	3	53	5.6	112			No criteria	unknown
Whole Effluent Toxicity	Pass-Fail	0 (Fail) (some data missing)	3	53	--	0 (Pass) (6)	39.2		0 (Pass)	No(6)

(1) For purposes of RP analysis, parameters measured as below the MDL (method detection limit) are counted as zero. Parameters reported as detected, not quantified were detected above the MDL (method detection limit) but are less than the ML (minimum level). Because measured values above MDL but less than ML were not reported, they are entered as zero for this analysis. If all values of a pollutant are below the MDL, the parameter is not included in this analysis.
(2) When DMR and application data are different, the highest value is used.
(3) See Section VI.C, below, for a discussion of the reasonable potential statistical analysis results and rationale for establishing numeric effluent limits and monitoring requirements in the permit.
(4) AIR is the ratio of measured ammonia value to ammonia. Ammonia criteria are pH- and temperature-dependent.
(5) Concentrations of metals are total recoverable.
(6) Maximum observed exceeds criterion without dilution factor; RP determined with dilution, which Guam EPA approved. Effluent limits determined using dilution factor.

VI.C. Rationale for Numeric Effluent Limits and Monitoring

EPA evaluated pollutants known or expected to be present in the effluent and selected the most stringent of TBELs for BOD_5, TSS, and pH (see Section VI.A) and WQBELs (Section VI.B.) for pH and for other pollutants determined to have reasonable potential to exceed water quality standards (Table 2, Section VI.B.6). For pollutants not detected in the effluent or determined not to have reasonable potential to cause or contribute to water quality standards excursions, EPA may establish monitoring requirements in the permit. When monitoring is required, future data will be evaluated, and the permit may be re-opened to incorporate effluent limitations as necessary. Effluent limits and monitoring requirements are shown Table 1 and Table 2 of the permit.

VI.C.1. TBELs

Flow. Limits are retained from the previous permit for flow; monitoring is required weekly. Flow limitations are established to determine appropriate mass limits for BOD_5 and TSS.

BOD_5 and TSS. Concentration and mass-based limits and removal rate limits for BOD_5 and TSS are retained from the previous permit as described above, using BPJ, as described in Section VI.A., above. The mass-based limits are based on the design flow.

VI.C.2. WQBELs

pH. Untreated and treated domestic wastewater could be contaminated with substances that affect pH, which indicates reasonable potential for pH levels in the effluent to cause or contribute to an excursion above the WQS. While the TBEL for pH would be 6.5-9 Standard Units (S.U.), Guam WQS establish pH criteria for M-2 waters to ensure adequate protection of beneficial uses of the receiving water. Accordingly, a minimum pH limit of 6.5 and a maximum limit of 8.5 S.U. are retained from the previous permit, consistent with Guam WQS. Measurements for pH, temperature, and ammonia are required to be taken concurrently.

Chlorine, Total Residual. The permittee uses chlorine to disinfect their wastewater, so chlorine residual is likely to be present in the effluent. Guam WQS establish numeric criteria for total residual chlorine. The criteria are equivalent to EPA criteria, and data indicate reasonable potential to cause or contribute to an excursion above the WQS. The effluent limitations are retained from the previous permit.

Ammonia, Ammonia Impact Ratio (AIR): Treated and untreated domestic wastewater may contain levels of ammonia that are toxic to aquatic organisms. Ammonia is converted to nitrate during the biological nitrification process, then nitrate is converted to nitrogen gas through the biological denitrification process. Presence of ammonia in untreated and treated domestic wastewater indicates reasonable potential for levels in the effluent to cause or contribute to an excursion above the WQS. Due to the potential for ammonia to be present in sanitary wastewater at toxic levels, the establishment of reasonable potential for ammonia levels to cause an excursion above water quality standards, and due to the conversion of ammonia to nitrate, effluent limitations using the AIR are carried over from the previous permit.

The AIR is calculated as the ratio of the ammonia value in the effluent and the applicable ammonia limit, which varies with temperature and pH. AIR is more appropriate than a fixed effluent concentration to the water quality criteria because the criteria vary with temperature and pH. An AIR exceeding 1.0, by definition, indicates that the ammonia-N concentration exceeds the ammonia water quality criterion. The AIR effluent limitation value is 1.0, carried over from the previous permit. Any AIR value more than 1.0 will indicate an exceedance of the permit limit.

The limit is calculated by applying the dilution factor (39.2:1). Objectives with dilution are shown in Attachment D of the permit. Ambient monitoring revealed non-detectable levels of ammonia in the ambient water, so the full dilution factor is applied when calculating the limit with dilution. The Guam EPA WQS (GEPA 2015) establish pH-dependent numeric criteria for ammonia, so pH and ammonia sampling must be conducted concurrently. EPA is using the water quality criteria from the chronic tables in Guam EPA WQS Section 5103(C)(3), “Nutrients,” because the chronic criteria are most protective of water quality. See Attachment E of the permit for a sample log to help calculate and record the AIR values and calculations for the effluent limit. EPA can issue the permit with the mixing zone and dilution factor if Guam EPA approves U.S. Navy’s request to continue the approval for this permit issuance.

Nitrate-Nitrogen (NO3-N) and Orthophosphate (PO4-P): EPA determined that the discharge has reasonable potential to cause or contribute to an exceedance of applicable WQS for nitrate-nitrogen and orthophosphate, so maximum daily effluent limits have been incorporated into the permit. Monitoring will be required quarterly.

Enterococcus. Guam WQS establish numeric bacteria criteria for M-2 waters of 35 colony-forming units (CFU)/100 ml based on the geometric mean of five samples taken over a period of 30 days and an instantaneous maximum of 104 CFU/100 ml. In addition, a bacteria TMDL established in the vicinity of the discharge establishes a waste load allocation (WLA) consistent with these criteria, which are retained from the previous permit, although monitoring frequency has been increased to weekly to correctly report the geomean.

Arsenic, Chromium, Lead, Mercury, Zinc: EPA determined that the discharge has reasonable potential to cause or contribute to an exceedance of applicable WQS for arsenic, lead, mercury, and zinc; accordingly, effluent limits from the previous permit are retained from the previous permit. The concentration of chromium reported in the application shows reasonable potential to cause or contribute to an exceedance of water quality criteria, so an effluent limit has been added. Guam WQS and NPDES regulations require metals to be expressed as total recoverable.

Copper, Nickel, and Aluminum: The limits calculated for the previous permit, using the dilution factor and the most stringent criteria, are applied as water quality criteria. Reasonable potential to exceed criteria for all three metals exists without considering the dilution factor, but none of the three metals has reasonable potential to exceed criteria when the dilution factor is applied. Accordingly, the effluent limits from the previous permit are removed for this permit. Monitoring will be reported as total recoverable, daily maximum, consistent with Guam WQS. Monitoring will continue monthly. Guam EPA approved U.S. Navy's request to continue the mixing zone and dilution, so EPA can issue the permit with the mixing zone and dilution factor.

The U.S. Navy commissioned a discharge characterization report in 2015 (USN 2015) in support of a mixing zone analysis. The discharger applied for mixing zone approval and provided the discharge characterization report. Discharge limits were calculated based on a dilution factor of 39.2:1 for these three metals.

The findings of the dilution and resulting effluent limitations are subject to mixing zone and CWA §401 certification approval by Guam EPA (see Section X.F). Guam EPA approved the resubmitted mixing zone request for aluminum, copper, nickel, ammonia, and chronic toxicity, for Outfall 001, with a dilution factor of 39.2:1, on September 15, 2023 (Lastimoza 2023a).

The concentration-based, dilution-factored criteria for copper, nickel, and aluminum are calculated according to the following equation (see Table 3):
$C_e = C_o + D_m(C_o - C_s)$

Where:
C_e = the effluent limitation
C_o = the water quality objective to be met at the completion of initial dilution
C_s = background concentration
D_m = minimum dilution factor

If the background concentration is assumed to be zero, the equation will be:
$C_e = C_o + D_m(C_o - 0) = C_o(D_m+1)$

Table 3. Criteria Calculations for Copper, Nickel and Aluminum with Dilution Factor

Pollutant	Most Stringent Criteria (ug/l) (C_o)	Mean Ambient (background) Concentration (C_s)	Dilution Factor (D_m)	Max. Observed 2017-2021 (ug/l)	Projected Max Mixed Conc (ug/l)	RP with no Mixing?	RP with Mixing? (Max observed/D_m)	Mixed Criteria (ug/l) (C_e)[(1)]
Copper	3.1	0.33	39.2	67.5	3.07	Yes	No	111
Nickel	8.2	0.56	39.2	26	1.31	Yes	No	307
Aluminum	200	16.5	39.2	154	8.8	Yes	No	7,390

[(1)] $C_e = C_o + D_m(C_o - C_s)$

Bromoform: EPA determined that the discharge has reasonable potential to cause or contribute to an exceedance of applicable water quality standards for this parameter, so the effluent limits and monitoring requirements from the previous permit are retained.

Chlorodibromomethane and Chlordane: EPA determined that the discharge has reasonable potential to cause or contribute to an exceedance of applicable water quality standards for these compounds, so an effluent limit is added, to be monitored semi-annually.

2,3,7,8-TCDD (Dioxin): EPA determined that the discharge has reasonable potential to cause or contribute to an exceedance of applicable water quality standard for 2,3,7,8-TCDD (dioxin), so effluent limits are retained from the previous permit.

Priority Pollutant Scan. The requirement for a priority pollutant scan is retained from the previous permit. Monitoring is scheduled for the first quarter of each year and must be conducted concurrent with WET testing.

Oil and Grease**.** Oil and grease are common pollutants in domestic wastewater. Guam WQS state that waters shall be free from oil, grease and scum that degrade water quality or use. Oil and grease limitations of 10 and 15 mg/L average monthly and max daily are common in POTW permits on a Best Professional Judgement basis and have been retained from the previous permit.

VI.D. Anti-Backsliding

CWA §402(o), §303(d)(4) and 40 CFR §122.44(l)(1) prohibit the renewal or reissuance of an NPDES permit that contains effluent limits and permit conditions less stringent than those established in the previous permit, except as provided in the statute and regulations. Permit limits for aluminum, copper, nickel, and chronic toxicity are removed in this permit because the pollutants have no reasonable potential to exceed criteria with the dilution factor and mixing zone that Guam EPA approved. This is new information, and removal is allowed consistent with 40 CFR §122.44(l)(2)(i)(B)(1). Monitoring is required to ensure that no reasonable potential to exceed criteria occurs in the future; permit limits will be reestablished if monitoring data demonstrate that effluent concentrations exceed or have reasonable potential to exceed the criteria, or if Guam EPA declines to approve the dilution factor in the future. All other permit limits are equal to or more stringent than those in the previous permit, and new permit limits have been established for pollutants without previous effluent limits that demonstrate reasonable potential to exceed criteria (nitrate-nitrogen, orthophosphate, chromium (IIII), chlordane, and chlorodibromomethane).

VI.E. Antidegradation Policy

Guam WQS and EPA's antidegradation policy under CWA §303(d)(4) and 40 CFR §131.12 require that existing water uses and the level of water quality necessary to protect the existing uses be maintained. Permit limits for aluminum, copper, nickel, and chronic toxicity are removed in this permit because the pollutants have no reasonable potential to exceed criteria with the dilution factor and mixing zone that Guam EPA approved for these pollutants. Removing these limits will not result in a decrease in the level of treatment or control or a reduction in the quality of the receiving water. Monitoring is required to ensure that no reasonable potential to exceed criteria occurs in the future; permit limits will be reestablished if monitoring data demonstrate that effluent concentrations exceed or have reasonable potential to exceed the criteria. All other permit limits are equal to or more stringent than those in the previous permit, and new permit limits have been established for pollutants that demonstrate reasonable potential to exceed criteria.

As described in this document, the permit establishes effluent limits and monitoring requirements to ensure that all applicable water quality standards are met. The limits will apply at the end of the pipe. A priority pollutant scan has been conducted of the effluent; limits are established for pollutants identified in the priority pollutant scan that have reasonable potential to exceed criteria. The permittee is required to monitor annually for the full list of priority pollutants as listed at 40 CFR §423, Appendix A (included as Appendix F in the permit, which is current as of the date of permit issuance; the permittee is required to monitor for any priority pollutants that are later added the list). The permit retains limits from the previous permit for

Enterococcus, with increased monitoring frequency, which is consistent with the approved TMDL under section 303(d) of the CWA. Based on the reasonable potential analysis, the permit also incorporates new limits for nitrate-nitrogen, orthophosphate, chromium (IIII), chlordane, and chlorodibromomethane.

VII. NARRATIVE WATER QUALITY-BASED EFFLUENT LIMITS

Guam WQS (GEPA 2015) contain narrative water quality standards for pollutants applicable to the discharge. The permit incorporates narrative water quality-based limits for the discharge in Part I, section I.A., based on the applicable water quality standards.

VIII. MONITORING AND REPORTING REQUIREMENTS

The permit requires the permittee to conduct monitoring for all pollutants or parameters in Table 1 and Table 2 of the permit, at the minimum frequency specified. Additionally, where effluent concentrations of pollutant parameters are unknown or where data are insufficient to determine reasonable potential, monitoring may be required for pollutant parameters where effluent limits have not been established.

VIII.A. Influent and Effluent Monitoring and Reporting

The permit requires influent and effluent monitoring to evaluate compliance with the permit conditions. The permittee shall perform all monitoring, sampling, and analyses in accordance with the methods described in the most recent edition of 40 CFR §136, unless otherwise specified in the permit. All monitoring data shall be reported to EPA electronically as specified in the permit, using NetDMR (https://cdx.epa.gov/).

VIII.B. Priority Toxic Pollutants Scan

A priority toxic pollutants scan must be conducted annually during the first quarter of the calendar year, concurrently with WET testing, to ensure that the discharge does not contain toxic pollutants in concentrations that may cause a violation of water quality standards. The permittee must perform all effluent sampling and analyses for the priority pollutants scan in accordance with the methods described in the most recent edition of 40 CFR §136, unless otherwise specified in the permit or by EPA. A complete list of priority toxic pollutants can be found in 40 CFR §131.36.

VIII.C. Whole Effluent Toxicity (WET) Requirements

Whole effluent toxicity refers to the aggregate toxic effect to aquatic organisms from all pollutants contained in a facility's discharge and is one way to implement the CWA's prohibition of the discharge of toxic pollutants in toxic amounts. Effluent samples are collected and tested for toxicity in a laboratory using EPA's WET methods. These aquatic toxicity test results are used to determine if the NPDES effluent causes toxicity to aquatic organisms. Toxicity testing is important because for scores of individual chemicals and compounds, chemical-specific environmentally protective levels for toxicity to aquatic life have not been developed or set as water quality standards. Some of these chemicals and compounds can eventually make their way into effluents and their receiving waters. When this happens, toxicity tests of effluents can demonstrate toxicity due to present, but unknown, toxicants (including possible synergistic and additive effects), signaling a water quality problem for aquatic life.

EPA's WET methods are systematically designed to expose sensitive life stages of a test species (e.g., fish, invertebrate, algae) to both an NPDES effluent sample and a negative control sample. During the toxicity test, each exposed test organism can show a difference in biological response; some will be undesirable

differences. Examples of undesirable biological responses include, but are not limited to: eggs not fertilized, early life stages that grow too slowly or abnormally, or death. At the end of a toxicity test, the different biological responses of the organisms in the effluent group and the organisms in the control group are summarized using common descriptive statistics (e.g., means, standard deviations, coefficients of variation). The effluent and control groups are then compared using an applicable inferential statistical approach (i.e., hypothesis testing or point estimate model) chosen by the permitting authority and specified in the NPDES permit. The chosen statistical approach is compatible with both the experimental design of the WET method and the applicable toxicity water quality standard. Based on this statistical comparison, a toxicity test will demonstrate that the effluent is either toxic or not toxic, in relation to the permit's toxicity level for the effluent, which is set to protect the quality of surface waters receiving the NPDES discharge. EPA's WET methods are specified under 40 CFR §136.

The permit requires the permittee to analyze WET test data using the Test of Significant Toxicity (TST) statistical approach. The statistical approach is described in *National Pollutant Discharge Elimination System Test of Significant Toxicity Technical Document* (EPA 833-R-10-004, 2010; TST Technical Document) and Denton et. al, 2011 (Denton, DL, Diamond J, and Zheng L. 2011. Test of Test of significant toxicity: A statistical application for assessing whether an effluent or site water is truly toxic. *Environ Toxicol Chem* 30:1117-1126). The TST is a statistical application for assessing whether an effluent or site water is truly toxic. This statistical approach supports important choices made within a toxicity laboratory which favor quality data and EPA's intended levels for statistical power when true toxicity is statistically determined to be unacceptably high (≥ 25 PE, Percent (%) Effect), or acceptably low (< 10 PE). Example choices are practices supporting healthy test organisms, increasing the minimum recommended replication component of the WET method's experimental design (if needed), technician training, etc.

TST results do not often differ from other EPA-recommended statistical approaches using hypothesis testing (Diamond D, Denton D, Roberts J, Zheng L. 2013. Evaluation of the Test of Significant Toxicity for determining the toxicity of effluents and ambient water samples. *Environ Toxicol Chem* 32:1101-1108.). The TST maintains EPA's desired low false positive rate for WET methods—the probability of declaring toxicity when true toxicity is acceptably low ≤ 5%—when quality toxicity laboratories conduct toxicity tests (TST Technical Document; Fox JF, Denton DL, Diamond J, and Stuber R. 2019. Comparison of false-positive rates of 2 hypothesis-test approaches in relation to laboratory toxicity test performance. *Environ Toxicol Chem* 38:511-523.). Note: The false positive rate is a long-run property for the toxicity laboratory conducting a WET method. A low false positive rate is indicated by a low long-run toxicity laboratory control coefficent of variation for the test species/WET method, using a minimum of 30 to 50 toxicity tests.

For ocean discharges governed by CWA §403(c) and implementing regulations, the choice of TST is also based on EPA's recommendation to apply statistical considerations linking NPDES monitoring data, performance, and decision-making prior to data collection. See *CWA §403: Procedural and Monitoring Guidance* (EPA 842-B-94-003, 1994), pages 37, 38, 209. Examples of such statistical considerations include defining acceptable type I (α) and type II (β) errors[1]; applying power analysis to evaluate the appropriate number of replicates (n) based on a prior knowledge of variation observed in historical data; etc.). Accordingly, statistical rigor (trustworthiness) is considered by EPA under 40 CFR §125.122(a) in choosing the TST statistical approach for this permit because such components are explicitly considered.

[1]Type I error (α) is the error of rejecting the null hypothesis that should have been accepted. Type II (β) error is the error of accepting the null hypothesis that should have been rejected. For toxicity tests, the true population mean (μ) refers to the mean for a theoretical statistical population of results from indefinite repetition of toxicity tests on the same control water and sample (e.g., a 24-hour composite sample of effluent). For an individual toxicity test, there must be a statistical analysis to determine if the null hypothesis is rejected in favor of the alternative hypothesis—in other words, that the difference in sample and control means is real and not simply reflective of random variation among the tested organisms.

VIII.C.1 Whole Effluent Toxicity (WET) Testing

The following chronic toxicity test results are DMR submissions representative of the effluent discharge monitored during the previous permit term. Results are analyzed using the TST statistical approach described in Appendix B of the TST Technical Document.

EPA determined that the discharge does not have reasonable potential to result in chronic toxicity. None of the chronic toxicity tests conducted resulted in Fail (1), and no associated PE (Percent (%) Effect) value was ≥ 10. These results indicate that unacceptable toxicity is not present in the effluent (see Section 1.4 in TST Technical Document, EPA 2010a). Accordingly, no chronic toxicity WQBELs are required for the permitted discharge (40 CFR §122.44(d)(1)).

Table 4. Chronic Toxicity Data Summary and Reasonable Potential Determination.

Toxicity test date	Test species/WET method	Chronic toxicity test result: Did not reject (Fail "1"), or Rejected (Pass "0") TST null hypothesis	Reasonable potential? (No if Pass; Yes if Fail (1) and associated PE ≥ 10)
1/21/2018	Chronic Toxicity: *Strongylocentrotus purpuratus* fertilization, Method 1008.0, WI33L	Pass "0"	No
1/22/2019	Chronic Toxicity: *Strongylocentrotus purpuratus* fertilization, Method 1008.0, WI33L	Pass "0"	No
1/22/2020	Chronic Toxicity: *Strongylocentrotus purpuratus* fertilization, Method 1008.0, WI33L	Pass "0"	No

The permit retains the requirement for monitoring and reporting chronic toxicity, so that effluent toxicity can continue to be assessed in relation to CWA requirements for the permitted discharge (see Part I, Table 2 in the permit). The permit can be reopened if necessary to address toxicity that may be discovered during the permit term.

Part II.C.3 in the permit describes the WET method (Fertilization Test Method 1008.0) and test species to be used for this effluent monitoring, requiring the permittee to conduct chronic toxicity testing using either the purple sea urchin or the eccentric sand dollar via laboratory on U.S. mainland; however, if either of those species is not available, then the permittee shall test for toxicity using the tropical sea urchin, which is currently available at Hawaii-based laboratories.

For NPDES samples for toxicity testing, the sample hold time begins when the 24-hour composite sampling period is completed (or the last grab sample in a series of grab samples is taken) and ends at the first time of sample use (initiation of toxicity test). 40 CFR § 136.3(e) states that the WET method's 36-hour hold time cannot be exceeded unless a variance of up to 72-hours is authorized by EPA. In a June 29, 2015 inter-office memorandum, **EPA Region 9 authorized a hold time variance of up to 72-hours applicable only to Pacific Island Territory permittees that ship the NPDES sample to the continental U.S. for toxicity testing**, with conditions (details specified in the permit).

In accordance with 40 CFR §122.44(d)(1)(ii), EPA is using a test species/chronic short-term WET method and a discharge Instream Waste Concentration (IWC) representing conservative assumptions for effluent dilution necessary to protect receiving water quality. The IWC is a discharge-specific term based on the permit's authorized mixing zone or initial dilution. Generally, the dilution model result "S" from Visual Plumes/Cormix is used. S is the volumetric dilution factor, i.e., 1 volume effluent is diluted with S − 1

volumes surface water) = [(Ve + Va) / Ve]. Following the mass balance equation, if the dilution ratio D = Qs / Qe, then [(Qe + Qs) / Qe] = 1 + D = S.

For this discharge, the volumetric dilution fact, S, = 40.2 if Guam EPA approves the dilution factor of 39.2:1. The discharge-specific IWC = 1 to 39.2 dilution (1:39.2, 1/39.2) = 2.55% effluent. The IWC made by the toxicity laboratory is mixed as 1 part solute (effluent) to 39.2 parts dilutant (1:(1 – 40.2)) for a total of 40.2 parts.

The TST null hypothesis for chronic toxicity (H_o) is: In-stream Waste Concentration (IWC) mean response (% effluent) ≤ 0.75 Control mean response. The TST's alternative hypothesis is (H_a): IWC mean response (% effluent) > 0.75 Control mean response. For this permit, results obtained from a single chronic toxicity test are analyzed using the TST statistical approach, where the required chronic toxicity IWC for Discharge Point Number 001 is 2.49% effluent, which incorporates the dilution factor of 39.2:1, which is the dilution factor approved by Guam EPA for aluminum, copper, nickel, ammonia, and chronic toxicity.

Species sensitivity screening for chronic toxicity is not an automatic requirement in this permit. However, the permit retains a species sensitivity screening condition as an option for the permitting authority to exercise, particularly when the quality of the permitted discharge has changed, or is expected to change, during the permit term.

Development of an Initial Investigation TRE Workplan for Whole Effluent Toxicity

In the event effluent toxicity is triggered from WET test results, the permit requires the permittee to develop and implement a Toxics Reduction Evaluation (TRE) Workplan after a "fail" test result. The permit also requires additional toxicity testing if a chronic toxicity monitoring trigger is exceeded. The permittee should also have an Initial Investigation TRE Workplan (1-2 pages) for chronic toxicity available for EPA or Guam EPA to review upon request.

IX. SPECIAL CONDITIONS

IX.A. Biosolids

Standard requirements for the monitoring, reporting, recordkeeping, and handling of biosolids in accordance with 40 CFR §503 are incorporated into the permit. The permit requires, for dischargers who are required to submit biosolids annual reports, including major POTWs that prepare sewage sludge and other facilities designated as "Class 1 sludge management facilities," electronic reporting requirements. Those permittees shall submit biosolids annual reports using EPA's NPDES Electronic Reporting Tool ("NeT") by February 19th of the following year. Annual reports when no biosolids are removed may consist of a statement that no biosolids are removed. The permit includes a requirement for submitting a report 120 days prior to disposal of biosolids. Electronic submittals should be copied to R9NPDES@epa.gov.

The permittee currently disposes of biosolids in a landfill and is not required under 40 CFR §503 to file a biosolids report when disposing of biosolids in a landfill; however, the permittee is requested to provide information to EPA to confirm disposal method and quantity (in dry metric tons) before February 19 annually. The information should be submitted to EPA through the NeT e-reporting system (https://www.epa.gov/biosolids/compliance-and-annual-reporting-guidance-about-clean-water-act-laws for more information) with the permit number in the subject line.

If changes to biosolids management methods are proposed in the future, a sludge management plan must be developed.

IX.B. Sewer Discharge Certification Program

Requirements for the sewer discharge certification program build on the permittee's Federal Facilities Compliance Agreement (FFCA) with EPA. The conditions are retained in the reissued permit to ensure non-domestic wastewater dischargers do not contribute to effluent violations at the facility. The permit requires that the Sewer Discharge Certification Program established under the FFCA be continued.

IX.C. Capacity Attainment and Planning

The permit requires that a written report be filed within ninety (90) days if the average dry-weather wastewater treatment flow for any month that exceeds 90 percent of the annual dry-weather design capacity of the waste treatment and/or disposal facilities.

IX.D. Development and Implementation of Best Management Practices

The permit requires the permittee to develop and implement BMPs for pollution prevention. Pursuant to 40 CFR §122.44(k)(4), EPA may impose Best Management Practices (BMPs) "reasonably necessary…to carry out the purposes of the Act." The pollution prevention requirements or BMPs in the permit operate as technology-based limitations on effluent discharges that reflect the application of Best Available Technology and Best Control Technology. Thus, the permit requires that the permittee develop (or update) and implement a Pollution Prevention Plan with appropriate pollution prevention measures or BMPs designed to prevent pollutants from entering the receiving water while performing normal processing operations at the facility.

IX.E. Asset Management

40 CFR §122.41(e) requires permittees to properly operate and maintain all facilities and systems of treatment and control which are installed or used by the permittee to achieve compliance with the conditions of this permit. EPA published a guide, entitled Incorporating Asset Management Planning Provisions into NPDES Permits (December 2014), which directs Municipalities "to manage their aging sewer and stormwater systems at a time of urban population growth, more stringent water quality protection requirements…" Asset management planning provides a framework for setting and operating quality assurance procedures and ensuring the permittee has sufficient financial and technical resources to continually maintain a targeted level of service. The permit requires the permittee to develop an Asset Management Plan that considers short- and long-term vulnerabilities of collection systems, facilities, treatment systems, and outfalls. The intent is to ensure facility operations are not disrupted and compliance with permit conditions is achieved. Asset management requirements have been established in the permit to ensure compliance with the provisions of 40 CFR §122.41(e).

X. OTHER CONSIDERATIONS UNDER FEDERAL LAW

X.A. Impact to Threatened and Endangered Species

Section 7 of the Endangered Species Act of 1973 ("ESA," 16 U.S.C. §1536) requires federal agencies to ensure that any action authorized, funded, or carried out by the federal agency does not jeopardize the continued existence of a listed or candidate species, or result in the destruction or adverse modification of its

habitat. The issuance of an NPDES permit by EPA is a federal action, so consideration of the potential effects of the permitted discharge on any federally listed species is required.

Action Area

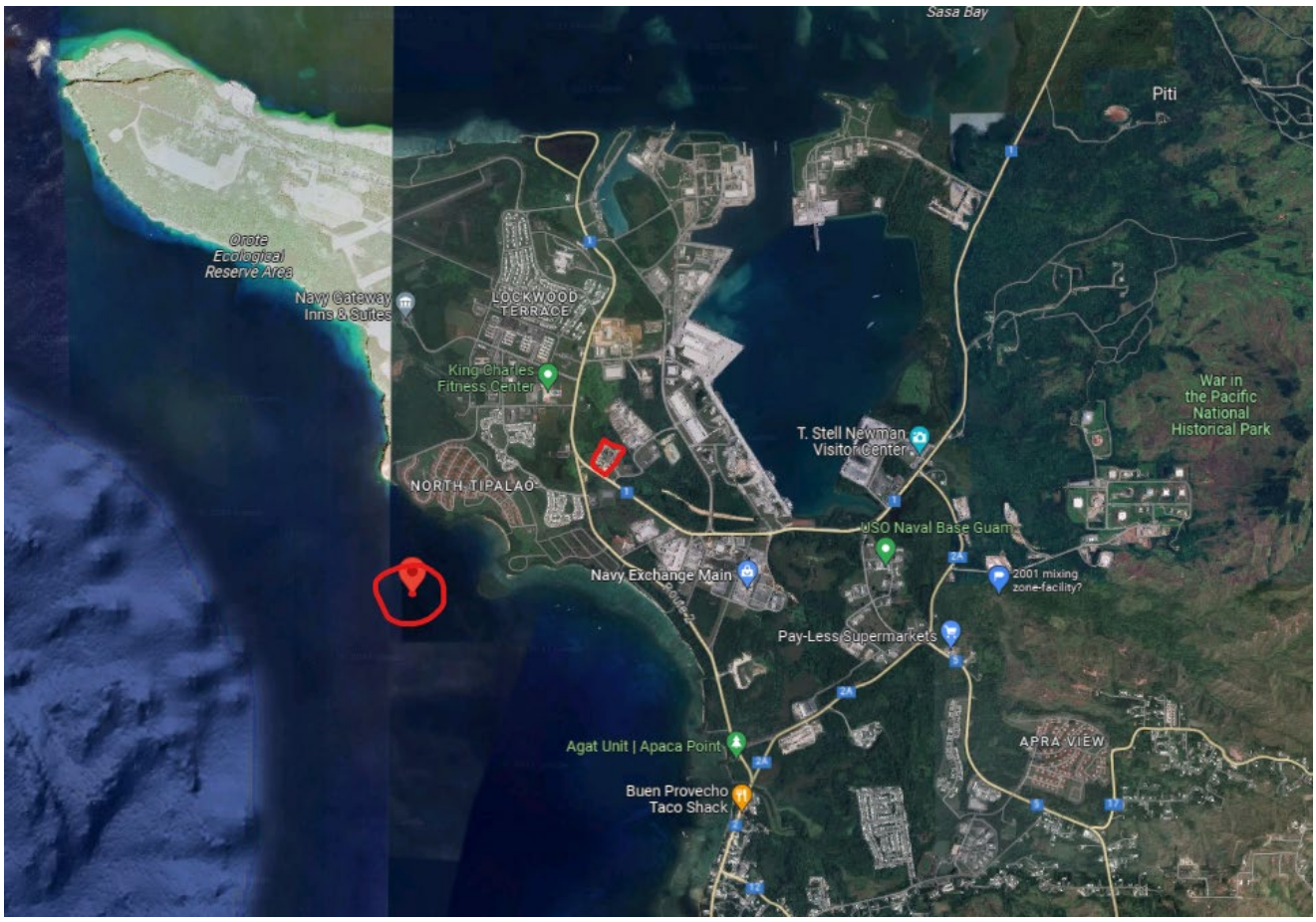
Under the Endangered Species Act (ESA) Section 7 regulations, the "action area" means all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 C.F.R. Section 402.02). The action areas for this proposed action include both the facility and the area surrounding the discharge outfall, including the proposed mixing zone, which is constrained to a cylinder that is 36 meters deep and 73.2 meters wide, centered on the discharge, and the immediate waters outside the mixing zone of Outfall 001. The outfall is located to the southwest of the facility in Santa Rita, Guam. Beyond the mixing zone, the effluent will be highly diluted after mixing with the surrounding coastal waters. The terrestrial footprint of the facility, located in Santa Rita, is defined as the facility action area. See Figure 1.

The facility and its outfall are already established, and there are no plans for new construction to expand the WWTP facility, nor new pipelines or any alterations to hydrology that will cause disruption of land or removal of land-based habitat. See map on next page.

Environmental Baseline

The environmental baseline includes the existing wastewater treatment plant and its existing discharges through the outfall into Tipalao Bay and the Philippine Sea. The permit does not authorize the construction or expansion of the treatment facility or collection system, nor does it authorize the discharge of higher pollutant concentrations. EPA's analyses consider the effects of continuing the discharge and considers the additional effluent limits to be established. The potential effects of the terrestrial footprint of the facility on listed aquatic species or turtle nesting is not considered in EPA's determinations.

Figure 1. Location of Facility (R) and Outfall with Approximate Mixing Zone (L)



Listed Species in or Near the Action Area

On March 23, 2023, EPA requested lists of endangered or threatened species in the project area from the National Marine Fisheries Service (NMFS), Pacific Islands Region office, via email. EPA received an email response from NMFS on March 23, 2023. On March 24, 2023, EPA also requested a list of endangered or threatened species via the Information for Planning and Conservation ("IPaC") website for the U.S. Fish and Wildlife Service ("USFWS") Pacific Islands office (see https://ecos.fws.gov/ipac/gettingStarted/map). The Species Lists identify threatened and endangered species and critical habitat that may occur in the vicinity of the Apra Harbor facility.

Based on a review of the best scientific and commercial data available, EPA determined the wastewater discharges from the permit renewal will not affect listed species except for the following, which the discharges may affect, but are not likely to adversely affect:

- Indo-West Pacific scalloped hammerhead shark (*Sphyrna lewini*)
- Giant manta ray (*Manta birostris*)
- Central West Pacific green sea turtle (*Chelonia mydas*)
- Hawksbill sea turtle (*Eretmochelys imbricata*)
- Corals (*Acropora globiceps*)

EPA initiated informal consultation with NMFS under ESA Section 7 on September 1, 2023, providing a Biological Evaluation (BE) to NMFS and requesting NMFS concurrence for EPA determinations (Parrish

2023). NMFS responded on September 6, 2023 (Dauterman 2023), recommending that EPA add one additional species (giant manta ray, *Manta birostris*) and consider evaluating two proposed critical habitats (for Central West Pacific green sea turtle, *Chelonia mydas*, and Indo-Pacific corals (which includes, on Guam, habitat for *Acropora globiceps*, *A.retusa*, and *Seriotopora aculeata*).

Under 50 C.F.R §402.10, federal agencies must also confer with NMFS on any action that is likely to result in the destruction or adverse modification of proposed critical habitat. Accordingly, EPA evaluated the potential effects of reissuing the permit on the proposed critical habitats for the following species:

- Central West Pacific green sea turtle (*Chelonia mydas*)
- Indo-Pacific corals proposed critical habitat corals (which includes, on Guam, habitat for *Acropora globiceps*, *A.retusa*, and *Seriotopora aculeata*)

NMFS also provided recommended BMPs for EPA consideration to provide additional protection to the listed species. EPA responded to these recommendations and additional questions and comments on September 15, 2023. On December 13, 2023, EPA provided a revised BE addressing relevant NMFS comments and evaluating impacts of the action on the additional species and critical habitats. EPA incorporated the additional analysis and recommendations from NMFS into the revised permit and fact sheet. NMFS provided concurrence with EPA's determinations on December 19, 2023.

EPA determined the permitting action will not destroy or adversely modify the proposed critical habitat. Accordingly, it is not necessary to confer on the proposed critical habitats.

The listed species, critical habitat status, and EPA Section 7(a) determination are provided in Table 5 below. This report provides an up-to-date listing of all proposed (P), candidate (C), threatened (T) and endangered (E) species that occur in the action area. Experimental Population, Non-Essential (XPNE) have been identified for two bird species. The analysis for each species follows.

Table 5. Summary of ESA Determination by Species

Type	Common Name	Scientific Name	Status	Critical Habitat	Action Area[1]	Conclusion-Section 7(a) Determination
Mammals	Mariana Fruit Bat	*Pteropus mariannus mariannus*	T	No	F	No Effect
Birds	Guam Micronesian Kingfisher	*Halcyon cinnamomina cinnamomina*	E, XPNE	No	F	No Effect
	Guam Rail	*Rallus owstoni*	E, XPNE	No	F	No Effect
	Mariana Gray Swiftlet	*Aerodramus vanikorensis bartschi*	E	No	F	No Effect
	Short-tailed Albatross	*Phoebastria (=Diomedea) albatrus*	E	No	O[2]	No Effect
Flowering Plants	Cebello Halumtano	*Bulbophyllum guamense*	T	No	F	No Effect
	Dendrobium guamense	*Dendrobium guamense*	T	No	F	No Effect
	Tuberolabium guamense	*Tuberolabium guamense*	T	No	F	No Effect
	Ufa-halomtano	*Heritiera*	E	No	F	No Effect

Type	Common Name	Scientific Name	Status	Critical Habitat	Action Area[1]	Conclusion-Section 7(a) Determination
		longipetiolata				
Conifers and Cycads	Fadang	*Cycas micronesica*	T	No	F	No Effect
Snails	Fragile Tree Snail	*Samoana fragilis*	E	No	F	No Effect
	Guam Tree Snail	*Partula radiolata*	E	No	F	No Effect
	Humped Tree Snail	*Partula gibba*	E	No	F	No Effect
Reptiles	Slevin's Skink	*Emoia slevini*	E	No	F	No Effect
	Central West Pacific Green Sea Turtle	*Chelonia mydas*	E	Proposed	O[2]	Not Likely to Adversely Affect; Will not destroy or adversely modify proposed critical habitat
	Hawksbill Sea Turtle	*Eretmochelys imbricata*	E	No	O[2]	Not Likely to Adversely Affect
Fish	Indo-West Pacific Scalloped Hammerhead Shark	*Sphyrna lewini*	T	No	O[2]	Not Likely to Adversely Affect
	Giant Manta Ray	*Manta birostris*	T	No	O[2]	Not Likely to Adversely Affect
Corals	Coral	*Acropora globiceps*	T	Proposed	O[2]	Not Likely to Adversely Affect
	Indo-Pacific corals	*Acropora globiceps, A. Retusa, Seriotopora aculeata*		Proposed	O[2]	Will not destroy or adversely modify proposed critical habitat

[1]F=Facility only; O=Outfall only.
[2]Marine species under NOAA assumed to be in the outfall action area.

Mammals

Mariana Fruit Bat (*Pteropus mariannus mariannus*), also known as the Mariana flying fox, is included in the action area of the facility but not within the action area of the outfall. Species profile can be found at https://ecos.fws.gov/ecp/species/2415. Final critical habitat has been designated but does not overlap with the action area. Mariana fruit bats typically roost in colonies in undisturbed native limestone forests and may occasionally use coconut groves and strand vegetation for roosting. They feed on nectar, fruits, and leaves from plants, including papaya, figs, and breadfruit, among others. Fruit bats drink from streams and rivers by skimming the surface of the water and licking the water from their fur. Species decline is mainly due to habitat loss and predation. This species is not likely to come into contact with, consume, or consume food from the receiving water. EPA determined that the action will not affect the Mariana Fruit Bat.

Birds

The Guam Micronesian Kingfisher (*Halcyon cinnamomina cinnamomina*) is included in the action area of the facility but not within the action area of the outfall. Species profile can be found at https://ecos.fws.gov/ecp/species/6. Final critical habitat has been designated but does not overlap with the action area. The Guam Micronesian kingfisher, also known as the sihek in the indigenous Chamorro language, is a small kingfisher that is endemic to Guam but was extirpated on the island in the late 1980s. Similar to most native bird species on Guam, the kingfisher was decimated by invasive brown tree snakes.

Previously the kingfisher occurred throughout the island in all habitats except for pure savannah and wetlands. They favored woodlands and limestone forest areas for feeding and nesting. They fed primarily on grasshoppers, skinks, insects, and small crustaceans that they captured on the ground. In captivity, the kingfisher has been fed mealworms, crickets, and anoles on the ground. They nested in tree cavities. (McKee 2022, Smithsonian National Zoo and Conservation Biology Institute, no date(a)).

The last 29 birds were brought into captivity in 1988, and after non-essential experimental populations were established around the world, they number 140 as of September 2022. A partnership between FWS and The Nature Conservancy has yielded a plan to reintroduce them to the Island of Palmyra, which no longer has predators. Currently, no plan yet exists to reintroduce the kingfisher to the wild Guam due to predators such as the brown tree snake.

Operations or discharges will not affect the Guam Micronesian kingfisher or its habitat. EPA determined that the action will not affect the Guam Micronesian Kingfisher.

The Guam Rail (*Rallus owstoni*) is included in the action area of the facility but not in the action area of the outfall. Species profile can be found at https://ecos.fws.gov/ecp/species/5112. Guam rails are small, flightless but fast-running birds with narrow bodies. They have strong, medium-length legs and long toes that help them walk over marsh grasses, weeds, underbrush, and soft marsh mud (FWS, no date, a; Smithsonian National Zoo and Conservation Biology Institute, no date, b). The Guam rail is extinct in the wild; its recovery is dependent on captive propagation and eventual reintroduction to its historic range once threats to the species have been addressed. Two nonessential experimental populations have been established off the island of Guam (on Rota and Cocos) where the primary threat of the brown tree snake (*Boiga irregularis*) does not occur. On the island of Guam, this threat has not yet been managed sufficiently for reintroduction. An amended recovery plan (FWS 2018) identifies interim recovery objectives for downlisting, once there is effective control of the brown tree snake and adds delisting criteria. The amended recovery criteria acknowledge the continued need for captive propagation and for eventual reintroduction to its historic range. Factors affecting the species other than the brown tree snake include feral cats and degradation or loss of habitat. Guam rails prefer edge habitats and while increases in development on Guam may increase such habitat, no monitoring of vegetation changes on the island exist (FWS 2018). In the wild, the Guam rail is omnivorous and foraged along field edges and roadsides, never far from cover, for snails, slugs, insects, geckos, vegetable matter, seeds and flowers from low grasses and shrubs. They breed throughout the year, peaking during the rains from July to November, making a shallow nest on dry ground in dense grass (Smithsonian National Zoo and Conservation Biology Institute, no date b). Operation of the WWTP will not affect the Guam rail, which is currently extinct in the wild, and experimental populations are not currently found on Guam. Experimental populations have been established on nearby islands. EPA determined that the action will not affect the Guam Rail.

The Mariana Gray Swiftlet (*Aerodramus vanikorensis bartschi*) is included in the action area of the facility but not in the action area of the outfall. Species profile can be found at https://ecos.fws.gov/ecp/species/8166. No critical habitat has been designated. The Mariana gray swiftlet is a small, narrow winged bird with dark sooty gray above and grayish brown below. The species is endemic to the Mariana Islands and populations currently exist on Guam, Agingan, and Saipan. The Mariana gray swiftlet populations are known to occur in 3 locations on Guam, in natural and manmade caves.

The swiftlet nests and roosts in limestone caves in nests composed of moss held tightly together and sealed to the cave wall by hardened saliva. The species navigates through caves using echolocation. Swiftlets leave the cave early morning and early evening to drink and forage on insects over a wide variety of terrain and vegetation. The Mariana gray swiftlet feeds on insect prey and invertebrates, preferring forest locations and

captures these insects during flight. The most likely historical and current threats to the survival of the Mariana gray swiftlet are the disturbance of caves by human activity, predation by brown tree snakes, the historical use and application of pesticides by the U.S. military, avian disease, the destruction of forests and habitats by typhoons, and the alteration of native habitats.

The Mariana gray swiftlet will not be exposed to the discharge, because it is not included in the discharge action area, and outfall is deep. Accordingly, EPA determined that the action will not affect the Mariana Gray Swiftlet. Mariana gray swiftlets forage over a wide variety of terrain capturing insects while flying. Mariana gray swiftlets are not known to occur within marine habitats, eat marine organisms, or drink saltwater. This species is not likely to come into contact with, consume, or consume food from the receiving waters. EPA determined that the action will not affect the Mariana gray swiftlet.

The Short-tailed Albatross (*Phoebastria (=Diomedea) albatrus*) is included in the action area of the outfall but not in the action area of the facility. Species profile can be found at https://ecos.fws.gov/ecp/species/433. No critical habitat has been designated. The short-tailed albatross is the largest and the only white-bodied albatross in the north Pacific. The population is known to or is believed to occur in Alaska, California, Guam, Hawaii, Northern Mariana Islands, Oregon, US Minor outlying Islands, and Washington (FWS, no date). The short-tailed albatross was listed as endangered throughout its range in 2000. At the turn of the 20th century, millions were harvested by feather hunters, resulting in near-extinction of the species. The short-tailed albatross was considered extinct by 1949, but the current population of several thousand individuals descended from 10 pairs that were discovered in 1951 (American Bird Conservancy, no date). They breed primarily on remote islands in the western Pacific. The largest breeding areas occur on Torishima Island, Japan, and the Senkaku Island Group, northwest of Taiwan. A third breeding colony was established on the island of Mukojima. Limited yet successful breeding of short-tailed albatross has occurred on Midway Atoll in Hawaii. During the non-breeding season, short-tailed albatross range along the Pacific Rim, from southern Japan to the west coast of Canada and the United States. Post-fledging juvenile birds range widely throughout the North Pacific Rim, and some individuals spend time in the oceanic waters between Hawaii and Alaska.

The short-tailed albatross forages diurnally and possibly nocturnally, either alone or in groups, and they predominantly hunt for prey on the surface. The short-tailed albatross feeds on squid, crustaceans, and a variety fish. Chicks are fed a mixture of stomach oil and partially digested, regurgitated food by adults. The short-tailed albatross follows commercial fishing vessels in Alaska, and commercial longlining bait now constitutes a notable portion of their calorie intake. They also eat trash and plastics found in the Pacific Ocea, which often chokes and kills albatross chicks. They also sometimes become hooked or entangled in longline fishing gear. Habitat destruction from volcanic eruption also poses a significant threat to the short-tailed albatross on Torishima Island. Extreme weather events may also affect vegetation and other characteristics of breeding colony sites. Nesting habitat used by short-tailed albatross on low-lying Midway and Kure Atolls may be at risk due to sea level rise and increased storm frequency and intensity. Other threats to short-tailed albatross include environmental contaminants like polychlorinated biphenyls and pesticides, as well as petroleum and toxic metals such as mercury and lead. Consumption of plastics can lead to internal injury or mortality from malnutrition and dehydration. (FWS no date(d))

EPA determined that the action will not affect the Short-tailed Albatross. Operation and discharge from the permitted facility will not contribute to known threats to the species, and the depth of ocean outfall for the WWTP, as well as immediate mixing of the effluent, indicates that the short-tailed albatross will not affect its surface-water foraging habits.

Flowering Plants

Cebello Halumtano (*Bulbophyllum guamense*) is included in the action area of the facility but not in the action area of the outfall. Species profile can be found at https://ecos.fws.gov/ecp/species/9753. General project design guidelines can be found at https://ipac.ecosphere.fws.gov/project/VVPYRCAOXZBLDAJU2246NBSOIE/documents/generated/7051.pdf. No critical habitat has been designated.

Dendrobium guamense (*Dendrobium guamense*) is included in the action area of the facility but not in the action area of the outfall. Species profile can be found at https://ecos.fws.gov/ecp/species/9754. General project design guidelines can be found at https://ipac.ecosphere.fws.gov/project/VVPYRCAOXZBLDAJU2246NBSOIE/documents/generated/7051.pdf. No critical habitat has been designated.

Tuberolabium guamense (*Tuberolabium guamense*) is included in the action area of the facility but not in the action area of the outfall. Species profile can be found at https://ecos.fws.gov/ecp/species/9762. General project design guidelines can be found at https://ipac.ecosphere.fws.gov/project/VVPYRCAOXZBLDAJU2246NBSOIE/documents/generated/7051.pdf. No critical habitat has been designated.

Ufa-halomtano (*Heritiera longipetiolata*) is included in the action area of the facility but not in the action area of the outfall. Species profile can be found at https://ecos.fws.gov/ecp/species/2526. General project design guidelines can be found at https://ipac.ecosphere.fws.gov/project/W5SZJNDMRNERNGSIKDJVVUP2JM/documents/generated/7051.pdf. No critical habitat has been designated.

All flowering plants identified are terrestrial plants and are not known to occur within or near water. They occur within the action area of the facility but not within the action area of the outfall and would not be affected by discharge from or operation of the WWTP. Accordingly, EPA determined that the action will not affect these plant species.

Conifers and Cycads

Fadang (*Cycas micronesica*) is included in the action area of the facility but not in the action area of the outfall. Species profile can be found at https://ecos.fws.gov/ecp/species/9763. General project design guidelines can be found at https://ipac.ecosphere.fws.gov/project/VVPYRCAOXZBLDAJU2246NBSOIE/documents/generated/7051.pdf. No critical habitat has been designated. The fadang is under attack by the nonnative insect cycad aulacaspis scale, which is causing rapid mortality. By January 2013, the fadang mortality had reached 92 percent on the island of Guam. Fadang is not associated with marine environments, and therefore would not be affected by discharge from or operation of the WWTP. Accordingly, EPA has determined that the action will not affect the fadang.

Snails

Fragile Tree Snail (*Samoana fragilis*) is included in the action area of the facility but not in the action area of the outfall. Species profile can be found at https://ecos.fws.gov/ecp/species/4835. No critical habitat has been designated.

Guam Tree Snail (*Partula radiolata*) is included in the action area of the facility but not in the action area of the outfall. Species profile can be found at https://ecos.fws.gov/ecp/species/1530. No critical habitat has been designated.

Humped Tree Snail (*Partula gibba*) is included in the action area of the facility but not in the action area of the outfall. Species profile can be found at https://ecos.fws.gov/ecp/species/61. No critical habitat has been designated.

The three snail species occur in cool and shaded forest habitats. These snail species prefer an environment with high humidity and reduced air movement to reduce water loss. Individuals can be found on a variety of native and introduced large-leaved plants including trees, shrubs, herbaceous plants, and ferns. Individuals of these species feed on fungi and microalgae. They get water from puddles on the ground and the moisture in leaves but are not found at or near the receiving water. EPA's action authorizes the discharge of the treated effluent into the receiving water but does not permit the construction or expansion of the treatment facility. Thus, the treatment plant is considered part of the environmental baseline, and EPA determined that the action will not affect the fragile tree snail, Guam tree snail, or humped tree snail.

Reptiles

Slevin's Skink (*Emoia slevini*) is included in the action area of the facility but not in the action area of the outfall. Species profile can be found at https://ecos.fws.gov/ecp/species/9767. No critical habitat has been designated. Slevin's skink is a small lizard, averaging about 77 mm (3 in) in length. It is fast-moving, active during the day, and typically found in several types of forest ecosystems, including native limestone, mixed-native ironwood, and coconut forests. Most individuals observed on the forest floor using leaf litter as cover while foraging for insects (FWS, no date e). It has historically been recorded on Guam, Rota, Aguiguan, Tinian, Sarigan, Alamagan, Pagan, and Asuncion; it is currently extant on Sarigan, Alamagan, and Asuncion. It was also recently rediscovered on Cocos Island off southern Guam, but it is not currently found on the island of Guam itself. It is the only lizard endemic to the Mariana Islands. Threats include primarily non-native, invasive predators, including the brown tree snake, which also likely contributed to the extirpation of Slevin's skink on Guam (Wiles et al. 2003, p. 1,358, in FWS 2020). The recovery plan aims for stable populations on six islands, including at least one of the larger islands of Guam, Rota, Tinian, Saipan, or Pagan, and for habitat free of or well controlled invasive predators such as the brown tree snake, Asian house shrew, and black rat. (FWS no date e; FWS 2022).

Slevin's skink previously occurred on the southern Mariana Islands. The facility does not include any suitable habitat. Accordingly, EPA has determined that the action will not affect Slevin's Skink.

Reptiles—Turtles: Central West Pacific DPS Green Sea Turtle and Hawksbill Sea Turtle

The Central West Pacific DPS Green Sea Turtle (*Chelonia mydas*) is included in the NOAA action area of the outfall but not in the action area of the facility. Species profile can be found at 81 FR 20057 and at https://ecos.fws.gov/ecp/species/6199. General project design guidelines can be found at https://ipac.ecosphere.fws.gov/project/VVPYRCAOXZBLDAJU2246NBSOIE/documents/generated/6929.pdf.

Central West Pacific DPS green sea turtles (*Chelonia mydas*) are found throughout the western Pacific, including American Samoa, Guam, and the CNMI. Individuals of this species have been sighted and/or tagged by NMFS scientists near Guam, particularly during December to February and May to June. (NMFS 1998a).

After Central West Pacific green sea turtles emerge from the nest, hatchlings swim offshore and live in pelagic habitats for several years, where they feed on animal life found in oceanic drift communities (e.g., pelagic sargassum communities). Juvenile green sea turtles eventually leave open ocean habitat and travel to shallow nearshore habitat to forage and mature to adults. Adult green sea turtles remain in shallow nearshore areas, except when migrating to the nesting beaches, which occurs every 2 to 5 years. Green sea turtles are the only herbivorous species of sea turtle. Adult green sea turtles mainly feed on algae and seagrasses, though they may also forage on sponges, invertebrates, and discarded fish.
Primary threats to green sea turtles include bycatch in fishing gear, vessel strikes, loss and degradation of nesting habitat, and extreme weather events. Other threats include direct harvest of turtles and eggs, ocean pollution/marine debris, and disease.

Nine major actions are needed to achieve recovery, as identified in the recovery plan for the U.S. Pacific populations of the green sea turtle (NMFS 1998a):

1. Stop the direct harvest of green sea turtles and eggs, through education and law enforcement actions.

2. Eliminate the threat of fibropapillomas[2] to green sea turtle populations.

3. Reduce incidental harvest of green sea turtles by commercial and non-commercial fisheries.

4. Determine population size and status through regular nesting beach and in-water censuses.

5. Identify stock home ranges using DNA analysis.

6. Support conservation and biologically viable management of green turtle populations in countries that share U.S. green sea turtle stocks.

7. Identify and protect primary nesting and foraging areas for the species.

8. Eliminate adverse effects of development on green sea turtle nesting and foraging habitats.

9. Control non-native predators of eggs and hatchlings, e.g., mongoose, feral cats, and pigs, in the Hawaiian population.

The Hawksbill Sea Turtle (*Eretmochelys imbricata*) is included in the NOAA action area of the outfall but not in the action area of the facility. Species profile can be found at 81 FR 20057.

Hawksbill sea turtles are generally found in tropical and subtropical waters of all the world's major oceans. After leaving the nest, hawksbill turtle hatchlings move to pelagic waters, where they shelter in floating algal mats and drift lines. After one to five years, juveniles make their way to shallow coastal habitats to feed and mature into adults. Hawksbill sea turtles prefer shallow water and coral reef habitats for foraging and shelter. They are also found around rock formations, high energy shoals, and estuaries. Every one to five years, female hawksbill sea turtles migrate to nest on the beaches where they once hatched. Hawksbill sea turtles may migrate long distances between their foraging areas and nesting beaches. Hawksbill sea turtles are omnivores, but their preferred food in many areas is sea sponges. They also feed on marine algae, corals, mollusks, tunicates, crustaceans, sea urchins, small fish, and jellyfish.

[2] A disease that causes external and internal tumors in green sea turtles that can lead to death.

Threats to hawksbill sea turtles include bycatch in fishing gear, direct harvest of turtles and eggs, loss and degradation of nesting and foraging habitat, predation of eggs and hatchlings, illegal human take, vessel strikes, entanglement, ocean pollution/marine debris, and extreme weather events.

Eight major actions are needed to achieve recovery, as identified in the recovery plan for the hawksbill sea turtle (NMFS 1998b):

1. Stop the direct harvest of hawksbill sea turtles and eggs, through education and law enforcement actions.

2. Reduce incidental mortalities of hawksbill sea turtles by commercial and non-commercial fisheries.

3. Determine population size, status, and trends through long-term regular nesting beach and in water censuses.

4. Identify stock home ranges using DNA analysis.

5. Support conservation and biologically viable management of hawksbill sea turtle populations in countries that share U.S. hawksbill sea turtle stocks.

6. Identify and protect primary nesting and foraging areas for the species.

7. Eliminate adverse effects of development on hawksbill sea turtle nesting and foraging habitats.

8. Control non-native predators of eggs and hatchlings, e.g., mongoose, feral cats, and pigs, in the Hawaiian population.

The Central West Pacific green sea turtle and hawksbill sea turtle have been sighted in the nearshore waters of Guam. Both species forage and rest in shallow waters and in coral reefs. Green turtles eat a variety of plants, invertebrates, seagrass, and marine algae. Hawksbill turtles feed mainly on sponges, sea anemones, and jellyfish. Sea turtles are threatened by the loss of nesting and feeding habitats, excessive egg collection by humans, and illegal human take. Both turtles also suffer stranding due to entanglement, shark bites, boat strikes, and infectious disease.

The permit establishes limits that will ensure the protection of aquatic life at the outer edges of the mixing zone and beyond. If a turtle were to enter the mixing zone, they would be transitory and would not be expected to stay within the mixing zone for long periods. While specific information for the benthos of the mixing zone is not available, it is unlikely there are abundant corals in this area due to the depth of the water. Marine algae and plants may be present; however, there is no information regarding potential abundance of these organisms within the mixing zone.

Proposed Critical Habitat for Green Sea Turtle

On July 19, 2023, both NMFS and the U.S. Fish and Wildlife Service proposed critical habitat for the green sea turtle (*Chelonia mydas*). The process of designating critical habitat included determining the geographical area occupied by each Distinct Population Segment (DPS), identifying the physical or biological features essential to the conservation of each DPS ("essential features" or EFs) that may require special management considerations or protection, delineating specific areas within the geographical area containing at least one EF, and assessing the conservation value of the specific areas. The essential life history requirements of green sea turtles include reproduction, adult migration between reproductive and foraging/resting areas, and foraging/resting at all life stages (NMFS 2023).

Guam is included in the Central-West Pacific proposed critical habitat (see Figure 2). Reproductive, foraging, and resting EFs are proposed for this DPS. Conservation value is proposed as high. The critical habitat for this DPS is proposed as endangered. The reproductive EF is proposed from the mean high-water line to 20 m depth, sufficiently dark and unobstructed nearshore waters adjacent to nesting beaches to allow for transit, mating, internesting of reproductive individuals, and transit for post-hatchlings. The benthic foraging/resting EF is proposed from the mean high-water line to 20 m depth, underwater refugia and food resources (sea grasses, macroalgae, and/or invertebrates) of sufficient condition, distribution, diversity, abundance, and density necessary to support survival, development, growth, and/or reproduction. The surface-pelagic foraging/resting EF is proposed for the margins of major boundary currents and other areas that result in concentrated components of the sargassum-dominated drift community, as well as the currents that carry turtles to sargassum-dominated drift communities, which provide sufficient food resources and refugia to support the survival, growth, and development of post-hatchlings and surface-pelagic juveniles, and which are located in sufficient water depth (at least 10 m) to ensure offshore transport via ocean currents to areas that meet forage and refugia requirements. (NMFS 2023)

EPA determined that the action may affect, but is not likely to adversely affect, the Central West Pacific green sea turtle and the hawksbill sea turtle. EPA has also determined that the action will not destroy or adversely modify the proposed critical habitat. Accordingly, it is not necessary to confer on the proposed critical habitats. EPA also determined the action will have no effect on sea turtle nesting habitat on land because the proposed action does not include facility construction, land disturbance or other sand-compacting activities.

Figure 2. Location of Proposed Green Sea Turtle Critical Habitat on Guam

Source: https://www.fws.gov/project/green-sea-turtle-critical-habitat-pacific-islands (Accessed November 28, 2023)

Fish: Indo-West Pacific Scalloped Hammerhead Shark and Giant Manta Ray

The Indo-West Pacific Scalloped Hammerhead Shark (*Sphyrna lewini*) is included in the NOAA action area of the outfall but not within the action area of the facility. Species profile can be found at 79 FR 83213. The Indo-West Pacific scalloped hammerhead shark is a pelagic species that are generally found offshore in open ocean waters. These sharks have also been observed near shore and can be found in shallow waters (less than 3 m deep). They are top predators and feed primarily on fish, squid, and rays. They are surface-dwelling and prefer warmer waters in the surface mixed layer. Threats to this species include commercial fishing for shark fins and incidental bycatch in other commercial fishing (NMFS 2022, 2023a). They are particularly sensitive to the stresses of incidental catch, which leads to high mortality (Morgan and Carlson 2010, in Budd et al. 2021). Warming ocean temperatures and more intense storms caused by extreme weather events also impact prey availability and habitat quality for migratory sharks. Predatory species like sharks are shifting their geographic distributions based on prey and habitat availability. Their complex and variable life histories mean that extreme weather events will impact individual species differently, making it important to understand species-specific vulnerabilities and needs. (NMFS 2023a).

Scalloped hammerhead sharks rely on shallow, coastal areas such as bays and mangroves for essential breeding habitat. Such nursery areas may be found in Guam (Budd et al. 2021). Adult scalloped hammerheads occupy both coastal and offshore ocean waters. Adult females move inshore to give birth to live young, who then remain inshore during their early life stages. Their dependence on coastal habitats makes scalloped hammerhead sharks particularly vulnerable to extreme weather events, including increased freshwater runoff and sedimentation. Extreme weather events can impact water temperatures, alter nutrient cycles, and decrease productivity in coastal nursery areas, affecting young sharks at a sensitive life stage. Recovery from these threats is challenged by the sharks' slow growth rates and late age at maturity (NMFS 2023a).

The permit establishes limits that will ensure the protection of aquatic life at the outer edges of the mixing zone and beyond. If a shark were to enter the mixing zone, they would be transitory and would not be expected to stay within the mixing zone for long periods, as there are no known preferred habitat features within the mixing zone.

Threats to the Indo-West Pacific scalloped hammerhead shark relate primarily to extreme weather events and foreign fishing practices rather than water quality. EPA determined this species has no nexus with the discharges, beyond the possibility of incidental contact, based on the following considerations:

- No known sightings of the scalloped hammerhead shark have been recorded in the vicinity of the discharges.
- The outfall is at a location 1,845 ft (562 m) from shore and 120 ft (37 m) deep, so it will not affect the important shallow, coastal area breeding habitat.
- If a member of the species were to arrive near the vicinity of the discharges and react negatively to any component of the wastewater, both species are sufficiently mobile to depart, or traverse, the maximum affected area very quickly. Thus, minimal exposure time for sub-lethal or harmful effects to occur would be expected.
- Monitoring results of effluent from the facility demonstrate that the effluent does not cause chronic toxicity.
- Effluent limits have been set in the proposed permit for pollutants as needed to meet Guam EPA Water Quality Standards for the protection of "protection and propagation of fish, shellfish, and wildlife" for "M-2" ("good" quality) marine waters.
- Based on a review of available information, EPA is not aware of scientific data or studies documenting negative effects on sharks from treated wastewater effluent discharges to ocean waters.

A Recovery Plan or Recovery Outline has not yet been developed for the scalloped hammerhead shark, so location and recovery information are limited (NMFS 2022). The most recent 5-year review of the species concluded that no change to the listing status was warranted (NMFS 2022). The last documented sighting occurred in 1971 (Budd et al. 2021); however, from the 1980s through the early 2000s, anecdotal sightings have been documented in the Apra Harbor area (GDOA 2021), which is north and east of the peninsula where the facility and outfall are located.

Multiple visual observations have not resulted in reported sightings of scalloped hammerhead sharks (Zglicynski et al. 2013 and MacNeil et al. 2020, in Budd et al. 2021), possibly due to low abundance in the area, behavioral factors and complex spatial organization (Coiraton et al. 2020, in Budd et al. 2021). A recent study using environmental DNA (eDNA) isolated from the water found evidence of scalloped hammerhead sharks in the Apra Harbor area north and east of the peninsula. Sampling was conducted in Apra Harbor proper (Middle Shoals, Sasa Bay, Inner Harbor), and Orote Point and Blue Hole on the northern edge of the peninsula (GDOA 2021). These are not near the outfall area. Most evidence of sharks were found in Apra Harbor itself, which is north of the peninsula, separated from the outfall location; limited evidence of sharks was found at the two coastal sites near the tip of the peninsula at Blue Hole and Orote Point (Budd et al. 2021).

Regarding waterborne pollutants, the NMFS 5-year review (2022) cited one study of juvenile scalloped hammerheads in Fiji incidentally caught by fishermen and examined for their intestinal microbiomes. The authors found that two bacterial species (*A. salmonisidas* and *K. pneumonia*) dominated the intestinal microbiota of two individual sharks sampled. Both microbes were described as opportunistic pathogens and may have been associated with a major sewage spill (presumably untreated) that occurred in the local waters of Laucala Bay, Fiji. It is unclear whether they were primary or secondary bacterial infections. This has not been studied in Guam waters or waters associated with WWTPs, like Apra Harbor WWTP, that utilize secondary treatment and disinfection systems prior to discharge to ocean waters.

Hammerhead sharks would have minimal nexus with the discharges beyond the possibility of incidental contact. Based on the above considerations, EPA determined the action may affect, but is not likely to adversely affect the Indo-West Pacific DPS (Distinct Population Segment) scalloped hammerhead shark.

Giant manta rays (*Manta birostris*) are listed as threatened under the ESA throughout their range (NMFS, no date). The giant manta ray is the world's largest ray, with a wingspan of up to 26 feet. They occur worldwide in tropical, subtropical, and temperate oceans. Their habitat requirements are like the habitat for the scalloped hammerhead shark. Their diminished regional populations and low reproduction suggests that the likelihood of recovery is low.

Giant manta rays are found worldwide in tropical, subtropical, and temperate oceans. They are commonly found offshore and in productive coastal areas in shallow and deep waters, but they may also occur in estuaries, inlets, bays, and intercoastal waterways. Giant manta rays are migratory, seasonally visiting productive coastlines and offshore pinnacles and seamounts. Timing of migration varies by region and may correspond to availability of food, seawater temperatures, and/or mating behavior. Giant manta rays tend to be solitary, although they aggregate at cleaning sites and to feed and mate. They feed primarily on planktonic organisms (e.g., copepods, mysids, euphausiids, decapod larvae, and shrimp). They may also feed on small and medium size fish.

The depths that giant manta rays can be found at vary. They may aggregate in shallow waters at depths less than 10 m during feeding, but they have been observed to dive from 200-500 m, and they are capable of diving to even greater depths. A recent study focused on Guam, cited in the University of Guam's Sea Grant Nåpu News, (Pacific Daily News 2022) discovered that juvenile manta rays dive to depths below 1,300 ft. They swim out to other areas, presumably to feed, but remain around Guam and return close to shore. This behavior may be influenced by season and shifts in prey location.

No critical habitat has been designated for the giant manta ray.

Primary threats to giant manta rays include overfishing, bycatch, and harvest for international trade. Other threats include marine pollution/debris, vessel strikes, entanglement, and recreational fishing interactions.

Major domestic actions needed to achieve recovery, as identified in the recovery outline for the giant manta ray (NMFS, no date):

1. Improve understanding of bycatch and investigate best methods for safe release of giant manta rays caught in U.S. fisheries.

2. Improve understanding of associated mortality rates in key commercial fisheries (including at-vessel and post-release mortality), including impacts of various factors such as gear type, temperature,

temporal, and spatial fishing effort, etc., for informing future fisheries management strategies to reduce fisheries interactions and associated mortality.

3. Improve understanding of taxonomy, population distribution, abundance, trends, and structure through research, monitoring, and modeling.

4. Identify and protect key habitat areas, including breeding and nursery grounds through research, monitoring, modeling, and management.

5. Improve understanding of movement and seasonal distribution to inform future management measures for minimizing impacts to the species during key life history functions.

6. Investigate the impact of other threats to the species (e.g., foul-hooking, vessel strikes, entanglement, extreme weather, pollution, tourism) through research, monitoring, modeling, and management.

7. Coordinate with partners and non-governmental organizations (NGOs) to reduce threats (e.g., foul-hooking, vessel strikes, entanglements, pollution, and tourism) through outreach and education to prevent additional mortalities.

8. Coordinate with relevant regional fisheries management organizations to improve, where needed, reporting and compliance related to current conservation measures for giant manta ray to address bycatch mortality.

The number of giant manta rays in Guam is small, comprising a micro-population of individuals (Micronesian Conservation Coalition 2020).

As with the scalloped hammerhead shark, EPA determined this species has no nexus with the discharges, beyond the possibility of incidental contact, based on the following considerations:

- No known sightings of the giant manta ray have been recorded in the vicinity of the discharges.
- The outfall is at a location 1,845 ft (562 m) from shore and 120 ft (37 m) deep, so it will not affect the important shallow, coastal area breeding habitat.
- If a member of the species were to arrive near the vicinity of the discharges and react negatively to any component of the wastewater, both species are sufficiently mobile to depart, or traverse, the maximum affected area very quickly. Thus, minimal exposure time for sub-lethal or harmful effects to occur would be expected.
- Monitoring results of effluent from the facility demonstrate that the effluent does not cause chronic toxicity.
- Effluent limits have been set in the proposed permit for pollutants as needed to meet Guam EPA Water Quality Standards for the protection of “protection and propagation of fish, shellfish, and wildlife” for “M-2” (“good” quality) marine waters.

- Based on a review of available information, EPA is not aware of scientific data or studies documenting negative effects on giant manta rays from treated wastewater effluent discharges to ocean waters.

The giant manta ray would have minimal nexus with the discharges beyond the possibility of incidental contact. Based on the above considerations, EPA determined the action may affect, but is not likely to adversely affect the giant manta ray.

Corals

Coral (*Acropora globiceps*) is included in the NOAA action area of the outfall but not in the action area of the facility. Species profile can be found at 79 FR 53852. This is the only species of coral potentially present near the action area. *A. globiceps* is a stony coral species, a type of reef-building coral. It occurs in shallow reef environments in the western Pacific, at a depth of 0-8 m (0-26 ft). Reef-building corals need the water temperature to be within a certain range (typically 25-30 °C), hard substrate, and sufficient light, water flow, and good water quality to establish and thrive. The main threats to these species include extreme weather events, ocean warming, ocean acidification, disease, habitat degradation, land-based sources of pollution, unsustainable fishing, and small population size.

According to the 2012 *Management Report for 82 Coral Status Review under the Endangered Species Act*, the following are considered by the Coral Biological Review Team (BRT) as risk to corals:

Table 6. Threats considered by the Biological Review Team in assessing extinction risks to 82 coral species, including the BRT's estimate of each threat's relative importance.

Threat	Importance
Ocean Warming	High
Disease	High
Ocean Acidification	Med-High
Reef Fishing – Trophic Effects	Medium
Sedimentation	Low-Medium
Nutrients	Low-Medium
Sea-Level Rise	Low-Medium
Toxins	Low
Changing Ocean Circulation	Low
Changing Storm Tracks/Intensities	Low
Predation	Low
Reef Fishing – Habitat Impacts /Destructive Fishing Practices	Low
Ornamental Trade	Low
Natural Physical Damage	Low
Human-induced Physical Damage	Negligible-Low
Aquatic Invasive Species	Negligible-Low
Salinity	Negligible
African/Asian Dust	Negligible
Changes in Insolation	Probably Negligible

Of the threats to corals listed in Table 6, wastewater discharges may have a potential impact on sedimentation (low-medium importance), nutrients (low-medium importance), toxins (low importance) and salinity (negligible importance).

Although WWTP discharges have potential to interact with *A. globiceps*, EPA believes the discharge has no nexus with *A. globiceps*, or the proposed critical habitat, based on the following considerations:

- All WWTP discharges occur 1,845 ft (562 m) out from the shore, at 120 ft (37 m) deep, which is beyond the depth range of potential *A. globiceps* habitat (0-26 ft, or 0-8 m). It is also beyond the range of *A. retusa*, and it is at the outer limit of the range of *S. aculeata*.

- The outfall and designated mixing zone are not located in proximity of known coral habitats. Not only is the outfall deeper and well out from shore than known coral habitat or the proposed critical habitat, the outfall and diffuser occur in an area of large, sandy substrate, which is excluded from the proposed critical habitat.

- Impacts from wastewater treatment plants have not been identified as contributing to medium or high threats by the Coral BRT. Those threats include ocean warming (high), disease (high), ocean acidification (medium-high) and reef fishing (medium).

- While the monitoring results reveal reasonable potential for the effluent to exceed criteria for ammonia, nitrate-nitrogen, and orthophosphate (low to medium effects on corals, based on Table 3 above), permit limits have been added to ensure the discharge does not exceed criteria for nitrate-nitrogen and orthophosphate, and the ammonia permit limit has been retained from the previous permit. This will address the low-medium threat of impacts from nutrients. The discharge occurs far from coral habitats and at a much greater depth. Moreover, pollutant mixing occurs with ocean currents at the discharge point, which would significantly reduce the concentration of nutrients prior to reaching the shallower depths nearer the shoreline, where corals occur.

- Effluent limits are consistent with applicable Guam EPA Water Quality Standards for “M-2” marine waters. These standards for M-2 waters allow for the protection and propagation of marine organisms, including corals, and other reef-related resources.

- While vessel transit related to receiving water monitoring may release small amounts of hydrocarbons into the water, at the surface, this would be expected to disperse quickly and to insignificant levels. Accordingly, potential harmful effects due to vessel transit would be expected to be minimal to nonexistent.

- While this facility uses chlorine to disinfect the effluent, it also includes a dechlorination process to neutralize any residual chlorine prior to discharge thru the outfall. The permit contains effluent limits for chlorine to ensure there is no excess chlorine in the discharge.

- Effluent monitoring results also show no chronic toxicity. These results suggest the effluent would not have a toxic effect on this coral species.

- Effluent concentrations are expected to be below the listed lowest-observed adverse effect levels (LOAELs) at the edge of the mixing zone. A 2021 study (Nalley et al.) evaluated the water quality thresholds for coastal contaminants on corals. The results present the LOAEL for contaminants for various coral species. Concentrations of parameters in the effluent are expected to be below the listed LOAELs at the edge of the mixing zone.

- The outfall and mixing zone areas are not located near the proximity of known coral habitats. Effluent will meet applicable water quality standards at edge of the mixing zone, which is considerably deeper than the habitat of this species (26 ft (8m) or less). EPA believes the discharges have no nexus with this coral species.

The permit establishes limits and receiving water monitoring that will ensure the protection of aquatic life at the outer edges of the mixing zone and beyond. Due to the depth of the outfall (37 m or 120 ft), the effluent is unlikely to have any effect on this shallow species (surface to 8 m or 26 ft depth). EPA determined that continued wastewater discharge from the WWTP under the proposed permit conditions, may affect, but is not likely to adversely affect, *Acropora globiceps*.

Proposed Critical Habitat for Indo-Pacific Corals

On November 2020, NMFS proposed critical habitat for all coral species in the Indo-Pacific region at depth of 0-40 m. Figure 3 shows the distribution of proposed habitat around Guam. Three proposed species and critical habitat depths included in the proposed Guam unit include: *A. globiceps* (0-20 m); *A. retusa*[3] (0-10 m); and *Seriatopora aculeata* (3-40 m). The area of the outfall is excluded from the proposed critical habitat designation, but the beach areas to the south, from depths of 0-40 m, are included. Proposed critical habitat consists of substrate and water column habitat characteristics essential for the reproduction, recruitment, growth, and maturation of the listed corals.

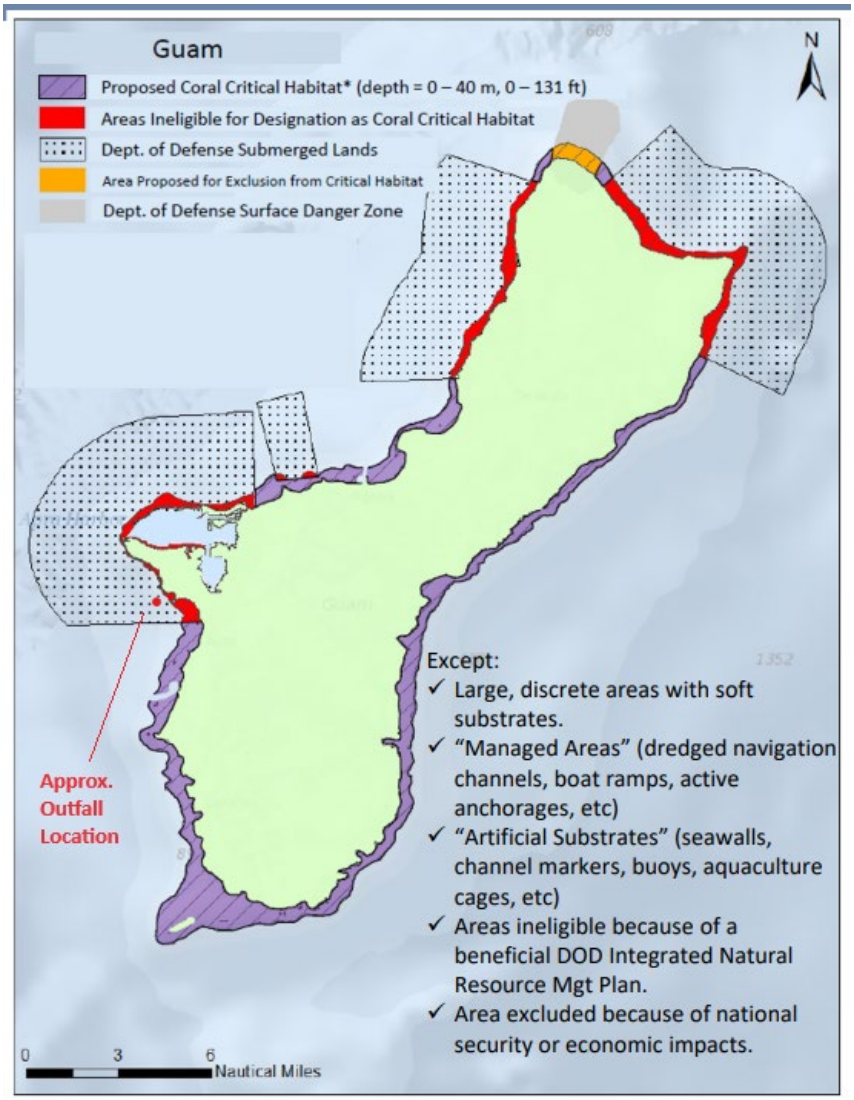
The definition of this critical habitat includes areas occupied by the species that have "essential features" which may require special management and are within U.S. waters. This critical habitat encompasses the coastal waters surrounding Guam, except for ineligible areas (see Figure 3). Critical habitat to a depth of 40 m occurs on the south of the facility and outfall.

A. globiceps occurs on upper reef slopes, reef flats, and adjacent habitats in depths ranging from 0 to 8 m. *A. retusa* occurs in shallow reef slope and back-reef areas, such as upper reef slopes, reef flats, and shallow lagoons, and its depth range is 0 to 5 m. *S. aculeata* occurs in a broad range of habitats on the reef slope and back-reef, including but not limited to upper reef slopes, mid-slope terraces, lower reef slopes, reef flats, and lagoons in a depth range of 3 to 40 meters.

As with the analysis of the effect of the action on *A. globiceps*, EPAbelieves the discharges have no nexus with the proposed critical habitat for Indo-Pacific corals, and determined that the proposed permitting action will not destroy or adversely modify the proposed critical habitat for Indo-Pacific corals in Guam.

[3] *A. retusa* may not occur in Guam; its inclusion on Guam was based on a photo of a single colony that has not been replicated or located. Source: https://www.noaa.gov/sites/default/files/2022-06/ID350-15-PIR-Proposed-Coral-CH-Peer-Rvw-Rpt-Info-Report.pdf, accessed November 28, 2023

Figure 3. Location of Proposed Indo-Pacific Coral Species Critical Habitat on Guam



Source (accessed November 28, 2023):
https://media.fisheries.noaa.gov/2021-02/summary-of-proposed-coral-critical-habitat-shown-01-21-2021-public-hearings-508.pdf?null=

Conclusion and Potential Effects

Considering the information available, EPA concludes that the reissuance of the permit for Apra Harbor WWTP will not affect the Mariana fruit bat, Guam Micronesia kingfisher, Guam rail, Mariana gray swiftlet, Slevin's skink, fragile tree snail, Guam tree snail, humped tree snail, or any of the plant species: Cebello halumtano, dendrobium guamense, tuberolabium guamense, ufa-halumtano, or fadang. There is no designated critical habitat for any of the listed species within the action area, although there is proposed critical habitat for the Central West Pacific green sea turtle. EPA has determined that reissuance of the NPDES permit may affect, but is not likely to adversely affect, the Central West Pacific green sea turtle, hawksbill sea turtle, Indo-West Pacific scalloped hammerhead shark, giant manta ray, and the coral species *Acropora globiceps*. EPA also determined that the proposed permitting action will not destroy or adversely modify the proposed critical habitats for the central-west Pacific DPS green sea turtle or the Indo-Pacific corals.

A copy of the fact sheet and permit was provided to the Pacific Islands Office of the USFWS and NMFS for review and comment prior to and during the 30-day public review period. Findings of "no effect" were made for USFWS species. EPA concluded informal consultation with NOAA for the Central West Pacific green sea turtle, hawksbill sea turtle, the Indo-West Pacific scalloped hammerhead shark, the giant manta ray, and the coral species *A. globiceps*, receiving NMFS concurrence on EPA determinations dated December 19, 2023.

If, in the future, EPA obtains information or is provided information that indicates that there could be adverse impacts to federally listed species, EPA will contact the appropriate agency or agencies and initiate consultation, to ensure that such impacts are minimized or mitigated. In addition, re-opener clauses have been included should new information become available to indicate that the requirements of the permit need to be changed.

X.C. Impact to Coastal Zones

The Coastal Zone Management Act (CZMA) requires that Federal activities and licenses, including Federally permitted activities, must be consistent with an approved state Coastal Management Plan (CZMA §307(c)(1) through (3)). CZMA §307(c) and implementing regulations at 40 CFR §930 prohibit EPA from issuing a permit for an activity affecting land or water use in the coastal zone until the applicant certifies that the proposed activity complies with the State (or Territory) Coastal Zone Management program, and the State (or Territory) or its designated agency concurs with the certification.

On September 29, 2023, EPA received a consistency certification from Guam Bureau of Statistics and Plans for this permit.

X.D. Impact to Essential Fish Habitat

The 1996 amendments to the Magnuson-Stevens Fishery Management and Conservation Act (MSA) set forth new mandates for the National Marine Fisheries Service, regional fishery management councils and other federal agencies to identify and protect important marine and anadromous fish species and habitat. The MSA §305(b)(2) requires federal agencies to determination whether federal actions may adversely impact Essential Fish Habitat (EFH).

The Fishery Ecosystem Plan for the Pacific Remote Island Areas ("Fishery Ecosystem Plan") (Western Pacific Regional Fishery Management Council 2009) includes EFH and Habitat Areas of Particular Concern (HAPC) designations for Guam. The Fishery Ecosystem Plan designates EFH as the marine water column from the surface to a depth of 1,000 m from the shoreline to the outer boundary of the Exclusive Economic Zone (200 nautical miles), and the seafloor from the shoreline out to a depth of 400 m around each of the Mariana Islands. This EFH is designated to support various life stages of coral, bottomfish, crustaceans, and pelagic fish. EFH designations encompass the outfall and mixing zone, so the facility discharges into designated EFH.

Little is known about the habitat characteristics within the mixing zone, so EPA assumes that EFH characteristics may occur within the mixing zone. Potential adverse effects to essential habitat within the mixing zone include possible settling of solids and semi-solids onto the seafloor. EFH may also be negatively affected by the levels of dissolved or sorbed pollutants in the mixing zone, which can be toxic to aquatic marine life and the habitat they depend on. EPA has established effluent limitations to protect aquatic life and chronic toxicity to minimize adverse effects and ensure that marine species in the receiving water are protected. The permit also contains technology-based effluent limits and numerical and narrative

water quality-based effluent limits as necessary for the protection of applicable aquatic life uses, including limiting suspended solids, nutrients, and bacteria. A reopener clause is included in the permit should new information become available that indicate requirements of the permit need to be modified.

On September 1, 2023, EPA provided NMFS with an EFH assessment, which determined that adverse effects to designated EFH may occur in the receiving waters. NMFS responded on September 25, 2023, with a conservation recommendation to conduct benthic surveys at the outfall to determine nearby benthic composition and whether the outfall attracts fish or is located near coral reefs or seagrass. NMFS determined that implementation of the conservation recommendation will ensure that potential adverse effects to EFH are avoided and minimized. EPA recommends that the discharger, Naval Base Guam, consider including this monitoring when it provides a revised monitoring plan to characterize and reassess the mixing zone if it would like to reapply for mixing zone approval. Naval Base Guam is required to develop a monitoring plan to update its current Discharge Monitoring Report, beyond what is currently specified in the permit, in support of its anticipated requests to approve a mixing zone and dilution credits. Benthic monitoring would be consistent with this effort, so coordinating development of the monitoring plan with both Guam EPA and NMFS to ensure that they obtain the best information on potential effects is desirable. EPA also encourages NMFS to work directly with the discharger to clarify any requests for monitoring. The EFH consultation concluded on January 25, 2024.

X.E. Impact to National Historic Properties

The National Historic Preservation Act (NHPA) §106 requires federal agencies to consider the effect of their undertakings on historic properties that are either listed on, or eligible for listing on, the National Register of Historic Places. Pursuant to the NHPA and 36 CFR §800.3(a)(1), EPA has determined that issuing this NPDES permit does not have the potential to affect any historic properties or cultural properties. As a result, Section 106 does not require EPA to undertake additional consulting on this permit issuance.

X.F. Water Quality Certification Requirements (40 CFR §124.53 and §124.54)

For States, Territories, or Tribes with EPA-approved WQS, EPA is required to seek certification from the affected State, Territory, or Tribe that the permit will meet applicable water quality standards. EPA will request certification from Guam EPA. Certification under §401 of the CWA must be in writing and include conditions necessary to assure compliance with referenced applicable provisions of Sections 208(e), 301, 302, 303, 306, and 307 of the CWA and appropriate requirements of Guam EPA regulations. EPA cannot issue the permit until Guam EPA has granted certification under 40 CFR §124.53 or waived its right to certify. EPA requested a pre-filing meeting with Guam EPA on July 12, 2023, and submitted a request for certification on August 31, 2023. Guam EPA issued the §401 water quality certification on October 23, 2023 (Lastimoza 2023b).

XI. STANDARD CONDITIONS

XI.A. Reopener Provision

In accordance with 40 CFR §122 and §124, this permit may be modified by EPA to include effluent limits, monitoring, or other conditions to implement new regulations, including EPA-approved water quality standards; or to address new information indicating the presence of effluent toxicity or the reasonable potential for the discharge to cause or contribute to exceedances of water quality standards; or new permit conditions for species pursuant to ESA requirements.

XI.B. Standard Provisions

The permit requires the permittee to comply with EPA Region 9 Standard Federal NPDES Permit Conditions.

XI.C Clean Water Act Section 402(k)

The permittee is authorized to discharge from the identified facility at the outfall location(s) specified in the permit, in accordance with the effluent limits, monitoring requirements, and other conditions set forth in the permit. This permit authorizes the discharge of only those pollutants resulting from facility processes, waste streams, and operations that have been clearly identified in the permit application process. Any discharges not expressly authorized in the Permit cannot become authorized or shielded from liability under CWA section 402(k) by disclosure to EPA, State, or local authorities after issuance of the Permit via any means, including during an inspection.

Any pollutant loading greater than or different than the proposed discharge (the "proposed discharge" is based on the chemical-specific data and the facility's design flow as described in the permit application, or any other information provided to EPA during the permitting process) is not authorized by this permit.

EPA notes that such other discharge or increases may be allowable, but the Permittee must first submit a request to EPA to authorize such other discharge or increase. This request will allow EPA to conduct an updated reasonable potential analysis to reassess whether a WQBEL is needed for the newly proposed discharge. Permit modification or reissuance may be required before the proposed discharge would be authorized.

XII. ADMINISTRATIVE INFORMATION

XII.A. Public Notice (40 CFR §124.10)

The public notice is the vehicle for informing all interested parties and members of the public of the contents of a NPDES permit or other significant action with respect to an NPDES permit or application.

XII.B. Public Comment Period (40 CFR §124.10)

Notice of the draft permit and fact sheet was posted on the EPA website for the public comment period of 30 days, beginning August 30, 2023 and closing September 30, 2023. The draft permit and fact sheet were posted on the EPA website for the duration of the public comment period. EPA received one comment, from Kuuipo Apiag, with DZSP 21, requesting that the 85% removal requirements for BOD_5 and TSS be removed. EPA disagrees with this request; recent facility upgrades have resulted in reduced infiltration and inflow and the removal requirements in the effluent limits for BOD_5 and TSS are appropriate. See Sections VI.A and VI.B.5.

XII.C. Public Hearing (40 CFR §124.12(c))

No requests for a public hearing were received during the public comment period, and EPA did not determine that a public hearing was necessary.

XIII. CONTACT INFORMATION

Additional information relating to this proposal may be directed to:

Janet Parrish
U.S. EPA Region 9

415-972-3456
parrish.janet@epa.gov

XIV. REFERENCES

American Bird Conservancy. No date. Short-tailed Albatross. Accessed June 7, 2023, at: https://abcbirds.org/bird/short-tailed-albatross/.

Budd, A.M., M.K. Cooper, A. Leport, T. Schils, M.S. Mills, M.E. Deinhart, R. Huerlimann, and J.M.

https://www.sciencedirect.com/science/article/pii/S1470160X21003149.

Camacho, Ramon, U.S. Navy, Naval Base Guam. 2023. Email to Jesse Cruz, Guam EPA, and Janet Parrish, U.S. EPA, regarding mixing zone request. March 14.

Dauterman, Kristina, NMFS. 2023. Electronic correspondence with Janet Parrish, U.S. EPA. September 1-15.

Dean, Ron, NOAA Federal. 2023. Apra Harbor WWTP Species List request for NPDES permit. Email to Janet Parrish, U.S. EPA, regarding endangered/threatened species list. March 23.

Denton, D.L., J. Diamond, and L. Zheng. 2011. Test of significant toxicity: a statistical application for assessing whether an effluent or site water is truly toxic. Environ. Toxicol. Chem. 2011 May; 30(5):1117-26. doi: 10.1002/etc.493. Epub 2011. Mar. 18. https://pubmed.ncbi.nlm.nih.gov/21305584/.

Denton, D.L., J. Diamond, D. Roberts, and L. Zheng. 2013. Evaluation of the test of significant toxicity for determining the toxicity of effluents and ambient water samples. Environ. Toxicol. Chem. 2013 Apr; 32(5):1101-8. doi: 10.1002/etc.2166. Epub 2013. Mar. 29. https://pubmed.ncbi.nlm.nih.gov/23172744/.

Guam Bureau of Statistics and Plans. 2023. Coastal Zone Management (CZMA) Federal Consistency Review for Department of the Navy's Negative Determination for its proposed USEPA NPDES Permit Renewal for the Apra Harbor Wastewater Treatment Plant Outfall #001 (NPDES No. GU0110019) (*GCMP FC No. 2023-0020*). Guam Coastal Management Plan.

Guam Department of Agriculture (GDOA). 2021. Sasa Bay Marine Preserve. October. https://doag.guam.gov/wp-doag-content/uploads/2021/10/Sasa-Bay-fact-sheet.pdf.

Guam Environmental Protection Agency (GEPA). 2013. Bacteria TMDLs for Twenty-Five Guam Beaches. (EPA approved February 20, 2015). date March 7, 2018). https://attains.epa.gov/attains-public/api/documents/actions/21GUAM/64121/104751. Accessed July 5-6, 2023.

Guam Environmental Protection Agency (GEPA). 2015, approved 2018. Guam Water Quality Standards, 2015 Revision (effective date March 7, 2018). https://www.epa.gov/sites/default/files/2014-12/documents/guam-wqs.pdf. Accessed June 13, 2022 and July 5-6, 2023.

Guam Environmental Protection Agency (GEPA). 2017. Letter from Walter S. Leon Guerrero, Administrator, Guam EPA, to David Smith, EPA Region 9 NPDES office manager, re: Section 401 Water Quality Certification (WQC 17-02) for NPDES Permit Renewal, for Naval Base Guam, Apra Harbor Wastewater Treatment Plant, Apra Harbor U.S. Naval Base, Santa Rita, GU 96925, NPDES Permit No. GU0110019. January 20.

Guam Environmental Protection Agency (GEPA). 2020. Guam Environmental Protection Agency 2020 Integrated Report, EPA approved March 7,2018. . https://attains.epa.gov/attains-public/api/documents/cycles/7088/198964. Accessed June 13, 2022, August 29, 2022, and July 5-6, 2023.

Guam Environmental Protection Agency (GEPA). 2023. Approval of U.S. Naval Base Guam's (NBG's) Request for a Mixing Zone: Apra Harbor Wastewater Treatment Plant (AHWWTP) and collection system National Pollutant Discharge Elimination System (NPDES) permit renewal (GU0110019) for discharge of treated effluent to Tipalao Bay. September 15, 2023.

McKee, Jenny. 2022. The Guam Kingfisher Could Soon Return to the Wild after a 30-Year Absence. Audobon news. At https://www.audubon.org/news/the-guam-kingfisher-could-soon-return-wild-after-30-year-absence. Accessed June 7, 2023.

Lastimoza, Michelle C.R. Administrator, Guam EPA. 2023a. Approval of NBG's Request for a Mixing Zone: Apra Harbor Wastewater Treatment Plant (AHWWTP) and collection system National Pollutant Discharge Elimination System (NPDES) permit renewal (GU0110019) for the discharge of treated effluent to Tipalao Bay. Letter to Edward. E. Moon, U.S. Naval Base Guam (NBG). September 15.

Lastimoza, Michelle C.R. Administrator, Guam EPA. 2023b. In the matter of granting a water quality certification to the U.S. Environmental Protection Agency R-9, WQC Order #2024-01, NPDES Permit No. GU0110019, Apra Harbor Wastewater Treatment Plant (AHWWTP). Addressed to Elizabeth Sablad. October 23.

Micronesian Conservation Coalition. 2020. Press Release. June 10, 2020. https://micronesianconservation.org/press-release-guam-manta-rays/.

Moon, Edward E., U.S. Navy, Naval Base Guam. 2023. Email to Jesse Cruz, Guam EPA, and Janet Parrish, U.S. EPA, regarding mixing zone request. June 16.

Nalley, E.M, L.J. Tuttle, A.L. Barkman, E.E. Conklin, D.M. Wulstein, R.H. Richmond, and M.J. Donahue. 2021. Water quality thresholds for coastal contaminant impacts on corals: a systematic review and meta-analysis. Science of the Total Environment 794: 148632. June. https://static1.squarespace.com/static/569b10311115e0984d208e2f/t/60f52f78a9adb72803bcee9d/1626681211455/Nalley+et+al+2021+STOTEN+Coral+pollutant+thresholds.pdf.

Pacific Daily News. Guam manta ray research yields new understanding of species. January 21, 2022. https://www.guampdn.com/news/guam-manta-ray-research-yields-new-understanding-of-species/article_4c72fbb6-7a7b-11ec-98ce-abd86f0de5fe.html#:~:text=Hartup%20said%20Guam's%20manta%20ray,with%20interaction%20or%20eco%2Dtourism.

Quezon, Maricar, Guam EPA. 2022, personal correspondence. Email to Janet Parrish, U.S. EPA, regarding mixing zone applicability and 401 certification for 2017 permit. October 19.

Smithsonian National Zoo and Conservation Biology Institute. No date a. Guam Kingfisher (Sihek). At https://nationalzoo.si.edu/animals/guam-kingfisher-sihek. Accessed June 7, 2023.

Smithsonian National Zoo and Conservation Biology Institute. No date b. Guam Rail (Ko-Ko'). At https://nationalzoo.si.edu/animals/guam-rail-koko. Accessed June 7, 2023.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS). 2014. Final rule, Endangered and Threatened wildlife and Plants: Final listing Determinations of Proposal to List 66 Reef-Building Coral Species and to Reclassify Elkhorn and Staghorn Corals. 79 FR 53852. September 10, 2014. Accessed June 7 at: https://www.govinfo.gov/content/pkg/FR-2014-09-10/pdf/2014-20814.pdf.

U.S. Department of the Interior, Fish and Wildlife Service (FWS). 2023. List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project, Apra Harbor WWTP Action Area 1-discharge zone, Project Code 2023-0060276. March 24.

U.S. Department of the Interior, Fish and Wildlife Service (FWS). 2023. List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project, Apra Harbor WWTP Action Area 2-discharge point, Project Code 2023-0060283. March 24.

U.S. EPA (EPA). 1991. Technical Support Document for Water Quality-based Toxics Control. Office of Water, EPA. EPA/505/2-90-001. March.

U.S. EPA. 1996b. Regions IX & X Guidance for Implementing Whole Effluent Toxicity Testing Programs, Interim Final, May 31. 1996.

U.S. EPA. 2002a. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms - Fifth Edition. Office of Water, EPA. EPA-821-R-02-012.

U. S. EPA. 2002b. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms (EPA/821/R-02/014, 2002)

U.S. EPA (EPA). 2010a. National Pollutant Discharge Elimination System Test of Significant Toxicity Technical Document. Office of Wastewater Management, EPA. EPA-833-R-10-004. June.

U.S. EPA (EPA). 2010b. U.S. EPA NPDES Permit Writers' Manual. Office of Water, EPA. EPA-833-K-10-001.

U.S. EPA (EPA). 2013. National Recommended Water Quality Criteria. Office of Water, EPA. Aquatic Life Criteria Table. https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table#table

U.S. EPA (EPA). 2015. National Recommended Water Quality Criteria. Office of Water, EPA. Human Health Criteria Table. https://www.epa.gov/wqc/national-recommended-water-quality-criteria-human-health-criteria-table

U.S. EPA (EPA). 2020. Region 9 Enforcement Division Clean Water Act NPDES Inspection of Apra Harbor Wastewater Treatment Plan, Agat, Guam. February 4.

U.S. EPA (EPA). 2023. Region 9 Enforcement Division Clean Water Act NPDES Inspection of Apra Harbor Wastewater Treatment Plan, Agat, Guam. February 22.

U.S. Fish and Wildlife Service (FWS), Pacific Region. 2018. Draft Amendment to the Native Forest Birds of Guam and Rota of the commonwealth of the Northern Mariana Islands Recovery Plan for Guam rail, (*Rallus owstoni*). November. Accessed June 7, 2023, at: https://ecos.fws.gov/docs/recovery_plan/Guam_Rail_Draft_Recovery_Plan_Amendment_20181109.pdf.

U.S. Fish and Wildlife Service (FWS), Pacific Region 1. 2022. Draft Recovery Plan for 23 Species in the Mariana Islands. Accessed June 7, 2023, at: https://ecos.fws.gov/docs/recovery_plan/SIGNED%20-%20Mariana%20Islands%20dRP%20(20221129).pdf.

U.S. Fish and Wildlife Service (FWS), Pacific Region. 2018. Draft Amendment to the Native Forest Birds of Guam and Rota of the commonwealth of the Northern Mariana Islands Recovery Plan for Guam rail, (*Rallus owstoni*). November. Accessed June 7, 2023, at:

U.S. Fish and Wildlife Service (FWS). No date a. ECOS Environmental conservation Online System: Species Profile for Guam Rail (*Rallus owstoni*). At https://ecos.fws.gov/ecp/species/5112, accessed June 7, 2023.

U.S. Fish and Wildlife Service (FWS). No date, b. ECOS Environmental conservation Online System: Species Profile for Guam Micronesian kingfisher (*Halcyon cinnamomina cinnamomina*). Accessed June 7, 2023, at: https://ecos.fws.gov/ecp/species/6.

U.S. Fish and Wildlife Service (FWS). No date c. ECOS Environmental conservation Online System: Species Profile for Short tailed albatross (*Phoebastria (=Diomedea) albatrus)*. At https://ecos.fws.gov/ecp/species/433, accessed June 7, 2023.

U.S. Fish and Wildlife Service (FWS). No date d. Short-tailed Albatross, FWS Focus. At At https://www.fws.gov/species/short-tailed-albatross-phoebastria-albatrus, accessed June 7, 2023.

U.S. Fish and Wildlife Service (FWS). No date e. ECOS Environmental conservation Online System: Species Profile for Slevin's Skink (*Emoia slevini)*. At https://ecos.fws.gov/ecp/species/9767, accessed June 7, 2023.

U.S. National Oceanic Atmospheric Administration, National Marine Fisheries Service (NMFS). 1998a. Recovery plan for U.S. Pacific populations of the green sea turtle (*Chelonia mydas*). Pacific Sea Turtle Recovery Team. At https://repository.library.noaa.gov/view/noaa/15970.

U.S. National Oceanic Atmospheric Administration, National Marine Fisheries Service (NMFS). 1998b. Recovery plan for U.S. Pacific populations of the hawksbill turtle (*Eretmochelys imbricata*). Pacific Sea Turtle Recovery Team. https://repository.library.noaa.gov/view/noaa/15969.

U.S. National Oceanic Atmospheric Administration, National Marine Fisheries Service (NMFS). 2020. Five-year review of Scalloped Hammerhead Sharks in four DPSs. May 14. https://media.fisheries.noaa.gov/dam-migration/scalloped_hammerhead_5-year_review.pdf

U.S. National Oceanic Atmospheric Administration, National Marine Fisheries Service (NMFS). 2022. Final Rule: Listing of 20 Reef-Building Coral Species Under the ESA. https://www.fisheries.noaa.gov/action/listing-20-reef-building-coral-species-under-esa

U.S. National Oceanic Atmospheric Administration, National Marine Fisheries Service (NMFS). 2023a. Sharks, Rays, and Climate Change: Impacts on Habitat, Prey Distribution, and Health. July 12. https://www.fisheries.noaa.gov/feature-story/sharks-rays-and-climate-change-impacts-habitat-prey-distribution-and-health

U.S. National Oceanic Atmospheric Administration, National Marine Fisheries Service (NMFS). 2023b. Draft Biological Report for the Designation of Marine Critical Habitat for Six Distinct Population Segment of the Green Turtle, *Chelonia mydas*. June. https://www.fisheries.noaa.gov/s3/2023-07/DraftGreenTurtleCH-BiologicalReport-June2023.pdf

U.S. National Oceanic Atmospheric Administration, National Marine Fisheries Service (NMFS). No date. Giant Manta Ray. https://www.fisheries.noaa.gov/species/giant-manta-ray

U.S. Navy (USN), Naval Facilities Engineering Command (NAVFACENGCOM), Marianas. 2015. US Navy, Apra Harbor Wastewater Treatment Plant NPDES Permit Application Renewal Discharge Characterization Report. Prepared by EEC Environmental and Element Environmental, LLC. May 29. Often referred to as the SPAWAR Study.

Western Pacific Regional Fishery Management Council. 2009. Fishery Ecosystem Plan for the Pacific Remote Island Areas. Honolulu, Hawaii. September 24. At http://www.wpcouncil.org/wp-content/uploads/2019/05/WPRFMC-PRIA-FEP-2009-09-21.pdf.

Western Pacific Regional Fishery Management Council. No date. Fishery Ecosystem Plan for the Pacific Remote Island Area. At http://www.wpcouncil.org/wp-content/uploads/2019/05/WPRFMC-PRIA-FEP-2009-09-21.pdf, accessed June 6, 2023.