VOLUME III
Large Applicant Questionnaire

City of San Diego
Public Utilities Department

March 2022

LIST OF VOLUMES

LARGE APPLICANT QUESTIONNAIRE

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Acronyms and Abbreviations

ADCP	acoustic Doppler current profiler
ASBS	Areas of Special Biological Significance
ATSD	EPA 1994 *Amended Section 301(h) Technical Support Document*
AUV	autonomous underwater vehicle
Basin Plan	*Water Quality Control Plan for the San Diego Region*
BF	buoyancy frequency
BIP	balanced indigenous population
BMP	best management practices
BOD	biochemical oxygen demand
BRI	Benthic Response Index
CalCOFI	California Cooperative Oceanic Fisheries Investigation
CDFW	State of California Department of Fish and Wildlife
CDOM	colored dissolved organic matter
CDP	Claude "Bud" Lewis Carlsbad Desalination Plant
CEC	constituent of emerging concern
CEDEN	California Environmental Data Exchange Network
CFR	*Code of Federal Regulations*
CFL	contributory flow limits
CFU	colony forming unit
City	City of San Diego
CIU	Categorical Industrial User
CIWQS	California Integrated Water Quality System
cm	centimeters
cm/sec	centimeters per second
CPFV	commercial public fishing vessels
CTD	conductivity, temperature, depth
CWA	Clean Water Act
DDD	dichloro-diphenyl-dichloroethane
DDE	dichloro-diphenyl-dichloroethylene
DDT	dichloro-diphenyl-trichloroethane
DEHQ	San Diego County Department of Environmental Health and Quality
DNQ	detected not quantifiable
DPS	distinct population segment
ELAP	Environmental Laboratory Accreditation Program
EPA	United States Environmental Protection Agency
ERP	Enforcement Response Plan

Acronyms and Abbreviations
(continued)

ESA	Endangered Species Act
FIB	fecal indicator bacteria
ft	feet
gpm	gallons per minute
gpd	gallons per day
HAB	harmful algae bloom
HCH	hexachlorocyclohexane
HHW	household hazardous waste
I&I	inflow and infiltration
IU	industrial user
IWCP	Industrial Wastewater Control Program
JPA	Joint Powers Authority
km	kilometer
km^2	square kilometer
m	meters
m^2	square meter
m^3	cubic meter
m^3/sec	cubic meters per second
MBC	Metro Biosolids Center
MDL	method detection limit
MER	mass emission rate
Metro System	San Diego Metropolitan Sewerage System
mgd	million gallons per day
mg/L	milligrams per liter
mg/kg	milligrams per kilogram
ml	milliliters
ml/L	milliliters per liter
MLLW	mean lower low water
MMPA	Marine Mammal Protection Act
MPA	marine protected area
mt/yr	metric tons per year
NA	not available or not applicable
NCPWF	North City Pure Water Facility
NCWRP	North City Water Reclamation Plant

Acronyms and Abbreviations
(continued)

ND	not detected
nm	nautical mile
NMFS	National Marine Fisheries Service (also known as NOAA Fisheries)
NOAA	National Oceanic and Atmospheric Administration
NOEC	no observed effects concentration
NOV	notice of violation
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Units
Ocean Plan	2019 Water Quality Control Plan, Ocean Waters of California
pg/L	picograms per liter
PAHs	polynuclear aromatic hydrocarbons
PCBs	polychlorinated biphenyls
PLOO	Point Loma Ocean Outfall
PLWTP	E.W. Blom Point Loma Wastewater Treatment Plant
POC	pollutant of concern
ppb	parts per billion
ppm	parts per million
ppt	parts per thousand
PRI-SC	peroxide regenerated iron sulfide control
PTMP	plume tracking monitoring plan
PWC	personal watercraft
RL	reporting limit
SANDAG	San Diego Association of Governments
SDPUD	San Diego Public Utilities Department
ROTV	remotely operated towed vehicle
RTOMS	real-time oceanographic mooring system
Regional Board	Regional Water Quality Control Board, San Diego Region
RNKSC	Region Nine Kelp Survey Consortium
RSB model	Roberts, Snyder, Baumgartner ocean outfall dilution model
SBOO	South Bay Ocean Outfall
SBWRP	South Bay Water Reclamation Plant
SCB	Southern California Bight
SCCWRP	Southern California Coastal Water Research Project
PUD	City of San Diego Public Utilities Department
SIO	Scripps Institution of Oceanography

Acronyms and Abbreviations
(continued)

SIU	Significant Industrial User
SMCA	State Marine Conservation Area
SMR	State Marine Reserve
SNC	significant non-compliance
SWQPA	State Water Quality Protection Area
State Board	State Water Resources Control Board
TCDD	tetrachlorodibenzo-p-dioxin
Thermal Plan	Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays of California
TOC	total organic carbon
TSS	total suspended solids
TST	test of significant toxicity
TVS	total volatile solids
µg/L	micrograms per liter
USDON	U.S. Department of the Navy
USFDA	U.S. Food and Drug Administration
USFWS	United States Fish and Wildlife Service
ZID	zone of initial dilution

I. INTRODUCTION

Section 301(h) of the Clean Water Act (CWA) establishes conditions under which the U.S. Environmental Protection Agency (EPA) may issue modified secondary treatment requirements for ocean discharges of treated municipal wastewater. EPA has promulgated regulations governing the application for such modified secondary treatment requirements within Title 40, Section 125, Subpart G of the Code of Federal Regulations (40 CFR 125).

Appendix B to 40 CFR 125, Subpart G presents a two-section questionnaire to be used by large applicants for modification of secondary treatment requirements. A large applicant is defined as a discharger serving a population of 50,000 or more or having a discharge flow in excess of 5 million gallons per day (mgd). The City of San Diego (City) meets the criteria for a large applicant.

Response Format - Large Applicant Questionnaire

The questionnaire presented in 40 CFR 125, Subpart G, Appendix B includes the following two sections of questions:

Section II General Information and Basic Data Requirements

Section II of the questionnaire presents questions for describing the treatment, source control, and outfall system, the proposed discharge, receiving water conditions, and how the discharge complies with state and federal laws.

Section III Technical Evaluation

Section III of the questionnaire presents questions to assess the effects of the discharge. To this end, Section III questions assess the physical characteristics of the discharge, compliance with water quality standards, impacts on public water supplies and recreation, biological impacts of the discharge and compliance with applicable regulations for toxics control.

Guidance for responding to the questions is provided by EPA in Amended Section 301(h) Technical Support Document (hereinafter ATSD). EPA issued the ATSD in 1994 to provide instructions and computational methodologies for addressing 301(h)-related issues. In accordance with direction presented within the ATSD, the following sections present responses to the Section II and Section III questions from the Large Applicant Questionnaire.

For questions requiring lengthy responses, a brief synopsis of the response is presented in italics at the beginning of the response. More detailed information is presented in regular type font below the italicized summary.

Data Period Evaluated

To address questions within the Large Applicant Questionnaire, this application evaluates influent, effluent, receiving water, beneficial use, and marine habitat data collected pursuant to monitoring requirements established within Order No. R9 2017 0007. This application also presents the results of special studies that have been conducted pursuant to provisions of Order No. R9-2017-0007.

Order No. R9-2017-0007 (NPDES CA0107409) became effective on October 1, 2017. To eliminate the potential for seasonal bias by utilizing data from partial years, this 301(h) application evaluates data collected from complete calendar years. Most analyses presented herein consider influent and effluent data from complete calendar years 2017-2020. It should be noted that a portion of the year 2017 data were collected pursuant to monitoring requirements established in the prior NPDES permit (Order No. R9-2009-0001). Data collected pursuant to Order No. R9 2009 0001, however, remain relevant to evaluating the effects of the PLOO discharge. These data are also useful in evaluating the potential for exceeding requirements established within Order No. R9 2017 0007.

Attached Technical Studies

To support responses presented within the Large Applicant Questionnaire, responses to more complex issues are evaluated in detail within attached technical appendices presented in Volumes IV through X. Several of the technical studies, however, present computations from the original 1995 PLOO NPDES application that utilized the computational methodology presented within the 1994 ATSD. These technical appendices include assessments evaluating re-entrainment (Appendix O), initial dilution (Appendix Q), dissolved oxygen demand (Appendix R) and ammonia (Appendix S). While these original 1995 computations are presented to comply with the methodologies set forth in the 1994 ATSD, each of these appendices have been updated to document the continued relevance and validity of this previously submitted information.

Table I-1 summarizes technical appendices presented in support of the City of San Diego 301(h) application. As shown in Table I 1, technical appendices presented herein analyze and assess data through the end of calendar year 2020.

Table I-1:
Technical Appendices to the 2022 Application for Modified Secondary Treatment Requirements [A] Volumes IV through X

Volume	Technical Appendix	Description and Sub-Appendices	Original to 2022 301(h) Application [B]	From Prior Application with Updates [C]
IV	A	Metro System Facilities and Operations	✓	
	B	Proposed Future Facilities	✓	
V	C	Ocean Benthic Conditions: Appendix C.1 Benthic Sediments, Invertebrates and Fishes Appendix C.2 San Diego Benthic Tolerance Intervals Appendix C.3 San Diego Sediment Quality Assessments Appendix C.4 Assessment of Macrobenthic Communities off Point Loma Appendix C.5 Bioaccumulation Assessment	✓	
VI	D	Point Loma Plume Behavior and Tracking Study	✓	
	E	2014-2020 Kelp Forest Ecosystem Monitoring Summary	✓	
	F	2014-2020 Coastal Remote Sensing Summary	✓	
	G	2016-2020 Summary of Remotely Operated Vehicle Surveys for Outfall Integrity	✓	
VII	H	Beneficial Use Assessment	✓	
	I	Endangered Species Evaluation	✓	
	J	Essential Fish Habitats	✓	
	K	Proposed Monitoring Program	✓	
VIII	M	2020 Annual Biosolids Report	✓	
IX	M	2020 Annual Pretreatment Report	✓	
	N	2020 Annual Local Limits Reevaluation Report	✓	
X	O	Re-Entrainment		✓
	P	Oceanography	✓	
	Q	Initial Dilution Simulation Models		✓
	R	Dissolved Oxygen Demand		✓
	S	Analysis of Ammonia		✓
	T	California Ocean Plan	✓	
	U	Correspondence	✓	

Table I-1 Notes:
- A Application for modified secondary treatment requirements for the E.W. Blom Point Loma Wastewater Treatment Plant is submitted pursuant to Section 301(h) of the Clean Water Act.
- B New technical appendices that address updated data from 2017-2020, present assessments of the updated data or descriptions of changed conditions since the prior PLOO NPDES application was submitted in 2015 and compare pre-discharge data (1991-1993) with data collected during post-discharge conditions (1994-2020).
- C Technical appendices that include computations presented in the original 1995 PLOO NPDES application, updated with information on present-day data and relevancy of the 1995 conclusions and computations to present-day conditions.

Similarly, several of the Large Applicant Questionnaire sections presented herein involve items for which the following conditions are satisfied:

- No material change in facilities, operations, or oceanographic conditions have occurred since the City's prior 2015 301(h) application.
- The question at issue is not affected by modifications in Metro System facilities or operations that have been implemented since the prior application.
- The Large Applicant Questionnaire response presented in the prior 2015 NPDES application remains valid.

For questions satisfying of the above conditions, Large Applicant Questionnaire responses previously submitted in prior PLOO NPDES applications are again presented herein, updated as applicable.

Effluent and Receiving Water Data

Effluent and receiving water monitoring data required under the provisions of Monitoring and Reporting Program No. R9-2017-0007 (NPDES CA0107409) have been previously submitted by the City to the Regional Water Quality Control Board (Regional Board) in the form of monthly, quarterly, semiannual, and annual reports. These reports are incorporated by reference as part of this 301(h) application for modified secondary treatment requirements.

In accordance with an agreement between City staff and staff of EPA Region IX, to eliminate duplication and paper waste, effluent and receiving water data from these reports are not reprinted in their entirety herein. Instead, these data have been transmitted to EPA in electronic format. Additionally, the data are summarized and analyzed where appropriate within the Large Applicant Questionnaire and attached appendices.

II. GENERAL INFORMATION AND BASIC DATA REQUIREMENTS

II.A TREATMENT SYSTEM DESCRIPTION

II.A.1. On which of the following are you basing your application: a current discharge, improved discharge, or altered discharge, as defined in 40 CFR 125.58? [40 CFR 125.59(a).]

SUMMARY: This application is based on a current discharge, as defined by 40 CFR 125.58(h).

40 CFR 125.58(h) defines a current discharge as:

"Current discharge means the volume, composition, and location of an applicant's discharge at the time of permit application."

The volume, composition, and location of the Point Loma Ocean Outfall (PLOO) discharge and the description of Metro System treatment facilities is as documented within the findings of Order No. R9-2017-0007 (NPDES CA0107409). This permit application presented herein does not request or propose any changes in effluent concentration or mass emission limitations or performance goals established within Order No. R9-2017-0007. The application is based on a current discharge, as defined by 40 CFR 125.58.

While the application is based on a current discharge, it is worth noting that a significant number of Metro System improvements have been implemented during the past 25 years. Additionally, as noted in the "Basis of Application" (Volume II), the City is currently engaged in a comprehensive effort to implement the Pure Water San Diego Program which will significantly increase recycled water use, bolster regional water supplies and reduce future PLOO discharge flows and solids mass emissions.

Summary of Past Metro System Improvements. The Point Loma Wastewater Treatment Plant (PLWTP) discharge has operated under modified secondary treatment requirements for total suspended solids (TSS) and biochemical oxygen demand (BOD) since 1995. During this period, the City of San Diego, as operator of the Metro System, has implemented a systematic sequence of planned facilities improvements that are directed toward developing recycled water supplies, improving wastewater treatment, reducing PLOO discharge flows, and reducing PLOO mass emissions.

Table II.A-1 summarizes progressive Metro System improvements during the prior four 301(h) NPDES permit periods that address the reduction of PLOO discharge flows and/or improve treatment at the PLWTP. As a result of these actions, the City of San Diego has been able to achieve (see Figures II.A-1 and II.A-2) a reduction in PLOO TSS mass emissions during each of the prior 301(h) NPDES permit terms.

Commitment to Implementing Pure Water San Diego Program. While this application is based on a current discharge (per 40 CFR 125.58), this NPDES application also reaffirms the City's continued commitment to implement a comprehensive water reuse program called Pure Water San Diego. Pure Water San Diego is a long-term joint water and wastewater facilities plan that will provide a safe, reliable, and cost-effective drinking water supply for San Diego through the application of advanced treatment technology to purify recycled water. The Pure Water San Diego Program is the result of collaboration between the City of San Diego, Metro Wastewater Joint Powers Authority (JPA), and a diverse array of regional stakeholders. The City of San Diego, Metro Wastewater JPA, and regional stakeholders have agreed to cooperate to:

- Implement a comprehensive potable reuse program using state-of-the-art advanced treatment technology to achieve an ultimate goal of 83 mgd of potable reuse by December 31, 2035.
- Reduce influent flows and solids loads to the PLWTP so that ultimate PLOO TSS mass emissions are reduced to levels that would have occurred if the 240 mgd PLWTP were to achieve secondary treatment TSS concentration standards.
- Support the City's application for renewed 301(h) modified TSS and BOD limits for the PLWTP.
- Support the City's pursuit of administrative or legislative efforts to codify that, as a result of implementing the comprehensive Pure Water San Diego Program, the PLOO discharge is recognized as providing the equivalent to secondary treatment for purposes of compliance with the CWA.

**Table II.A-1:
Summary of Major Metro System Milestones to
Improve Treatment and/or Reduce PLOO Discharge Flows, 1995-2021**

Action	Improvements to Reduce PLOO Discharge Flows or Improve Effluent Quality [A]			
	Effective Period of Order No. 95-106	Effective Period of Order No. R9-2002-0025	Effective Period of Order No. R9-2009-0001	Effective Period of Order No. R9-2017-0007
Improvements to Point Loma solids handling and digestion	✓			
Implementation of solids processing facilities at Metro Biosolids Center	✓			
Flows from Mexico reduced by implementation of International Boundary and Water Commission International Wastewater Treatment Plant (IWTP)	✓			
North City Water Reclamation Plant (NCWRP) brought online	✓			
Approval and Implementation of Urban Area Pretreatment Program	✓			
NCWRP recycled water users brought online [B]	✓	✓	✓	✓
Water conservation/education program to reduce wastewater flows	✓	✓	✓	✓
South Bay Water Reclamation Plant (SBWRP) brought online and discharge to South Bay Ocean Outfall (SBOO) initiated [C]		✓		
SBWRP recycled water users brought online [D]		✓	✓	✓
Installation of effluent disinfection at the PLWTP [E]			✓	✓
Implementation/refinement of system-wide chemical addition program to improve treatment effectiveness at the PLWTP [F]			✓	✓
Completion of initial Pure Water San Diego potable reuse feasibility studies; City commitment to move forward with Pure Water San Diego [G]			✓	
Complete %100 design for Phase 1 Pure Water facilities and secure environmental and regulatory approvals/permits for Phase 1 project [H]				✓
Complete improvements to the PLWTP headworks and grit removal system				✓
Complete design of Phase 1 facilities and initiate construction [H]				✓
Initiate detailed planning for Phase 2 of Pure Water San Diego program [I]				✓

Table II.A-1 Notes:

A Improvements completed during the applicable effective period of the relevant Order.
B The City of San Diego (City) maintains ongoing programs to market recycled water, retrofit sites, and bring additional recycled water users online within the distribution service area of the NCWRP.
C The SBWRP discharge to the South Bay Ocean Outfall (SBOO) was initiated in May 2002. The 15 mgd SBWRP offloaded flows which were previously directed to the PLWTP.
D The City of San Diego Public Utilities Department and Otay Water District (which receives and markets SBWRP recycled water) maintain ongoing programs to retrofit sites and bring additional recycled water users online within their respective recycled water service areas.
E Effluent disinfection using sodium hypochlorite was initiated in 2008 to ensure compliance with State of California recreational body-contact bacteriological standards throughout the water column (ocean surface to ocean bottom) in all State-regulated waters. See Appendix A.
F The City has implemented a system-wide coordinated chemical addition technology called PRI-SC (Peroxide Regenerated Iron Sulfide Control) to improve odor control while increasing solids removal at the PLWTP. See Appendix A.
G Includes completion of the North City Demonstration Pure Water Facility (NCDPWF, 2013). City Council approval to move forward with the Pure Water San Diego Project occurred in November 2014.
H Phase 1 of the Pure Water San Diego involves constructing facilities to initiate 30 mgd of potable reuse by December 31, 2027.
I Phase 2 of the Pure Water San Diego program involves implementing 83 mgd of purified water production by December 31, 2035.

Figure II.A-1: PLWTP Effluent TSS Mass Emissions, 10-Year Running Average, 2000-2020

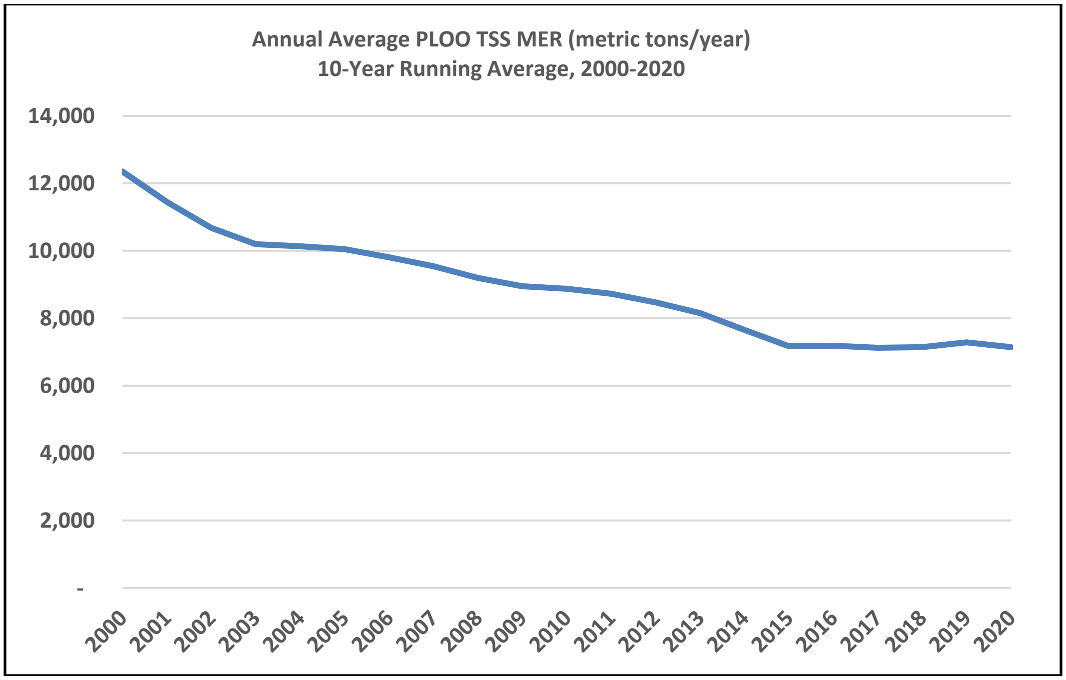
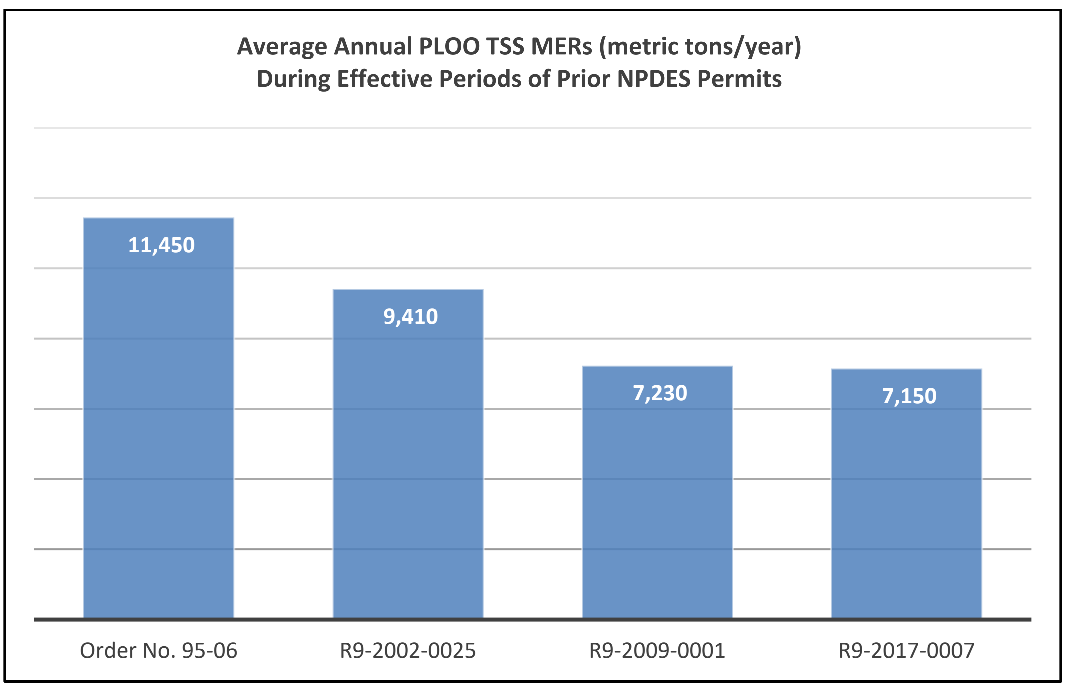


Figure II.A-2: Average Annual PLWTP Effluent TSS Mass Emissions during Prior NPDES Permit Terms



Special Provision VI.C.6 of Order No. R9-2017-0007 addresses the City's commitment for implementing the Pure Water San Diego Program, which will include achieving a goal of 83 mgd of potable reuse by 2035. Table 8 of Order No. R9-2017-0007 establishes tasks and completion dates for completing Phase 1 of the Pure Water San Diego Program. Table 8 requires the City to submit task reports and progress reports to track implementation progress.1,2 As documented within these task and progress reports, the City has faced delays on the program resulting from legal challenges, Covid-19 issues, and supply chain issues. Nonetheless, the City remains committed to implementing the Phase 1 facilities as soon as possible and the City has established a schedule for completing Phase 1 tasks by December 31, 2027.[3]

Proposed Reduction in TSS Mass Emissions Limits for Renewed NPDES Permit. Table II.A-2 summarizes existing TSS mass emission rates (MERs) established in Order No. R9-2017-0007 and TSS MERs established within prior PLOO NPDES permits. As shown in the table, the current permitted PLOO TSS mass emission limit is 11,999 metric tons per year (mt/yr). As part of the renewed 301(h) NPDES permit, it is proposed that PLOO mass emissions be reduced to 11,998 mt/yr for years 1 through 4, and to 11,500 mt/yr in year 5 of the renewed modified NPDES permit (see Table II.A-2).

As shown in Table II.A-2, the program goal is to cap PLOO mass emissions at 9,942 mt/yr by year 2028 and beyond. This 9,942 mt/yr TSS MER would be achieved with a combination of:

- PLWTP solids offloading resulting from upstream potable reuse and treatment facilities.
- Maintaining chemically enhanced primary treatment at the PLWTP (no conversion of the PLWTP to traditional secondary treatment).

This 9,942 mt/yr TSS MER limit is the same MER that would apply to a 240 mgd PLWTP discharge (the annual average design capacity of the PLWTP) if a 30 mg/L (milligrams per liter) TSS concentration limit (secondary treatment concentration limit) were to be applied.

1 The Phase 1 Pure Water San Diego schedule established in Table 8 of Order No. R9-2017-0007 is based on progress achieved by 2017 (when Order No. 2017-0007 was adopted). The Table 8 schedule notes that completion dates presented in the table may be modified based on issues related to regulatory approvals, environmental review issues, and legal challenges that affect the program, individual projects, or the program schedule.
2 As a result of delays incurred due to lawsuits, contracting issues, supply chain issues and COVID-19, the City will not be able to meet the original Phase 1 completion date for completing construction of Phase 1 Pure Water facilities by July 31, 2022. The current construction schedule provided to the City by its contractors is based on completing construction of Phase 1 facilities by December 31, 2027.
3 As a result of delays (see footnote 2), as documented within the "Basis of Application" (Volume II) and Appendix B (Volume IV), the City is proposing a revised implementation schedule that would achieve completion of Phase 1 tasks by December 31, 2027.

Table II.A-2:
Comparison of Proposed TSS Mass Emission Rates with Prior NPDES Mass Emission Limits

Year of NPDES Permit	Total Suspended Solids (TSS) Mass Emission Rate (MER) (metric tons per year)				
	Original TSS MER Established in Order No. 95-106[A,B]	TSS MER Established in Order No. R9-2002-0025[A,C]	TSS MER Established in Order No. R9-2009-0001[A,D]	TSS MER Established in Order No. R9-2017-0007[A,E]	Proposed TSS MER for Renewal of NPDES CA0107409
Year 1	15,000	15,000	15,000	12,000	11,998
Year 2	15,000	15,000	15,000	12,000	11,998
Year 3	15,000	15,000	15,000	12,000	11,998
Year 4	15,000	15,000	15,000	12,000	11,998
Year 5	13,600	13,599	13,598	11,999	11,500
Beyond Year 2028:					9,942 [F,G]

Table II.A-2 Notes:

A Not to include solids contributions from (1) Tijuana, Mexico via the emergency connection, (2) federal facilities in excess of solids contributions received in calendar year 1995, (3) Metro System flows treated in the City of Escondido, (4) SBWRP flows discharged to the SBOO, and (5) emergency use of the Metro System participating agencies over their capacity allotments.

B Original PLWTP 301(h) NPDES permit adopted in 1995. A TSS MER limit of 15,000 mt/yr applied through December 31, 1999, and a TSS MER limit of 13,600 mt/yr applied after January 1, 2000.

C MER limits within Order No. R9-2002-0025, as amended by State Water Resources Control Board (State Board) Order No. WQO 2002-0013. A TSS MER limit of 15,000 mt/yr applied through December 31, 2005, and TSS MER limit of 13,599 mt/yr applied after January 1, 2006. The original version of Order No. R9-2002-0025 imposed a TSS MER limit of 13,995 mt/yr for years 1 through 4, but this was revised to 15,000 mt/yr by State Board Order No. WQO 2002-0013.

D TSS MER limits established within Order No. R9-2009-0001, which became effective on August 1, 2010. A TSS MER limit of 15,000 mt/yr applied through December 31, 2013, and TSS MER limit of 13,598 mt/yr applied after January 1, 2014.

E TSS MER limits established within Order No. R9-2017-0007, which became effective on October 1, 2017. Order No. R9-2017-0007 establishes a TSS MER limit of 12,000 mt/yr for years 1 through 4 of the permit, and a TSS MER of 11,999 mt/yr for year 5 of the permit.

F Compliance with proposed reduced TSS MER limit is to be achieved through future offloading the PLWTP by implementing potable reuse projects as part of the Pure Water San Diego program. It is anticipated that this TSS MER goal would become an enforceable TSS MER limit in either (1) future 301(h) modified NPDES permits or (2) future NPDES permits based on approval of secondary equivalency status for the PLWTP. (Note: Establishing the secondary equivalency status of the PLWTP may require administrative or legislative action.)

G The proposed TSS MER limit would be capped at 9,942 mt/yr going forward beyond 2028. This 9,942 mt/yr MER is the same MER that would apply to a 240 mgd PLWTP discharge if a 30 mg/L TSS concentration limit (secondary treatment concentration limit) were to be applied.

No Proposed Changes in Effluent Limitations or Performance Goals. In keeping with the "current discharge" designation (as defined by 40 CFR 235.58), the City does not request any change in existing NPDES effluent concentration limitations or performance goals established in Order No. R9-2017-0007. Table II.A-3 presents targeted Pure Water San Diego goals for potable reuse for the next 25 years. As shown in the table, the Pure Water San Diego program targets 83 mgd of potable reuse by December 31, 2035.

Table II.A-3:
Potable Reuse Implementation Goals [A]

Phase	Targeted Goal: Cumulative Potable Reuse Capacity	Target Implementation Date
1	30 mgd [B]	December 31, 2027 [C]
2	83 mgd [B]	December 31, 2035 [C]

Table II.A-3 Notes:

- A Implementation of the targeted potable reuse capacity goals is subject to (1) timely environmental approval of the Pure Water San Diego Program and associated projects, (2) timely regulatory approval of proposed reuse facilities and projects program that comprise the Pure Water San Diego Program, and (3) continued approval of future 301(h) modified NPDES permits for the PLWTP or approval of secondary equivalency status for the PLWTP.
- B Cumulative total purified water production capacity of potable reuse facilities within the Metro System that result in flow offloads to the PLWTP.
- C Target implementation dates may be subject to modification based on regulatory approval schedules, environmental review issues, or legal challenges to the proposed program or projects (see footnote A). See "Basis of Application" (Volume II) and Appendix B (Volume IV).

Table II.A-4 presents key tasks proposed by the City during the upcoming five-years for implementing the goals of completing construction of Phase 1 Pure Water facilities by December 31, 2027 and achieving 83 mgd of potable reuse by December 31, 2035.

Table II.A-4:
Pure Water San Diego Potable Reuse Tasks for the Period of 2022-2028

Category	Task	Implementation Date [A, B, C]
Pure Water Phase 1 North City Pure Water Project [D]	Complete construction for North City potable reuse facility and pipelines	June 30, 2027
	Produce a cumulative total of at least 30 mgd of potable reuse	December 31, 2027
Pure Water Phase 2 Central Area Project [E, F]	Complete design of a central area small-scale facility at the PLWTP	June 30, 2023
	Begin Central Area Small-Scale Facility Operation [G]	June 30, 2025
	Issue Notices to Proceed (NTPs) for pre-design of potable reuse facility and pipelines [G]	June 30, 2025
	Issue Notice of Preparation for Central Area Project EIR [G]	December 31, 2026
	Issue NTPs for full design of potable reuse facility and pipelines [G]	June 30, 2027

Table II.A.4 Notes:

A The listed milestones are those that are expected to occur during the effective period of the renewed permit that is anticipated to potentially extend until the end of 2028.
B This schedule is based on the current progress as of the date of submission of the permit renewal application.
C Task completion dates may require modification in the future based on issues related to the regulatory approval schedule, environmental review issues, supply chain interruptions, legal challenges to the proposed program or projects, or other unforeseen circumstances.
D Phase 1 Pure Water implements an ultimate annual average daily production of 30 mgd of water suitable for potable reuse.
E Phase 2 Pure Water implements an ultimate annual average daily production of an additional 53 mgd of water suitable for potable reuse resulting in a cumulative total of 83 mgd. The tasks listed in Table 2 represent the work necessary during the renewed permit period to allow for the ultimate production of 83 mgd of water suitable for potable reuse by December 31, 2035.
F Future permit applications prior to December 31, 2035, may also contain a schedule of tasks necessary to ensure completion and full operation of Phase 2 by December 31, 2035.
G These tasks are dependent upon future approval by the Mayor and City Council of San Diego.

II.A.2. Description of the treatment/outfall system

[40 CFR 125.61(a) and 125.61(e)]

a. Provide detailed descriptions and diagrams of the treatment system and outfall configuration which you propose to satisfy the requirements of 40 CFR part 125, subpart G. What is the total discharge design flow upon which this application is based?

SUMMARY: This application is based on an annual average design discharge flow of 240 mgd (10.5 m^3/sec) through the 23,472-foot-long (7,154 meters) PLOO. Discharged wastewaters undergo chemically enhanced primary treatment at the PLWTP. Detailed descriptions of existing Metro System treatment, solids handling, wastewater conveyance, and ocean discharge facilities are presented in Appendix A (Volume IV). Appendix B (Volume IV) presents facilities improvements proposed within the next five-year period. Brief summaries of these facilities are presented below.

System Overview - Existing System. Figure II.A-3 presents the location of key Metro System facilities. Figure II.A-4 presents a schematic of existing Metro System treatment and solids handling facilities. As shown in the figures, existing Metro System wastewater treatment facilities include the:

- E.W. Blom Point Loma Wastewater Treatment Plant (PLWTP).
- North City Water Reclamation Plant (NCWRP).
- South Bay Water Reclamation Plant (SBWRP).

Waste solids from the SBWRP are conveyed to the PLWTP for treatment. Waste solids from the PLWTP and NCWRP are conveyed to the Metro Biosolids Center (MBC) for dewatering and disposal. Appendix A (Volume IV) presents detailed descriptions of Metro System collection, treatment, solids handling, and ocean disposal facilities. Brief descriptions of key Metro System facilities and operations are presented in the following sections.

Pump Station 1. Pump Station 1 (see Figure II.A-3) conveys wastewater from the southern portion of the Metro System through the South Metro Interceptor to Pump Station 2. Ferrous chloride, sodium hydroxide, and sodium hypochlorite are used for odor and sulfide control. With one unit as standby, the Pump Station 1 pumping capacity is approximately 160 mgd.

Pump Station 2. Pump Station 2 is the largest pump station within the Metro System. Virtually all wastewater delivered to the PLWTP is pumped through Pump Station 2. In addition to pumping wastewater, Pump Station 2 provides chemical addition (hydrogen peroxide, sodium hydroxide, and sodium hypochlorite) and coarse screening for all effluent directed to the PLWTP.

With one main pump serving as a standby unit, Pump Station 2 has a maximum pumping capacity of 432 mgd. Pump Station 2 discharges wastewater to the east portal of the Point Loma Tunnel through two 2.21-meter-diameter (87-inch) force mains, respectively 4.3 and 4.7 kilometers or km (2.7 and 2.9 statute miles) long. One force main follows a land route while the second force main is routed underneath San Diego Bay. The Point Loma Tunnel conveys wastewater to the PLWTP under the Point Loma peninsula.

**Figure II.A-3:
Metro System Facilities and Participating Agency Service Area**

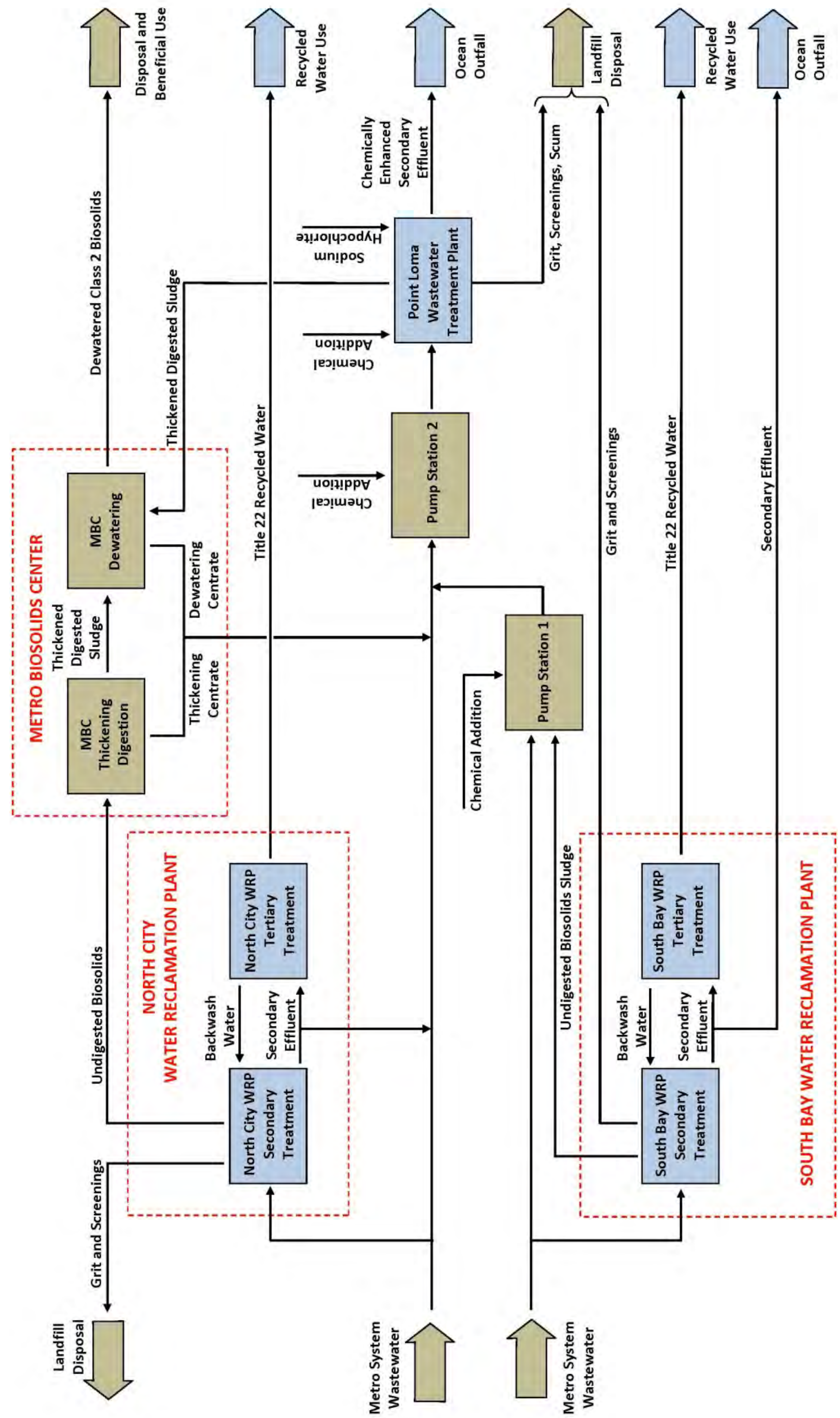


Figure II.A-4:
Schematic of Metro System Operations

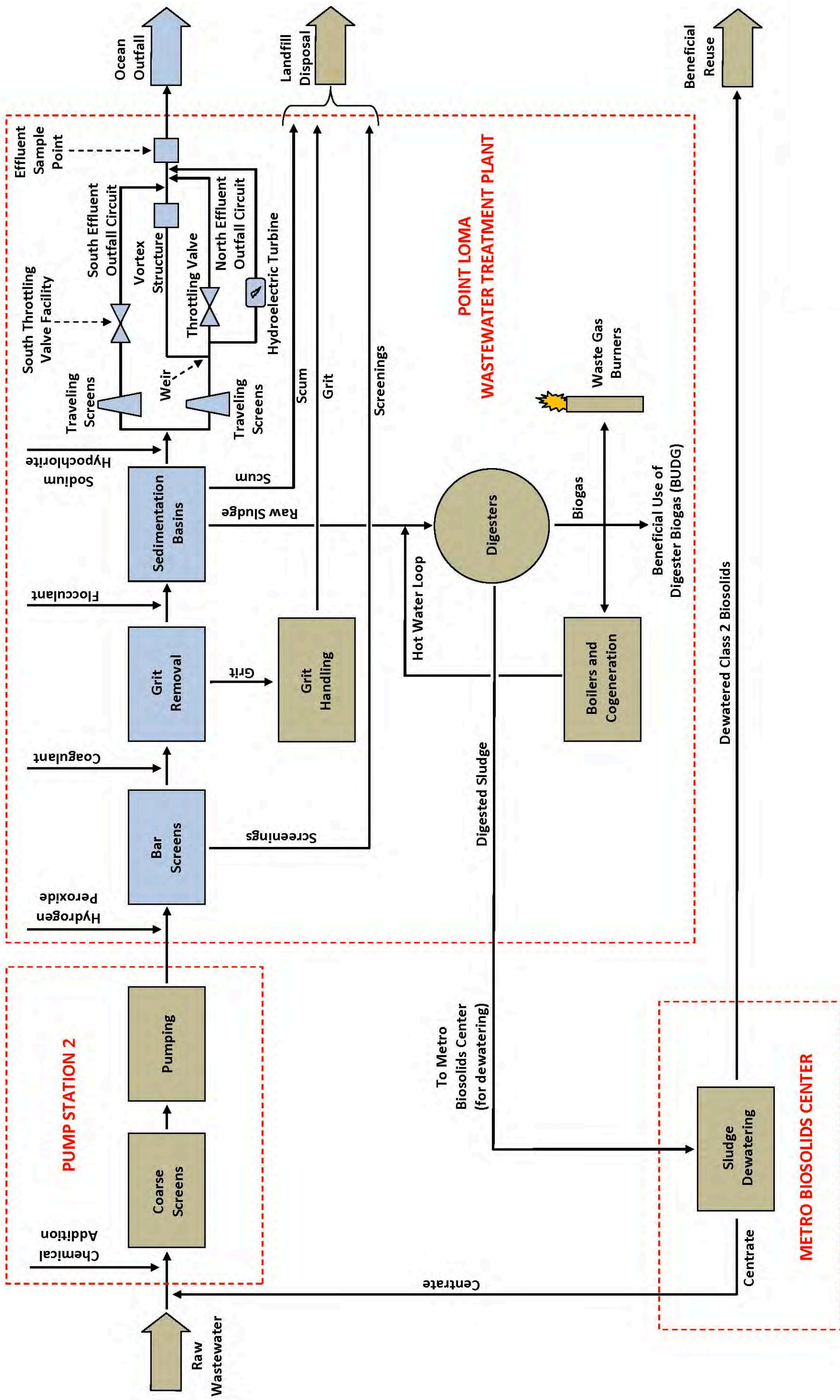
PLWTP. The PLWTP is the terminal treatment facility that discharges to PLOO. The PLWTP has a treatment capacity of 240 mgd (10.5 m^3/sec).[4] The PLWTP receives a blend of secondary treated effluent from NCWRP, return solids from the SBWRP, centrate from the MBC, and untreated sewage from all other parts of the Metro System. Figure II.A-5 presents a schematic of PLWTP treatment processes. Appendix A presents a detailed description of the PLWTP, along with unit process design criteria and chemical addition operations. PLWTP processes include:

- Mechanical self-cleaning climber screens to remove rags, paper, and other floatable material from the raw wastewater.
- Chemical addition to enhance settling and achieve at least 80 percent removal of suspended solids.
- Aerated grit removal including grit tanks, separators and washers.
- Sedimentation where flocculated solids (sludge) settle to the bottom of the sedimentation tanks and scum floats to the surface.
- Sludge and scum removal facilities.
- Effluent disinfection.
- Final screening.
- Anaerobic digestion of waste solids.

Onsite solids treatment at the PLWTP consists of anaerobic sludge digestion. Digested sludge is transported via pipeline to the MBC for dewatering and disposal. Screenings, grit, and scum are trucked to a landfill for disposal.

4 In metric units, a PLOO discharge rate of 240 mgd converts to 10.515 m^3/sec. To be consistent with significant figures (three), the metric equivalent of 240 mgd is expressed as 10.5 m^3/sec throughout this NPDES application.

Figure II.A-5:
Schematic of PLWTP Treatment Processing System



System-Wide Integrated Chemical Addition. Significant improvements during the past few years have been achieved in solids removal effectiveness at the PLWTP. This increase in TSS removal is largely attributed to the City's implementation of an integrated system-wide chemical addition approach which utilizes a proprietary technology called PRI-SC (Peroxide Regenerated Iron Sulfide Control). The PRI-SC system involves coordinated chemical addition at key points within the Metro System to achieve the following goals:

- Improved solids removal at the PLWTP.
- More effective odor control.
- Reduced iron and solids emissions to PLOO.
- Reduced system-wide chemical costs.

The conceptual basis of the PRI-SC system is to utilize iron for sulfide control, and to utilize hydrogen peroxide (H_2O_2) to regenerate ferrous or ferric iron from the spent iron salts for subsequent use as a flocculent. In practice, this integrated chemical addition approach involves dosing ferrous chloride at several upstream locations (see Appendix A) for odor control within Metro System collection facilities. The second part of this integrated process involves adding hydrogen peroxide at downstream points to regenerate the iron for use in sulfide control and to enhance settling and solids removal at the PLWTP. In this way, iron added at upstream collection facilities and pump stations for odor control is regenerated and becomes available for enhancing flocculation in the PLWTP primary treatment clarifiers.

When combined with anionic polymer and additional ferric chloride injected at the PLWTP, the City has been able to achieve significant improvements in TSS removal. City operators continue to refine chemical addition practices as part of this PRI-SC approach, but have achieved steady improvement in Point Loma TSS removals during the past decade. Point Loma effluent TSS concentrations during 2020 averaged 34 mg/L, near the 30 mg/L technology-based TSS concentration standard for secondary treatment.

Point Loma Ocean Outfall (PLOO). Treated effluent from PLWTP is discharged to the PLOO. A detailed description of the PLOO is presented in Appendix A (Volume IV). The PLOO consists of an original 3,422 m (11,226 ft) outfall section that was constructed in 1963 and a 3,732 m (12,246 ft) extension that was added in 1993. The total length of the outfall system is 7,154 m (23,472 ft). The two diffuser legs branch outward from the outfall in a "wye" orientation and discharge ports are located at depth ranging from 93.3 to 95.4 m (306 to 313 ft).[5] Each diffuser leg is 761 m (2,496 ft) and consists of 7 ft, 5.5 ft, and 4 ft internal diameter pipe. Diffuser ports are set in the middle of each pipe on opposite sides, six inches above the springline of the pipe. No changes in the physical structure of PLOO have occurred during the past five years, and no changes are proposed during the next five years.

5 Due to the height of the diffuser pipe and outfall ballast, the ocean bottom is approximately 320 feet (98 m) deep at the end of the PLOO diffusers.

NCWRP. The 30 mgd (1.31 m^3/sec) NCWRP collects and treats wastewater from a service area that includes Del Mar, La Jolla Valley, Mira Mesa, Rancho Peñasquitos, Poway, and Sorrento Valley. Recycled water produced by the NCWRP complies with requirements established by the State of California within Title 22, Division 4 of the *California Code of Regulations* for unrestricted body contact (e.g., disinfected tertiary recycled water).

Appendix A presents a detailed description of the NCWRP. The NCWRP serves two purposes. First, the plant produces tertiary-treated recycled water for delivery to non-potable customers in the North City region. Second, the NCWRP contributes to Metro System TSS and BOD removal, providing relief to the downstream PLWTP. NCWRP wastewater flows in excess of recycled water demands receive secondary treatment. Secondary treated effluent is returned to the sewer for conveyance to the PLWTP. NCWRP waste solids are directed to the MBC for digestion and dewatering. NCWRP treatment processes (see Appendix A) include:

- Influent pumping
- Screening
- Aerated grit removal
- Primary sedimentation with sludge and scum removal
- Sideline flow equalization
- Anoxic-aerobic activated sludge consisting of anoxic mixing with mixed liquor recycle and fine bubble aeration
- Secondary clarification with scum removal
- Mixed liquor and excess sludge wasting
- Chemical addition for coagulation
- Flocculation
- Tertiary filtration through anthracite coal media
- Electrodialysis reversal (to reduce recycled water salinity, when required)
- Advanced water purification demonstration facilities
- Effluent chlorination

Recycled water from the NCWRP is conveyed to recycled water customers via a non-potable recycled water conveyance network that consists of 127 km (79 miles) of pipeline serving the communities of Mira Mesa, Miramar Ranch North, Scripps Ranch, University City, Torrey Pines, Santaluz, and Black Mountain Ranch. Recycled water is also provided to recycled water wholesale agencies that include the Olivenhain Municipal Water District and City of Poway.

NCWRP recycled water is primary used for irrigation. During 2020, recycled water production at the NCWRP averaged approximately 6.0 mgd (0.26 m^3/sec), with peak summer production of approximately 10 mgd (0.44 m^3/sec). The treatment and use of NCWRP recycled water is regulated by Regional Board Order No. R9-2015-0091.

SBWRP. The SBWRP is an advanced wastewater treatment facility that produces recycled water that complies with requirements of Title 22, Division 4 of the *California Code of Regulations* for unrestricted body contact (e.g., disinfected tertiary recycled water). The SBWRP collects and treats wastewater from a service area that includes portions of Chula Vista and the South Bay portion of San Diego. In addition to producing tertiary-treated recycled water for delivery to customers in the South Bay Region, the SBWRP provides hydraulic capacity relief to Metro System wastewater collection facilities and the PLWTP.

The hydraulic capacity of the SBWRP is 18 mgd (0.79 m^3/sec), and the plant can produce up to 15 mgd (0.66 m^3/sec) of tertiary treated recycled water. SBWRP treatment processes (detailed in Appendix A) include:

- Influent pumping
- Screening
- Grit removal
- Primary sedimentation
- Sideline flow equalization
- Air activated sludge process with an anoxic selector zone
- Secondary clarification
- Chemical addition for coagulation
- Tertiary filtration through deep bed mono-media filters
- UV disinfection

SBWRP recycled water is conveyed to recycled water customers through a non-potable distribution system that serves the Tijuana Valley, Otay Valley, and Otay Mesa area. SBWRP recycled water is also disturbed to the Otay Water District for distribution within the Otay Water District service area. The treatment and reuse of SBWRP recycled water is regulated by Regional Board Order No. R9-2021-0015. Recycled water production at the SBWRP averaged 3.97 mgd (0.17 m^3/sec) during 2020. An annual average of approximately 2.35 mgd (0.10 m^3/sec or 2,634 acre-feet per year) of this flow during 2020 was distributed to recycled water customers via the South Bay recycled water distribution system.

SBWRP wastewater flows in excess of recycled water demands receive secondary treatment and are discharged to the South Bay Ocean Outfall (SBOO). The discharge of excess SBWRP recycled water to the SBOO is regulated by Regional Board Order No. R9-2021-0011 (NPDES CA0109045). Waste solids from the SBWRP are discharged to the Metro System for transport to the PLWTP for treatment and removal.

Metro Biosolids Center. The MBC is located at Marine Corps Air Station Miramar. MBC provides dewatering for sludge from the PLWTP and thickening, anaerobic digestion, and dewatering of sludge from the NCWRP. Appendix A presents a detailed description of MBC solids processing. Appendix A also presents design criteria for MBC facilities, presents schematics of MBC processes, and presents a layout of the facilities at MBC.

Primary sludge and waste activated sludge from the NCWRP is conveyed to flow equalization tanks at MBC. After equalization, the sludge undergoes sludge degritting and centrifuge thickening before being transferred to anaerobic digesters. Digested NCWRP sludge is transferred to holding tanks where it is mixed with screened digested sludge from the PLWTP. The mixed sludge is dewatered using high-solids type centrifuges. The dewatered biosolids cake is pumped to storage silos which provide approximately three days of capacity. Dewatered Class 2 MBC biosolids (see Appendix L) are transported offsite for use as an alternative daily cover at Otay Landfill or used as a soil amendment.

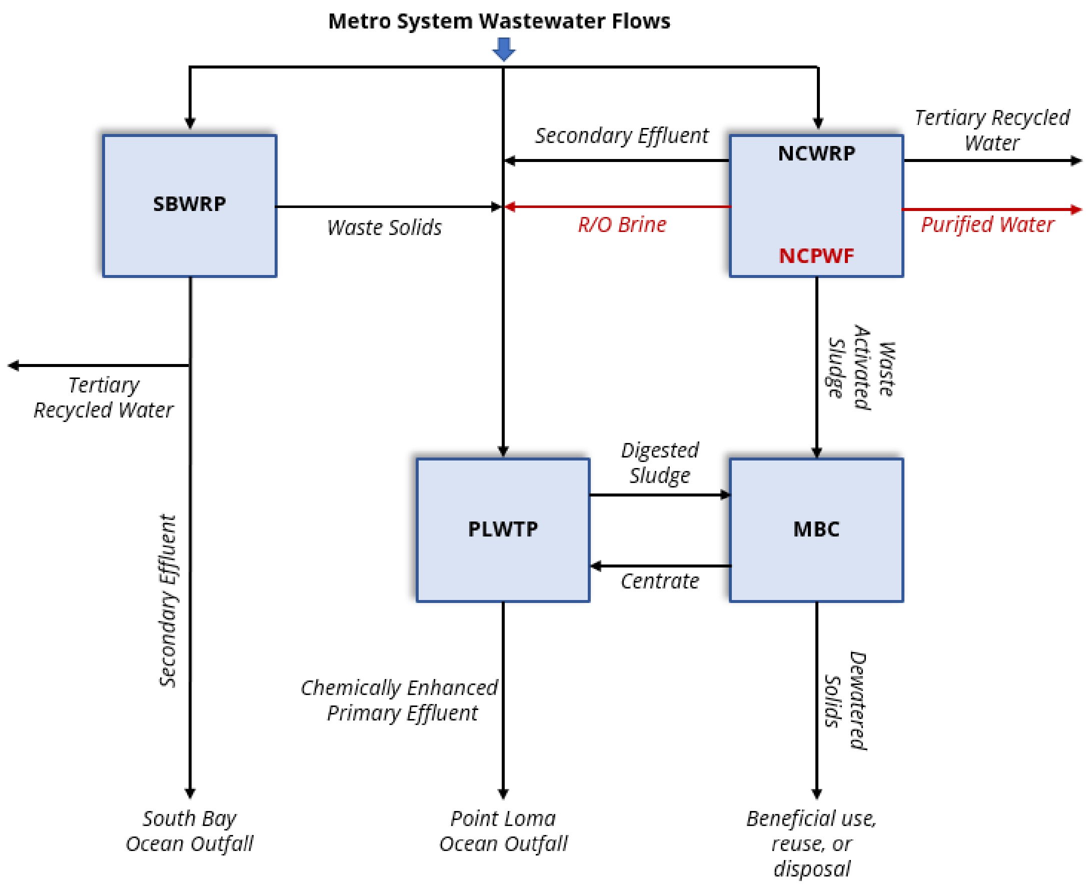
Planned Near-Term System Improvements

Phase 1 - North City Pure Water Project. As detailed in Appendix B, a number of efforts are currently underway to upgrade key Metro System facilities and equipment and implement Phase 1 (North City Pure Water Project) of the Pure Water San Diego Program. These efforts include:

- Expanding the treatment capacity of the NCWRP and implementing treatment improvements,
- Upgrading solids handling facilities at the MBC,
- Constructing the Morena Pump Station and associated conveyance facilities to transport additional Metro System flows to the NCWRP,
- Constructing Phase 1 of the North City Pure Water Facility (NCPWF), and
- Constructing conveyance facilities to transport purified water to Miramar Reservoir.

Figure II.A-6 presents a schematic of how the North City Pure Water Project will be integrated into existing Metro System operations. The following section presents a summary of system improvement that will be implemented as part of North City Pure Water Project. Detailed descriptions of Phase 1 facilities are presented in Appendix B.

**Figure II.A-6:
Schematic of Metro System Operations with Implementation of Phase 1
Pure Water San Diego**



Note: Red indicates facilities under construction and flows associated with the Phase 1 NCPWF, expected to be in operation by the end of calendar year 2027.

Commencement of Phase 1 operations, including the initial delivery of purified water, is estimated to occur by December 31, 2027. When full operating capacity is achieved, PLWTP influent flows will be reduced and the Phase 1 Pure Water San Diego facilities will produce at least 30 mgd of advanced purified water suitable for potable reuse, as well up to 12 mgd of recycled water for irrigation and other approved non-potable uses.

NCWRP Expansion and Upgrades. As part of Phase 1, the NCWRP is being expanded from a production capacity from 30 to 52 mgd. As part of this expansion, upgrades to the NCWRP include:

- A new flow equalization basin
- Additional primary clarifiers with chemically enhanced primary treatment
- First and second stage bioreactor basins

- New secondary clarifiers
- New filters
- A new pump station to convey recycled water to the North City Pure Water Facility

Metro Biosolids Center Upgrades. To support expansion of the NCWRP and implementation of the Pure Water San Diego Program, upgrades to MBC facilities will include: improvements to grit removal facilities, digesters, sludge thickening facilities, dewatering facilities, centrate pumping facilities, and biogas facilities.

Morena Pump Station and Conveyance Facilities. The Morena Pump Station is being constructed in Mission Valley to direct increased Metro System flows to the NCWRP. Wastewater will be conveyed from the pump station to the NCWRP via a new force main.

North City Pure Water Facility. The 30 mgd NCPWF is being constructed at a site immediately north of the NCWRP. The NCPWF will produce purified water using a five-step process that includes ozonation, biological activated carbon filters, membrane filtration, reverse osmosis, and ultraviolet light with advanced oxidation. Treated purified water will also undergo chlorination prior to conveyance to Miramar Reservoir.

Conveyance and Miramar Reservoir Facilities. Treated purified water will be conveyed to Miramar Reservoir via a new pipeline and dechlorinated at Miramar Reservoir at a dechlorination facility. Dechlorinated purified water will be delivered to Miramar Reservoir via a subaqueous pipeline and diffuser.

Non-Potable Recycled Water Use. In conjunction with the Pure Water San Diego Program, the City continues its ongoing efforts to expand non-potable recycled water use that can be served by existing infrastructure within the recycled water service areas of the NCWRP and SBWRP. By expanding the NCWRP and directing increased Metro System flows to the NCWRP via the new Morena Pump Station, the City will be capable of supporting non-potable reuse demands while implementing potable reuse via the Pure Water San Diego Program.

Ongoing Metro System Flow Modeling. To support facilities planning efforts and ensure that collection and treatment facilities maintain adequate capacity to handle or process anticipated flows, the City of San Diego (see Appendix B) annually updates future dry weather and wet weather flows using a comprehensive GIS-based (geographic information system) hydraulic model of Metro System and City of San Diego wastewater collection facilities. The model superimposes SANDAG (San Diego Association of Governments) Series 13 population and employment projections on grid levels as small as a city block to generate projected dry weather and wet weather flows, as well as system-wide TSS and BOD loads.

Conservative flow and load estimations are employed to ensure that future facilities have adequate capacity to handle or process projected wet weather and dry weather flows.

Planned Long-Term System Improvements

Phase 2 – Central Area Project. As documented in the response to Question II.A.1, the City has committed to implementing Phase 2 of the Pure Water San Diego Program. Phase 2 (Central

Area Project) entails implementing a cumulative total potable reuse within the Metro System of 83 mgd by December 31, 2035.

Phases 1 and 2 of the Pure Water San Diego reuse effort, in addition to developing a sustainable non-interruptible local water supply that will reduce the need for imported water, will result in significant offload of flow and solids loads to the PLWTP. The Pure Water San Diego Program will sufficiently reduce influent flows and solids loads to the PLWTP so that ultimate PLOO TSS mass emissions would be reduced to levels at or below those that would have occurred if the 240 mgd PLWTP were to be operated at its design capacity while achieving secondary treatment TSS standards.[6]

b. Provide a map showing the geographic location of the proposed outfall(s) (i.e., discharge). What is the latitude and longitude of the proposed outfall(s)?

Appendix A presents a detailed description of the PLOO. Figure II.A-7 presents the location of the PLOO discharge in plan view. Figure II.A-8 presents a profile view of the PLOO.

As shown in Figure II.A-8, the 7,154 m (23,472 ft) PLOO extends to near the edge of the mainland shelf. Off the coast of Point Loma, the edge of the shelf is located at approximately the 110 m to 120 m (360 to 395 foot) depth contour. Beyond the edge of the shelf the slope of the ocean bottom steepens significantly.

The outfall diffuser ports discharge at a depth of 93.3 to 95.4 m (306 to 313 ft).[7] The outfall features a "Y"-shaped diffuser. The center of the "Y" diffuser is located at:

- North latitude 32 degrees, 39 minutes, 55 seconds (32.665278)
- West longitude 117 degrees, 19 minutes, 25 seconds (117.323611)

6 See Tables II.A-30 and II-A-31 within Section II.A.5.a of this Large Applicant Questionnaire.

7 Due to the height of the diffuser pipe and outfall ballast, the ocean bottom is approximately 320 feet deep (98 m) at the end of the PLOO diffusers.

**Figure II.A-7:
Location of Point Loma Ocean Outfall**

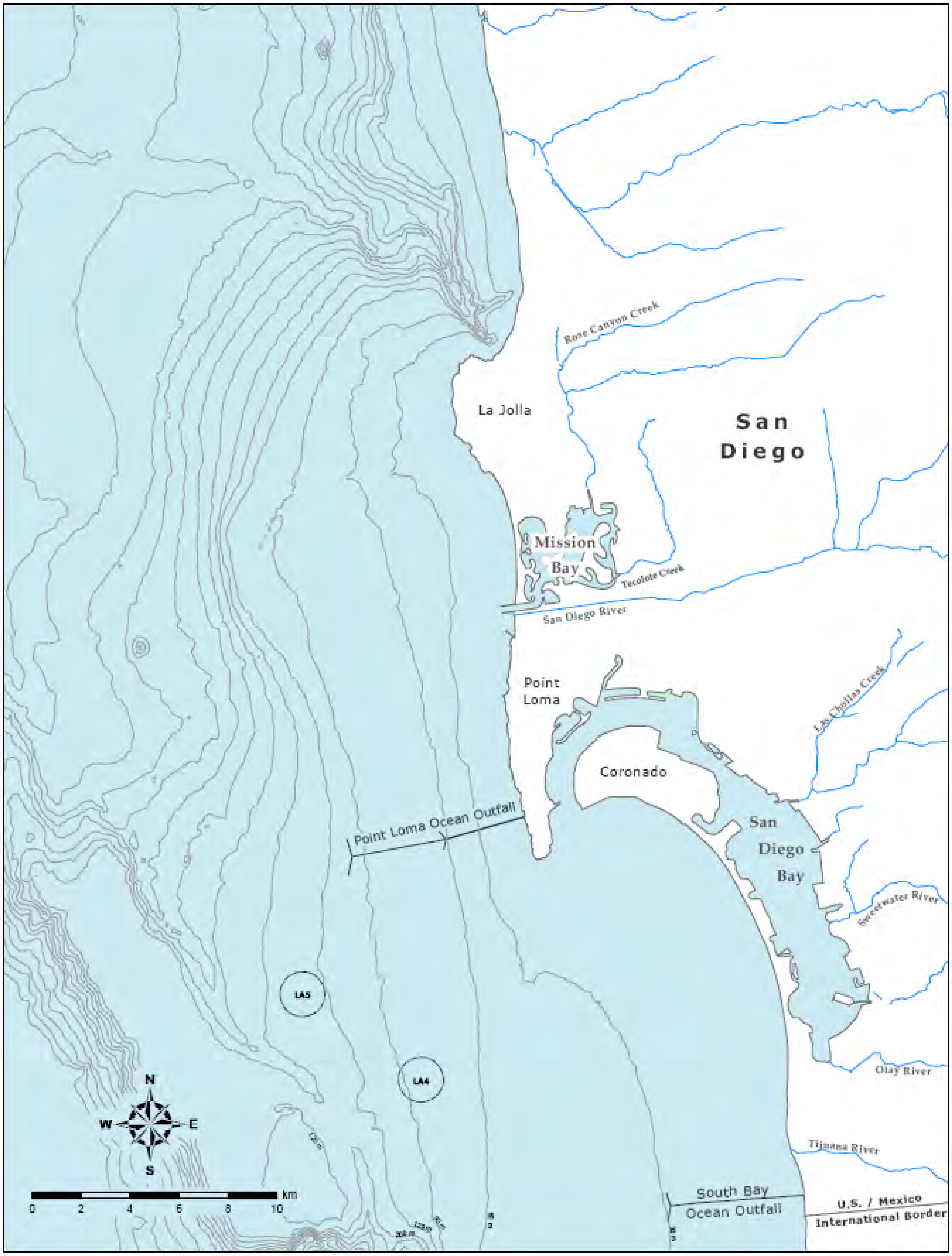
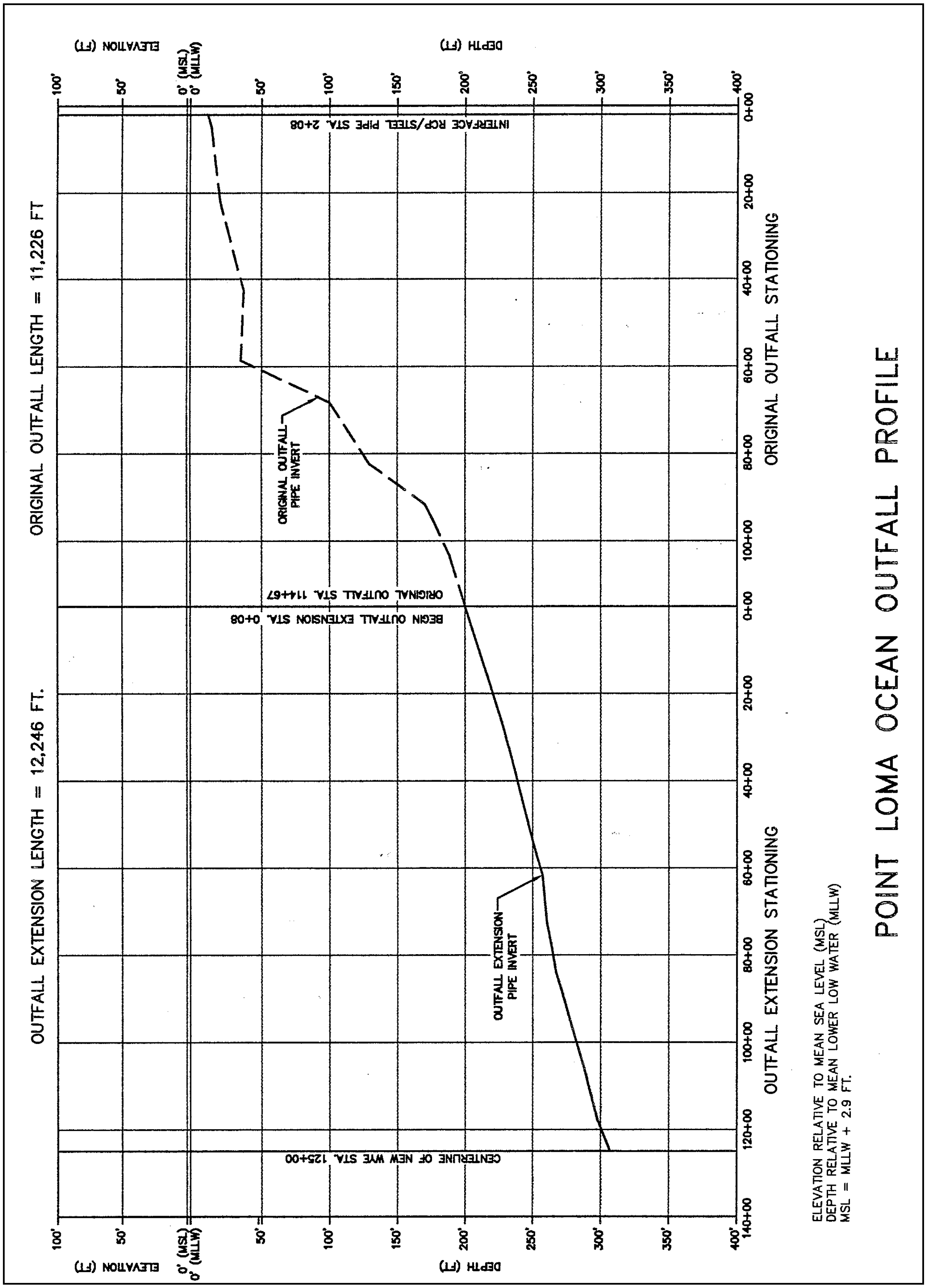


**Figure II.A-8:
Point Loma Ocean Outfall Profile**



c. For a modification based on an improved or altered discharge, provide a description and diagram of your current treatment system and outfall configuration. Include the current outfall latitude and longitude, if different from the proposed outfall.

Not applicable. The application is based on a current discharge. See Appendix A for a description of existing Metro System wastewater collection, treatment, and outfall discharge facilities.

II.A.3. Primary or Equivalent Treatment Requirements [40 CFR 125.60]

a. Provide data to demonstrate that your effluent meets at least primary or equivalent treatment requirements as defined in 40 CFR 125.58 (r).

SUMMARY: The PLWTP achieves a degree of treatment significantly in excess of the primary treatment requirements defined in 40 CFR 1256.58(r).

CFR Title 40, Part 125 requires 301(h) applicants to maintain a minimum of primary treatment and achieve 30 percent or more removal of suspended solids and biochemical oxygen demand (BOD). Chemically enhanced primary sedimentation at the PLWTP provides a degree of treatment significantly greater than the 30 percent removal requirement.

Existing Facilities Performance. Effluent data for calendar years 2017 through 2020 have been previously submitted to the Regional Board in monthly, quarterly, semiannual, and annual monitoring reports. The data have also been electronically transmitted to EPA.

Table II.A-5 summarizes TSS removal by month during 2017-2020. In accordance with requirements of Order No. R9-2017-0007, solids removal rates presented in Table II.A-5 are computed on a system-wide basis, so as to avoid double-counting of waste flow returns to the PLWTP influent from the MBC solids processing facilities, the NCWRP and the SBWRP.

As shown in Table II.A-5, monthly TSS percent removal rates during 2017-2020 ranged from 85.5 percent to 91.2 percent. During 2020, TSS percent removal averaged 90.3 percent, and was at 88.9 percent or greater each month during the year. Table II.A-5 also presents PLWTP monthly average effluent TSS concentrations during 2017-2020. Point Loma effluent TSS averaged 34 mg/L during 2020.

Table II.A-6 summarizes BOD percent removals during 2017-2020 for the PLOO discharge. Per requirements in Order No. R9-2017-0007, BOD removal is also computed on a system-wide basis to avoid double-counting of returned solids streams. As shown in Table II.A-6, annual average BOD percent removal rates during 2017-2020 ranged from 61.0 percent to 63.1 percent. During 2020, system-wide BOD removal averaged 63.1 percent.

Table II.A-6 also presents monthly average PLWTP BOD concentrations during 2017-2020. As demonstrated in Tables II.A-5 and II.A-6, BOD and TSS removal at the PLWTP greatly exceed the minimum 30 percent removal requirements established in 40 CFR 125.58 (r).

Table II.A-5:
System-Wide TSS Removal, 2017-2020

Month	System-Wide TSS Percent Removal (%) [A,B,C]				PLWTP Effluent TSS Concentration [D] (mg/L)			
	2017	2018	2019	2020	2017	2018	2019	2020
Jan	90.4	89.8	85.8	90.0	30	35	48	35
Feb	90.4	89.7	87.6	88.9	34	35	41	40
Mar	91.0	89.7	88.3	89.5	30	36	42	34
Apr	91.1	91.2	89.4	89.0	32	35	42	33
May	90.5	90.1	90.1	91.2	34	36	38	32
Jun	89.6	86.9	90.3	90.9	40	45	38	33
Jul	89.7	89.5	90.6	91.1	40	39	38	33
Aug	88.6	89.3	90.4	90.8	42	38	38	34
Sep	91.0	89.6	89.9	91.1	34	38	39	32
Oct	90.7	89.5	87.7	91.1	34	38	46	31
Nov	89.8	89.6	88.2	89.7	37	40	44	36
Dec	85.5	86.6	89.8	89.7	52	45	34	36
Annual Average	89.9	89.3	89.0	90.3	37	38	41	34
Maximum Month	91.1	91.2	90.6	91.2	52	45	48	40
Minimum Month	85.5	86.6	85.8	88.9	30	35	34	31

Table II.A-5 Notes:

A TSS percent removal computed on a system-wide basis. Data from PLOO annual monitoring reports submitted to the Regional Board for 2017-2020. Data from SDPUD (2018, 2019, 2020, 2021).

B Order No. R9-2017-0007 became effective on October 1, 2017. The PLOO discharge was regulated by Order No. R9-2009-0001 for the first nine months of calendar year 2017.

C Data for calendar year 2021 were not available at the time of preparation of this report. Year 2021 data will be electronically transmitted to regulators as required under Order No. R9-2017-0007.

D Monthly average PLWTP effluent TSS concentration during the listed year and month.

Table II.A-6:
System-Wide BOD Removal, 2017-2020

Month	System-Wide BOD Percent Removal (%) A,B,C				PLWTP Effluent BOD Concentration D (mg/L)			
	2017	2018	2019	2020	2017	2018	2019	2020
Jan	65.2	60.3	60.6	62.8	104	128	117	129
Feb	64.4	60.5	57.0	60.4	109	134	107	138
Mar	65.3	62.1	61.8	62.0	111	132	123	123
Apr	64.4	62.6	62.0	64.1	126	135	134	102
May	63.0	61.9	62.5	64.5	126	138	127	123
Jun	61.3	60.3	61.1	62.9	135	148	135	138
Jul	60.4	64.4	60.8	63.3	135	129	139	143
Aug	60.5	61.6	60.5	64.1	134	134	146	137
Sep	62.9	62.7	61.7	64.7	119	131	139	129
Oct	64.8	62.9	59.0	63.4	119	125	146	137
Nov	63.2	63.4	61.7	61.7	124	129	135	145
Dec	58.3	59.2	63.4	63.4	145	128	116	137
Annual Average	62.8	61.8	61.0	63.1	124	133	130	132
Maximum Month	65.3	64.4	63.4	64.7	145	114	146	145
Minimum Month	58.3	59.2	57.0	60.4	109	101	107	102

Table II.A-6 Notes:

A BOD percent removal computed on a system-wide basis. Data from PLOO annual monitoring reports submitted to the Regional Board for 2017-2020. Data from SDPUD (2018, 2019, 2020, 2021).

B Order No. R9-2017-0007 became effective on October 1, 2017. The PLOO discharge was regulated by Order No. R9-2009-0001 for the first nine months of calendar year 2017.

C Data for calendar year 2021 were not available at the time of preparation of this report. Year 2021 data will be electronically transmitted to regulators when available

D Monthly average PLWTP effluent BOD concentration during the listed year and month.

b. If your effluent does not meet primary or equivalent treatment requirements, when do you plan to meet them? Provide a detailed schedule, including design, construction, start-up and full operation, with your application. This requirement must be met by the effective date of the new Section 301(h) modified permit.

The question is not applicable. As demonstrated in II.A.3(a), the PLWTP provides a degree of treatment superior to that required in 40 CFR 125.58(r).

II.A.4. Effluent Limitations and Characteristics

[40 CFR 125.60(b) and 125.61(e)(2)]

a. Identify the final effluent limitations for five-day biochemical oxygen demand (BOD_5), suspended solids, and pH upon which your application for a modification is based:

- **BOD_5 (mg/L)**
- **Suspended solids (mg/L)**
- **pH (range)**

SUMMARY: This application is based on the following:

- *A minimum of 80 percent removal of total suspended solids, computed as a monthly average on a system-wide basis.*
- *A minimum of 58 percent removal of BOD, computed as an annual average on a system-wide basis.*
- *A pH requirement of 6 -9 pH units at all times.*

Proposed BOD Removal, TSS Removal, and pH Limits. This application does not propose any revisions to the BOD, TSS, and pH effluent limitations that were established in Order No. R9-2017-0007 (NPDES CA0107409). In accordance with Ocean Plan and CWA Section 301(j)(5) requirements, proposed BOD requirements are expressed in terms of percent removal. TSS requirements are expressed in terms of percent removal and maximum month concentration. As noted, per requirements of Order No. R9-2017-0007, the City computes percent BOD and TSS removal rates on a system-wide basis to avoid double-counting of return solids and centrate streams. This application does not propose any change in the percent removal computational procedures set forth in Order No. R9-2017-0007.

Table II.A-7 presents the BOD, suspended solids, and pH requirements on which this application is based. The proposed limits retained from Order No. R9-2017-0007 implement applicable State of California requirements for BOD, TSS, and pH established in the *Water Quality Control Plan Ocean Waters of California* (hereinafter Ocean Plan).[8] The proposed effluent limits also implement requirements of Section 301(j)(5) of the CWA.[9]

8 The current version of the Ocean Plan (State Board, 2019) was adopted by the State Board on August 7, 2018 and became effective on February 4, 2019.

9 Clean Water Act Section 301(j)(5) requires the PLWTP to achieve a monthly average system-wide TSS percent removal of not less than 80 percent and an annual average system-wide BOD percent removal of no less than 58 percent.

Table II.A-8 compares the requirements on which this application is based with applicable state and federal regulations. As shown in the table, the proposed requirements are in accordance with the Ocean Plan and provisions of 40 CFR 124.60.

Table II.A-7
Proposed BOD, Suspended Solids, and pH Limitations
City of San Diego PLOO Discharge

Parameter	Mean Annual Percent Removal	Mean Monthly Percent Removal	Mean Annual Effluent Concentration	Monthly Average Effluent Concentration	Maximum Day Effluent Concentration
Total Suspended Solids	No Requirement	80% [A,B]	No Requirement	75 mg/L [C]	No Requirement
5-Day Biochemical Oxygen Demand (BOD_5)	58% [A,B]	No Requiremen t	No Requirement	No Requirement	No Requirement
pH	No Requirement	No Requiremen t	6 - 9 Units [D]	6 - 9 Units [D]	6 - 9 Units [D]

Table II.A-7 Notes:

A To be computed on a system-wide basis in accordance with procedures established in Order No. R9-2017-0007 and in prior PLOO NPDES permits.

B Implements TSS and BOD percent removal requirements established within Section 301(j)(5) of the Clean Water Act.

C Implements State of California TSS percent removal standard established within Table 4 of the 2019 Ocean Plan (see Appendix T).

D Instantaneous maximum limit. Effluent pH to be maintained between 6.0 and 9.0 pH units at all times.

Table II.A-8:
Comparison of Proposed Modified Requirements With Applicable State and Federal Limitations

Requirement	BOD Removal	Suspended Solids Removal	pH Limitation
Requirement on which this Application is Based	58% Removal [A]	80% Removal [B]	6 - 9 pH Units [C]
Current Requirement of Order No. R9-2017-0007 (NPDES CA0107409)	58% Removal [A]	80% Removal [B]	6 - 9 pH Units [C]
Requirement in 2019 Ocean Plan [D]	Receiving Water Requirements Only [E]	75% Removal [F]	6 - 9 pH Units [C]
Requirement in 40 CFR 125.60 [G]	30% Removal [G]	30% Removal [G]	6 - 9 pH Units [C]
Requirement in Section 301(j)(5) of the Clean Water Act [H]	58% Removal [H]	80% Removal [H]	Not applicable

Table II.A-8 Notes:

- A Annual average value to be computed on a system-wide basis in accordance with procedures established in Order No. R9-2017-0007 (NPDES CA0107409).
- B Monthly average value to be computed on a system-wide basis in accordance with procedures established in Order No. R9-2017-0007.
- C Effluent pH to be maintained between 6.0 and 9.0 pH units at all times, per requirements established in the Ocean Plan and 40 CFR 133.
- D From the 2019 Ocean Plan (see Appendix T within Volume X).
- E The Ocean Plan does not establish a percent removal BOD requirement or a BOD effluent concentration limit. In lieu of establishing effluent BOD requirements, the Ocean Plan regulates the discharge of oxygen-demanding wastes through establishing BOD-related receiving water requirements, including dissolved oxygen, light transmittance, and biostimulation.
- F The Ocean Plan TSS removal limit is computed as 30-day average. In addition, the Ocean Plan establishes receiving water requirements to prevent the discharge of suspended solids from impacting beneficial uses of marine waters.
- G Primary treatment or equivalent regulations promulgated in 40 CFR 125.58 and 125.60 per Sections 301(h) and 303 of the Clean Water Act.
- H Section 301(j)(5) requires that the EPA Administrator not grant a 301(h) modification pursuant to Section 301(j)(5) unless the discharge achieves a monthly average BOD removal of 58 percent and a TSS annual average removal of 80 percent.

b. Provide data on the following effluent characteristics for your current discharge as well as for the modified discharge if different from the current discharge:

- Flow (m^3/sec):
    - minimum
    - average dry weather
    - average wet weather
    - maximum
    - annual average
- BOD_5 for the following plant flows:
    - minimum
    - average dry weather
    - average wet weather
    - maximum
    - annual average
- Suspended Solids for the following plant flows:
    - minimum
    - average dry weather
    - average wet weather
    - maximum
    - annual average
    - Toxic Pollutants and pesticides (µg/L)
- Dissolved Oxygen (prior to chlorination) for the following plant flows:
    - minimum
    - average dry weather
    - average wet weather
    - maximum
    - annual average
- Immediate dissolved oxygen demand

PLWTP effluent data have been submitted to the Regional Board in monthly, quarterly, semiannual, and annual reports. Through agreement with EPA, these data are not reproduced in their entirety herein, but have been electronically transferred to EPA. The following section presents a brief summary of effluent flow, BOD, suspended solids, toxic pollutants, and dissolved oxygen data for the current PLOO discharge.

Flow, BOD, and Suspended Solids in Current Discharge. Table II.A-9 summarizes wastewater flow, effluent BOD concentrations, effluent total suspended solids concentrations, and effluent pH for all days of 2020, for wet weather and dry weather conditions during 2020. As shown in Table II.A-9, average daily BOD_5 values during 2020 tended to be higher during dry weather than wet weather conditions. TSS and pH concentrations, on the other hand, do not appear to significantly differ during wet and dry weather conditions.

Table II.A-9
PLWTP Effluent Flows and Quality
Current PLOO Discharge - Calendar Year 2020 [A]

Condition	Parameter	PLOO Flow		Effluent BOD (mg/L)	Effluent TSS (mg/L)	pH (units)	Effluent Dissolved Oxygen [B] (mg/L)
		m^3/sec	Mgd				
All Days [C]	Average Value [F]	6.32	144.3	132	34	7.23	1.5 [B]
	Maximum Value [G]	13.07	298.3 [I]	257 [J]	59 [K]	7.38	3.5 [B]
	Minimum Value [H]	4.96	113.3	53	22	7.01	0.06 [B]
Dry Weather [D]	Average Value [F]	6.16	140.5	134	34	7.23	1.5 [B]
	Maximum Value [G]	7.70	175.8	257 [J]	59 [K]	7.38	NA [L]
	Minimum Value [H]	4.96	113.3	99	22	7.01	NA [L]
Wet Weather [E]	Average Value [F]	7.11	162.2	118	34	7.22	0.5 [B]
	Maximum Value [G]	13.07	298.3 [I]	162	47	7.37	NA [L]
	Minimum Value [H]	5.78	132.0	53	25	7.11	NA [L]

Table II.A-9 Notes:

A Based on daily data from monthly monitoring reports submitted by the City to the Regional Board via CIWQS for calendar year 2020.

B The PLWTP effluent is no longer evaluated for dissolved oxygen. The listed dissolved oxygen concentrations represented recorded values during August 1992 through July 1993, which is the last 12-month period during which the PLWTP effluent was routinely sampled for dissolved oxygen.

C Average values for all days during calendar year 2020. From SDPUD (2021).

D Based on observed daily PLWTP flows and water quality during days when no rainfall was recorded during 2020. See Table II.A-10 for wet weather days during 2020 at the PLWTP.

E Based on observed daily PLWTP flows and water quality during days when rainfall was recorded during 2020. See Table II.A-10.

F Average of all daily values during 2020. Listed value may differ from annual averages computed on the basis of the average of monthly averages (as presented in Section 5.4 of Appendix M).

G Maximum daily value recorded in 2020. The maximum flow, pH, BOD, and TSS values did not occur on the same day.

H Minimum daily value recorded in 2020. The minimum flow, pH, BOD, and TSS values did not occur on the same day.

I The listed maximum wet weather flow is the highest recorded daily wet weather flow at the PLWTP during 2020. The recorded flow occurred on April 10, 2020 after a period of six consecutive days of precipitation, including two consecutive days on which daily precipitation totals exceeded 1 inch.

J The highest observed PLWTP effluent BOD_5 concentration occurred on June 12, 2020. PLWTP effluent BOD_5 concentrations exceeded 200 mg/L on ten days during 2020, and all of these days occurred during dry weather.

K The listed highest effluent TSS concentration during 2020 occurred on October 3, 2020 during dry weather conditions. During 2020, LWTP effluent TSS concentrations exceeded a 50 mg/L concentration on three days (February 17, October 3 and December 19), and all of these days occurred during dry weather.

L Minimum and maximum wet and dry weather effluent dissolved oxygen data are not available.

During calendar year 2020, annual precipitation at the PLWTP totaled 19.9 cm (7.83 inches), which is approximately 20 percent below the long-term average annual San Diego precipitation.[10] Wet weather averages for 2020 have been determined using the arithmetic average of data for days on which recorded precipitation occurred at the PLWTP. Table II.A-10 presents precipitation days and totals during 2020. As shown in Table II.A-10, calendar year 2020 was dominated by dry weather. Two periods of sustained precipitation occurred during 2020, including the period March 7-26 and April 5-13. The highest recorded average daily PLWTP flow (298.3 mgd or 13.07 m^3/sec) occurred on April 10, 2020 near the end of the second of these sustained wet weather periods (April 5-13).

Table II.A-10:
Precipitation Days During 2020 [A]

1st Quarter 2020		2nd Quarter 2020		3rd Quarter 2020		4th Quarter 2020	
Date	Precipitation (inches)	Date	Precipitation (inches)	Date	Precipitation (inches)	Date	Precipitation (inches)
9-Jan-20	0.05	5-Apr-20	0.19	4-Aug-20	T	25-Oct-20	0.12
17-Jan-20	0.18	6-Apr-20	0.75			6-Nov-20	Trace
20-Jan-20	Trace	7-Apr-20	0.37			7-Nov-20	0.12
21-Jan-20	0.25	8-Apr-20	0.07			8-Nov-20	0.14
3-Feb-20	Trace	9-Apr-20	1.16			9-Nov-20	Trace
9-Feb-20	0.02	10-Apr-20	1.04			14-Dec-20	0.03
10-Feb-20	0.25	11-Apr-20	0.01			17-Dec-20	Trace
21-Feb-20	Trace	12-Apr-20	Trace			24-Dec-20	Trace
22-Feb-20	0.11	13-Apr-20	0.06			28-Dec-20	0.56
1-Mar-20	0.01	14-Apr-20	Trace			29-Dec-20	0.01
2-Mar-20	Trace	18-Apr-20	0.03				
7-Mar-20	0.01	19-Apr-20	Trace				
8-Mar-20	0.07	20-Apr-20	Trace				
9-Mar-20	0.14	21-Apr-20	Trace				
10-Mar-20	0.35	29-Apr-20	Trace				
12-Mar-20	0.26	12-May-20	0.02				
13-Mar-20	0.39	13-May-20	Trace				
14-Mar-20	0.07	5-Jun-20	Trace				
15-Mar-20	Trace	6-Jun-20	0.06				
16-Mar-20	0.25	28-Jun-20	Trace				
17-Mar-20	0.01	29-Jun-20	0.08				
18-Mar-20	0.23						
19-Mar-20	Trace						
20-Mar-20	0.07						
22-Mar-20	0.08						
23-Mar-20	0.01						
25-Mar-20	0.04						
26-Mar-20	0.04						
27-Mar-20	0.12						
29-Mar-20	Trace						
1st Qtr. Total	3.01	2nd Qtr. Total	3.84	3rd Qtr. Total	0.0	4th Qtr. Total	0.98

Table II.A-10 Notes:

A Precipitation for calendar year 2020 at Lindbergh Field, as reported by the National Weather Service and as presented in the 2020 Point Loma annual monitoring report submitted to the Regional Board. (SDPUD, 2021)

Table II.A-11 presents a month-by-month breakdown of effluent flow, pH, TSS, and BOD for calendar year 2020. As shown in the table, the annual average PLWTP effluent BOD_5 concentration during 2020 was 132 mg/L, and the highest monthly average PLWTP effluent

10 Long-term average annual precipitation at Lindbergh Field is approximately 10.1 inches, based on annual precipitation reported by the National Weather Service for the period 1939-2020 (NOAA, 2021).

BOD_5 concentration was 145 mg/L. The average annual PLWTP effluent TSS concentration during 2020 was 34 mg/L, and monthly average TSS concentrations were 36 mg/L or less during 11 of 2020.

Table II.A-11:
2020 PLWTP Flows and Water Quality by Month

Month	Monthly Average Value during 2020 [A]				
	Flow		Effluent pH (pH units)	Effluent BOD_5 (mg/L)	Effluent TSS (mg/L)
	m^3/sec	mgd			
Jan	6.56	149.8	7.19	129	35
Feb	6.52	148.8	7.21	138	40
Mar	6.99	159.6	7.19	123	34
Apr	7.58	173.0	7.21	102	33
May	6.07	138.6	7.21	123	32
Jun	6.05	138.2	7.22	138	33
Jul	5.97	136.3	7.24	143	33
Aug	6.01	137.2	7.25	137	34
Sep	6.07	138.5	7.26	129	32
Oct	6.08	138.7	7.23	138	31
Nov	6.03	137.7	7.23	145	36
Dec	5.94	135.6	7.24	137	36
Average [B]	6.32	144.3	7.22	132	34
Max. Month	7.58	173.0	7.26	145	40
Min. Month	5.94	135.6	7.19	102	31

Table II.A-11 Notes:

A Data from SDPUD (2021) for calendar year 2020. Monthly average data for 2020 are also presented within Section 5.4 of Appendix M. Calendar year 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators when available per reporting requirements of Order No. R9-2017-0007.

B Average values from SDPUD (2021) are computed as the average of twelve 2020 monthly average values during 2020. The listed averages may differ slightly from annual average values shown in Table II.A-9 which are computed on the basis of the average of all daily values during 2020.

Toxic Inorganic Compounds. Table II.A-12 summarizes concentrations of toxic organic constituents in the PLWTP effluent during 2020. Table II.A-12 also present the range of Method Detection Limits (MDLs) achieved during 2020.

As shown in Table II.A-12, beryllium, thallium and cyanide were not detected in any of the PLWTP effluent samples during 2020. Concentrations of barium, cobalt, copper, lithium, mercury, molybdenum, nickel and zinc were above detection limits in all 2020 PLWTP effluent samples. Concentrations of antimony, arsenic, cadmium, chromium, lead, selenium and silver above detection limits in roughly half of the 2020 PLWTP samples.[11]

Table II.A-13 presents monthly average concentrations of toxic inorganic constituents during 2020. As shown in Table II.A-13, no seasonal trends are evident in the concentrations of toxic inorganic constituents within the PLWTP effluent.

Table II.A-14 presents a breakdown of PLWTP effluent concentrations of toxic inorganic constituents for wet weather and dry weather conditions during calendar year 2020. For almost all toxic inorganic constituents, maximum concentrations observed during 2020 occurred during dry weather conditions. No significant trends in the median and mean values are evident between wet and dry weather conditions.

Table II.A-15 summarizes concentrations of toxic inorganic constituents in the PLWTP effluent during 2017-2020. As shown in Table II.A-15, PLWTP effluent concentrations for year 2020 are consistent with values from years 2017-2019.

11 This is primarily due to the fact that a lower (more stringent) range of MDLs was achieved for these constituents in the latter half of 2020. Antimony, arsenic, cadmium, chromium, lead, selenium and silver were routinely detected at the improved (lower concentration) range of detection limits achieved during July through December 2020, while these constituents were commonly not detected at the higher range MDLs that occurred in January through June 2020.

Table II.A-12:
Summary of Toxic Inorganic Constituents in the PLWTP Effluent, 2020 [A]

Constituent	2020 PLWTP Effluent Concentration (µg/L)					Total Number of 2020 Samples	Number of DNQ or Non-Detected Samples [G]
	Highest Daily Value [B]	Lowest Daily Value [C]	Average Daily Value [D]	Median Daily Value [E]	Range of Daily MDLs [F]		
Antimony	2.52	0.572	0.39	0.67	0.04 - 2.43	53	24
Arsenic	1.86	0.572	0.76	ND [H]	0.047 - 3.21	53	27
Barium	41.4	17.9	29.4	30.5	0.09 - 0.095	53	0
Beryllium	ND [I]	ND [I]	ND [I]	ND [I]	0.127 - 0.40	53	53
Cadmium	3.39	ND [J]	0.10	0.0365	0.029 - 0.484	53	26
Chromium [K]	1.86	ND [J]	0.77	ND [H]	0.058 - 7.17	53	27
Cobalt	1.27	0.382	0.71	0.67	0.025 - 0.618	53	0
Copper	22.7	7.25	12.7	12.3	0.42 - 9.37	53	0
Lead	8.59	ND [J]	0.70	0.20	0.036 - 5.93	53	24
Lithium	56	23	35	36	3.0	53	0
Mercury	0.034	0.004	0.0076	0.007	0.0005 - 0.001	53	0
Molybdenum	8.58	4.24	5.30	5.11	0.067 - 0.742	53	0
Nickel	5.64	3.49	4.41	4.34	0.068 - 3.35	53	0
Selenium	1.79	ND [J]	0.67	ND [H]	0.472 - 5.78	53	28
Silver	0.123	ND [J]	0.03	ND [H]	0.011 - 1.57	53	27
Thallium	ND [I]	ND [I]	ND [I]	ND [I]	0.027 - 3.37	53	53
Vanadium	1.84	ND [J]	0.86	1.05	0.318 - 1.09	53	15
Zinc	48.1	14.8	26.1	25.7	0.938 - 10.4	53	0
Cyanide	ND [I]	ND [I]	ND [I]	ND [I]	4.0	53	53

Table II.A-12 Notes:

A Data from monthly monitoring reports for calendar year 2020 submitted by the City to the Regional Board via CIWQS. Calendar year 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators when available per reporting requirements of Order No. R9-2017-0007.
B Highest daily average value during calendar year 2020.
C Lowest daily average value during calendar year 2020.
D Average annual values for 2020 are computed as the arithmetic average of daily samples assuming that ND samples have a concentration of zero. Annual average values computed using this approach may differ slightly from annual average values that are computed as an average of monthly averages (such as those presented in Section 5.4 of Appendix M).
E Median value from 2020 daily sample results.
F Range of Method Detection Limits (MDLs) achieved during 2020 for the listed constituent. MDLs for each sample change depending on the sample volume extracted and/or sample dilution.
G Number of samples during 2020 in which the constituent was not detected at the referenced MDL.
H The constituent was not detected in the majority of the 2020 daily samples; the median value is thus ND (not detected).
I The constituent was not detected in any of the 2020 PLWTP effluent samples.
J The constituent was not detected in some of the 2020 PLWTP effluent values; the minimum value is listed as ND (not detected).
K Total chromium.

Table II.A-13: 2020 PLWTP Toxic Organic Constituents by Month

Parameter	Monthly Average PLWTP Effluent Concentration (µg/L) [A]													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average [A]	Maximum Month
Antimony	ND [B]	< 2.07 [C]	ND [B]	ND [B]	< 2.07 [C]	< 2.07 [C]	0.89	0.78	0.75	0.74	0.70	0.77	0.39	0.89
Arsenic	ND [B]	ND [B]	ND [B]	ND [B]	ND [B]	ND [B]	1.57	1.63	1.54	1.50	1.53	1.37	0.76	1.63
Barium	19.6	22.0	22.2	27.1	29.9	30.2	30.0	35.8	35.7	34.2	32.6	33.7	29.4	35.8
Beryllium	ND [B]	ND [B]	ND [B]	ND [B]	ND [B]	ND [B]	ND [B]	ND [B]	ND [B]	ND [B]	ND [B]	ND [B]	ND [E]	ND [B]
Cadmium	ND [B]	ND [B]	ND [B]	ND [B]	0.85	ND [B]	0.08	0.06	0.07	0.05	0.05	0.05	0.10	0.85
Chromium [D]	ND [B]	ND [B]	ND [B]	ND [B]	ND [B]	ND [B]	1.76	1.59	1.39	1.66	1.47	1.38	0.77	1.76
Cobalt	1.08	1.11	0.78	0.96	0.87	0.83	0.53	0.46	0.44	0.45	0.44	0.46	0.71	1.11
Copper	14.4	18.0	15.4	12.9	12.0 [G]	14.7	11.1	11.9	10.7	11.1	10.2	10.2	12.7	18.0
Lead	ND [B]	ND [B]	ND [B]	< 3.01 [c]	0.87 [F]	2.41 [F]	2.59	2.16	2.45	0.42	0.54	0.20	0.70	2.59
Lithium	25	27	39	33	35	34	36	39	38	40	37	40	35	40
Mercury	0.0080	0.0090	0.0115	0.0070	0.0058	0.0054	0.0065	0.0063	0.0080	0.0060	0.0065	0.0112	0.0076	0.0115
Molybdenum	5.13	5.93	5.01	6.13	4.73	4.77	5.33	4.96	4.80	4.86	5.27	6.44	5.30	6.44
Nickel	4.55	4.72	4.78	4.24	4.04	4.54	4.70	4.40	4.53	4.44	4.07	3.94	4.41	4.78
Selenium	ND [B]	ND [B]	ND [B]	ND [B]	ND [B]	ND [B]	0.97	1.55	1.30	1.40	1.32	1.48	0.67	1.55
Silver	ND [B]	ND [B]	ND [B]	ND [B]	ND [B]	ND [B]	0.04	0.05	0.05	0.07	0.04	0.06	0.03	0.07
Thallium	ND [B]	ND [B]	ND [B]	ND [B]	ND [B]	ND [B]	ND [H]	ND [B]	ND [B]	ND [B]	ND [B]	ND [B]	ND [E]	ND [B]
Vanadium	1.37	ND [B]	1.44	1.49	1.37	1.18	1.16	1.21	1.04	1.13	1.20	1.00	0.86	1.49
Zinc	32.4	40.0	33.6	34.4	30.7 [G]	26.3	25.1	19.5	17.7	18.4	18.1	16.9	26.1	40
Cyanide	ND [B]	ND [B]	ND [B]	ND [B]	ND [B]	ND [I]	ND [B]	ND [B]	ND [B]	ND [B]	ND [B]	ND [I]	ND [E]	ND [B]

Table II.A-13 Notes:

A Monthly average of individual daily PLWTP effluent samples collected during 2020, as reported by the SDPUD (2021) in monthly and annual monitoring reports. See Section 5.4 of Appendix M (Annual Pretreatment Report) for monthly 2020 data. Annual averages computed as an average of monthly values (which assume ND samples have a concentration of zero) may differ from annual averages computed using daily values (see Table II.A-12). 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators when available per reporting requirements of Order No. R9-2017-0007.

B ND indicates the sample was not detected at the MDL range referenced in Table II.A-12 in any of the daily samples collected during the listed month.

C The listed value of "< x" indicates that the monthly average is less than the Method Detection Limit "x".

D Total chromium.

E The listed constituent was not detected in any of the PLWTP effluent samples during 2020.

F Monthly average value for lead for May and June 2020 is incorrectly listed as "< 3.01 µg/L" in the 2020 annual report (see Section 5.4 of Appendix M). Correct values are shown above.

G Monthly average value listed in the annual report (see Section 5.4 of Appendix M) differs by 0.1 µg/L from value reported in the monthly report. The monthly average value listed in the monthly report is shown above.

H Monthly average value for thallium is listed as < 0.03 µg/L in the annual report, but all July 2020 samples were listed as "ND" in the monthly report.

I Monthly average value for cyanide is listed as "ND" in the annual report (see Section 5.4 of Appendix M) but listed as "0.0" in monthly reports.

Table II.A-14:
Summary of Toxic Inorganic Concentrations in Wet and Dry Conditions
PLWTP Effluent - Calendar Year 2020

Toxic Inorganic Constituent	Range of MDLs[B] (µg/L)	Wet Weather Conditions[A,C]					Dry Weather Conditions[A,D]				
		No. of Samples	Effluent Concentration (µg/L)				No. of Samples	Effluent Concentration (µg/L)			
			Highest Daily Value[E]	Lowest Daily Value[F]	Mean Value[G]	Median Value[H]		Highest Daily Value[E]	Lowest Daily Value[F]	Mean Value[G]	Median Value[H]
Antimony	0.04 - 2.43	12	0.984	ND[I]	0.20	ND[J]	41	2.52	ND[I]	0.61	0.71
Arsenic	0.047 - 3.21	12	1.65	ND[I]	0.38	ND[J]	41	1.86	ND[I]	0.85	1.19
Barium	0.09 - 0.095	12	36.2	19.4	27.7	27.6	41	41.4	17.9	29.9	30.7
Beryllium	0.127 - 0.40	12	ND[K]	ND[K]	ND[K]	ND[K]	41	ND[K]	ND[K]	ND[K]	ND[K]
Cadmium	0.029 - 0.484	12	0.046	ND[I]	0.010	ND[J]	41	3.39	ND[I]	0.12	0.046
Chromium[L]	0.058 - 7.17	12	1.47	ND[I]	0.35	ND[J]	41	1.86	ND[I]	0.87	1.29
Cobalt	0.025 - 0.618	12	1.16	0.45	0.82	0.86	41	1.27	0.38	0.67	0.51
Copper	0.42 - 9.37	12	18.7	10.3	13.9	14.1	41	22.7	7.25	12.4	11.9
Lead	0.036 - 5.93	12	3.47	ND[I]	0.37	ND[J]	41	8.59	ND[I]	1.15	0.22
Lithium	3.0	12	43	26	34	35	41	56	23	35	36
Mercury	0.0005 - 0.001	12	0.011	0.004	0.0076	0.007	41	0.034	0.004	0.0076	0.006
Molybdenum	0.067 - 0.742	12	6.66	4.5	5.23	5.08	41	8.58	4.24	5.31	5.12
Nickel	0.068 - 3.35	12	5.12	3.49	4.40	4.43	41	5.64	3.57	4.41	4.34
Selenium	0.472 - 5.78	12	1.73	ND[I]	0.34	ND[J]	41	1.79	ND[I]	0.75	1.08
Silver	0.011 - 1.57	12	0.0835	ND[I]	0.013	ND[J]	41	0.123	ND[I]	0.028	0.027
Thallium	0.027 - 3.37	12	ND[K]	ND[K]	ND[K]	ND[K]	41	ND[K]	ND[K]	ND[K]	ND[K]
Vanadium	0.318 - 1.09	12	1.73	ND[I]	0.79	1.2	41	1.84	ND[I]	0.88	1.05
Zinc	0.938 - 10.4	12	48.1	17.6	31.9	30.7	41	40.9	14.8	24.3	23.0
Cyanide	4.0	12	ND[K]	ND[K]	ND[K]	ND[K]	41	ND[K]	ND[K]	ND[K]	ND[K]

Table II.A-14 Notes:

- A Data from monthly monitoring reports for calendar year 2020 submitted by the City to the Regional Board via CIWQS. Calendar year 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators when available per reporting requirements of Order No. R9-2017-0007.
- B The listed range of Method Detection Limits (MDLs) achieved for the listed constituent during 2020.
- C PLWTP effluent sampling results during calendar year 2020 for days (see Table II.A-10) where precipitation was recorded.
- D PLWTP effluent sampling results during calendar year 2020 for days where no precipitation was recorded.
- E Highest daily average value during calendar year 2020 for the listed wet or dry weather conditions.
- F Lowest daily average value during calendar year 2020 for the listed wet or dry weather conditions.
- G Average annual values for 2020 are computed as the arithmetic average of daily samples assuming that ND samples have a concentration of zero.
- H Median (50^{th} percentile) value during calendar 2020 for the listed wet or dry weather conditions.
- I The constituent was not detected in some of the 2020 PLWTP effluent values; the minimum value is listed as ND (not detected).
- J The constituent was not detected in the majority of the wet or dry weather samples; the median value is listed as ND.
- K The constituent was not detected at the reference MDL in any of the listed wet or dry weather conditions.
- L Total chromium.

**Table II.A-15:
Summary of Point Loma Effluent Quality for Calendar Years 2017-2020
Toxic Inorganic Constituents**

Parameter	PLWTP Effluent Concentration [A] (µg/L)							
	2017		2018		2019		2020	
	Highest Daily Value[B]	Median Value[C]	Highest Daily Value[B]	Median Value[C]	Highest Daily Value[B]	Median Value[C]	Highest Daily Value[B]	Median Value[C]
Antimony	2.76	ND [D]	0.79	0.63	1.06	0.69	2.52	0.67
Arsenic	1.98	0.76	1.87	1.49	2.14	1.40	1.86	ND [I]
Barium	50.1	28.2	64.8	34.5	38.2	34.0	41.4	30.5
Beryllium	0.06	ND [D]	ND [E]	ND [E]	ND [E]	ND [E]	ND [E]	ND [E]
Cadmium	0.37	ND [D]	5.05	ND [D]	0.044	ND [D]	3.39	0.0365
Chromium [F]	2.14	1.27	5.88	1.01	1.64	1.22	1.86	ND [I]
Cobalt	1.30	0.88	0.78	0.49	1.13	0.49	1.27	0.67
Copper	23.9	14.0	28.5	10.1	30.6	12.0	22.7	12.3
Lead	13.6	0.25	4.01	0.32	2.46	0.24	8.59	0.20
Lithium	48	29	44	35	40	27	56	36
Mercury	0.100	0.010	0.033	0.008	0.019	0.009	0.034	0.007
Molybdenum	9.87	5.92	8.39	5.14	9.67	5.20	8.58	5.11
Nickel	7.01	4.47	5.34	3.92	4.88	3.88	5.64	4.34
Selenium	2.41	1.01	2.12	1.38	2.04	1.12	1.79	ND [I]
Silver	6.12	ND [D]	0.038	ND [D]	0.109	ND [D]	0.123	ND [D]
Thallium	ND [E]	ND [E]	ND [E]	ND [E]	ND [E]	ND [E]	ND [E]	ND [E]
Vanadium	4.15	0.99	2.49	1.63	3.31	1.89	1.84	1.05
Zinc	54.6	24.4	32.9	16.7	37.9	18.9	48.1	25.7
Cyanide	4 [G]	< 5 [H]	ND [E]	ND [E]	ND [E]	ND [E]	ND [E]	ND [E]

Table II.A-15 Notes:

- A Data from monthly monitoring reports for calendar year 2020 submitted by the City to the Regional Board via CIWQS. Calendar year 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators when available per reporting requirements of Order No. R9-2017-0007.
- B Highest daily average value during the listed calendar year.
- C Median (50th percentile) value for the listed calendar year.
- D The constituent was not detected (ND) in the majority of the daily samples; the annual median value is listed as ND.
- E The constituent was not detected in any PLWTP effluent sample during the listed year.
- F Total chromium.
- G Highest daily cyanide concentration during 2017 that was in excess of the MDL. A total of 18 cyanide samples during 2017 had MDLs of 5 µg/L and reported cyanide concentrations of "< 5 µg/L".
- H More than half of the 2017 cyanide values were reported as "ND" or "< X", where "x" was the MDL. Median cyanide value during 2017 was reported at < 5 µg/L.

Toxic Organic Compounds. The City routinely monitors the PLWTP effluent for a variety of toxic organic compounds, including:

- Chlorinated pesticides and PCBs
- Organophosphorus pesticides
- Acid extractable compounds
- Base-neutral compounds
- Volatile organic compounds
- Tributyltin and other butyltin compounds
- Dioxins and furans

Tables II.A-16 through II.A-26 presents the results of PLWTP effluent monitoring for each of these categories of toxic organic compounds.

Chlorinated Pesticides and PCBs. Table II.A-16 summarizes PLWTP effluent concentrations for chlorinated pesticides and PCBs. As shown in Table II.A-16, BHC-gamma was the only chlorinated pesticides or PCB detected in the PLWTP effluent during 2020, and BHC-gamma was detected in only one sample during 2020.

Table II.A-17 summarizes chlorinated pesticide and PCB data for 2017-2020. No chlorinated pesticides or PCBS were detected in the PLWTP effluent during 2017 through 2020.

Organophosphorus Pesticides. Tables II.A-18 and II.A-19 summarize PLWTP effluent concentrations for organophosphorus pesticides during 2017-2020. Malathion, dichlorvos diazinon and chlorpyrifos are the only organophosphorus pesticides that are periodically (albeit rarely) observed in the PLWTP effluent.

Acid Extractable Compounds. Tables II.A-20 and II.A-21 summarize PLWTP effluent concentrations for acid extractable compounds. Phenol and 4-methyl phenol were the only two acid-extractable compounds routinely detected in the PLWTP effluent during 2017-2020. An analysis of phenol sources within the Metro System is presented as part of the Tier I Antidegradation Analysis (Part 3, Volume II).

Table II.A-16
Summary of Point Loma Effluent Quality for Calendar Year 2020
Chlorinated Pesticides and PCBs

Constituent	PLWTP Effluent Concentration [A] (µg/L)				Total Number of 2020 Samples	Number of DNQ or Non-Detected Samples [F]
	Highest Daily Value [B]	Average Value [C]	Median Value [D]	Maximum MDL [E]		
Aldrin	ND [G]	ND [G]	ND [G]	0.0068	53	53
Dieldrin	ND [G]	ND [G]	ND [G]	0.00517	53	53
BHC alpha	ND [G]	ND [G]	ND [G]	0.00608	53	53
BHC beta	ND [G]	ND [G]	ND [G]	0.00478	53	53
BHC delta	ND [G]	ND [G]	ND [G]	0.00632	53	53
BHC gamma	0.103	< 0.002 [H]	ND [H]	0.00668	53	52
Chlordane (alpha)	ND [G]	ND [G]	ND [G]	0.00648	53	53
Chlordane (gamma)	ND [G]	ND [G]	ND [G]	0.00489	53	53
2,4' -DDD	ND [G]	ND [G]	ND [G]	0.00615	53	53
2,4' -DDE	ND [G]	ND [G]	ND [G]	0.00497	53	53
2,4' -DDT	ND [G]	ND [G]	ND [G]	0.00852	53	53
4,4' -DDD	ND [G]	ND [G]	ND [G]	0.00728	53	53
4,4' -DDE	ND [G]	ND [G]	ND [G]	0.0065	53	53
4,4' -DDT	ND [G]	ND [G]	ND [G]	0.00753	53	53
Endosulfan (alpha)	ND [G]	ND [G]	ND [G]	0.00763	53	53
Endosulfan (beta)	ND [G]	ND [G]	ND [G]	0.0128	53	53
Endosulfan Sulfate	ND [G]	ND [G]	ND [G]	0.00868	53	53
Endrin	ND [G]	ND [G]	ND [G]	0.00872	53	53
Endrin aldehyde	ND [G]	ND [G]	ND [G]	0.00824	53	53
Heptachlor	ND [G]	ND [G]	ND [G]	0.00928	53	53
Heptachlor epoxide	ND [G]	ND [G]	ND [G]	0.00792	53	53
Methoxychlor	ND [G]	ND [G]	ND [G]	0.00881	53	53
Nonachlor (cis)	ND [G]	ND [G]	ND [G]	0.00936	53	53
Nonachlor (trans)	ND [G]	ND [G]	ND [G]	0.00915	53	53
PCB 1016	ND [G]	ND [G]	ND [G]	0.763	53	53
PCB 1221	ND [G]	ND [G]	ND [G]	0.763	53	53
PCB 1232	ND [G]	ND [G]	ND [G]	0.763	53	53
PCB 1242	ND [G]	ND [G]	ND [G]	0.763	53	53
PCB 1248	ND [G]	ND [G]	ND [G]	0.763	53	53
PCB 1254	ND [G]	ND [G]	ND [G]	0.763	53	53
PCB 1260	ND [G]	ND [G]	ND [G]	0.763	53	53
PCB 1262	ND [G]	ND [G]	ND [G]	0.763	53	53
Toxaphene	ND [G]	ND [G]	ND [G]	0.586	53	53

Table II.A-16 Notes:

A Data from monthly monitoring reports for calendar year 2020 submitted by the City to the Regional Board via CIWQS. Calendar year 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators when available per reporting requirements of Order No. R9-2017-0007.

B Highest daily average value in any single sample during calendar year 2020.

C Average annual values for 2020 are computed as the arithmetic average of daily samples assuming that ND samples have a concentration of zero. Annual average values computed using this approach may differ slightly from annual average values that are computed as an average of monthly averages (such as those presented in Section 5.4 of Appendix M).

D Median value during calendar year 2020.

E Maximum MDL achieved during 2020 for the listed constituent, as reported in Section 5.4 of Appendix M. MDLs for each sample change depending on the sample volume extracted and/or due to dilution.

F Number of samples during 2020 in which the constituent was not detected (ND) or was detected but below quantifiable limits (DNQ).

G ND indicates the constituent was not detected at the listed MDL in any PLWTP effluent sample during 2020.

H BHC-gamma (also known as lindane) was not detected in 52 of 53 2020 PLWTP effluent samples. The average value during 2020 is computed at less than 0.002 µg/L and the median 2020 value is ND.

Table II.A-17:
Summary of Point Loma Effluent Quality for Calendar Years 2017-2020
Chlorinated Pesticides and PCBs

Parameter	PLWTP Effluent Concentration [A] (µg/L)							
	2017		2018		2019		2020	
	Highest Daily Value [B]	Median Value [C]	Highest Daily Value [B]	Median Value [C]	Highest Daily Value [B]	Median Value [C]	Highest Daily Value [B]	Median Value [C]
Aldrin	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
Dieldrin	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
BHC alpha	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
BHC beta	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
BHC delta	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
BHC gamma	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	0.103 [E]	ND [E]
Chlordane (alpha)	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
Chlordane (gamma)	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
2,4' -DDD	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
2,4' -DDE	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
2,4' -DDT	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
4,4' -DDD	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
4,4' -DDE	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
4,4' -DDT	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
Endosulfan (alpha)	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
Endosulfan (beta)	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
Endosulfan Sulfate	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
Endrin	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
Endrin aldehyde	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
Heptachlor	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
Heptachlor epoxide	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
Methoxychlor	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
Nonachlor (cis)	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
Nonachlor (trans)	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
PCB 1016	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
PCB 1221	ND [D]	ND [D]	ND [D]	ND [F]	ND [D]	ND [D]	ND [D]	ND [D]
PCB 1232	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
PCB 1242	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
PCB 1248	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
PCB 1254	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
PCB 1260	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
PCB 1262	ND [D]	ND [D]	ND [D]	ND [F]	ND [D]	ND [D]	ND [D]	ND [D]
Toxaphene	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]

Table II.A-17 Notes:

A Data from monthly monitoring reports for calendar year 2020 submitted by the City to the Regional Board via CIWQS. Calendar year 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators when available per requirements established in Order No. R9-2017-0007.

B Highest daily average value during the listed calendar year.

C Median (50th percentile) value for the listed calendar year.

D The constituent was not detected (ND) in any of the PLWTP effluent samples for the listed year.

E BHC-gamma (also known as lindane) was not detected in 52 of 53 2020 PLWTP effluent samples. The median 2020 value is ND.

**Table II.A-18:
Summary of Point Loma Effluent Quality for Calendar Year 2020
Organophosphorus Pesticides**

Constituent	Concentration [A] (µg/L)				Total Number of 2020 Samples	Number of 2020 DNQ or Non-Detected Samples [F]
	Highest Daily Value [B]	Average Value [C]	Median Value [D]	Maximum MDL [E]		
Chlorpyrifos	7.6 DNQ [G,H]	ND [I]	ND [I]	0.095	12	12
Coumaphos	ND [J]	ND [J]	ND [J]	0.121	12	12
Demeton O	ND [J]	ND [J]	ND [J]	0.075	12	12
Demeton S	ND [J]	ND [J]	ND [J]	0.522	12	12
Diazinon	59 DNQ [G,H]	ND [I]	ND [I]	0.125	12	12
Dichlorvos	ND [J]	ND [J]	ND [J]	0.075	12	12
Disulfoton	ND [J]	ND [J]	ND [J]	0.101	12	12
Guthion	ND [J]	ND [J]	ND [J]	0.532	12	12
Malathion	0.50	< 0.06	ND	0.097	12	10
Parathion	ND [J]	ND [J]	ND [J]	0.042	12	12
Stirophos	ND [J]	ND [J]	ND [J]	0.091	12	12

Table II.A-18 Notes:

- A Data from SDPUD (2021) for calendar year 2020. See Section 5.4 of Appendix M (Annual Pretreatment Report) for monthly PLWTP data. 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators when available per requirements established in Order No. R9-2017-0007.
- B Highest daily average value during calendar year 2020.
- C Average annual values for 2020 are computed as the arithmetic average of daily samples assuming that ND samples have a concentration of zero. Annual average values computed using this approach may differ slightly from annual average values that are computed as an average of monthly averages (such as those presented in Section 5.4 of Appendix M).
- D Median value during calendar year 2020.
- E Maximum MDL achieved during 2020 for the listed constituent, as reported in Section 5.4 of Appendix M. Does not include MDLs for January 15, 2020 samples (see Footnote H).
- F Number of samples during 2020 in which the constituent was not detected (ND) or was detected but below quantifiable limits (DNQ).
- G The listed maximum value was detected not quantifiable (DNQ); result was greater than the MDL but below the reporting limit.
- H Analyses of PLWTP effluent samples collected on January 15, 2020 that were conducted by an outside contract laboratory showed the presence of chlorpyrifos and diazinon. Re-analysis of these constituents by the City's Environmental Chemistry Laboratory did not detect either constituent, although samples were past their holding time. The listed DNQ values are thus suspect. All other PLWTP effluent samples for chlorpyrifos and diazinon during 2020 were ND.
- I Average values do not include suspect DHQ values from January 15, 2020. Median and average values for all other samples during 2020 are ND. See footnote H.
- J ND indicates the constituent was not detected at the listed MDL in any PLWTP effluent sample during 2020.

Table II.A-19:
Summary of Point Loma Effluent Quality for Calendar Years 2017-2020
Organophosphorus Pesticides

Parameter	PLWTP Effluent Concentration [A] (µg/L)							
	2017		2018		2019		2020	
	Highest Daily Value [B]	Median Value [C]	Highest Daily Value [B]	Median Value [C]	Highest Daily Value [B]	Median Value [C]	Highest Daily Value [B]	Median Value [C]
Chlorpyrifos	ND [D]	ND [D]	0.3 DNQ[E]	ND [F]	ND [D]	ND [D]	7.6 DNQ[E,G]	ND [F]
Coumaphos	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
Demeton O	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
Demeton S	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
Diazinon	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	59 DNQ[E,G]	ND [F]
Dichlorvos	0.1 DNQ[E]	ND [F]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
Disulfoton	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
Guthion	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
Malathion	0.17	ND [F]	0.22	ND [F]	0.07 DNQ[E]	ND [F]	0.50	ND [F]
Parathion	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
Stirophos	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]

Table II.A-19 Notes:

- A Data from SDPUD (2018, 2019, 2020, 2021) for calendar years 2017-2020. See Section 5.4 of Appendix M (Annual Pretreatment Report) for monthly PLWTP data. 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators when available per reporting requirements of Order No. R9-2017-0007.
- B Highest daily average value during the listed calendar year.
- C Median (50th percentile) value for the listed calendar year.
- D The constituent was not detected (ND) in any of the PLWTP effluent samples for the listed year.
- E The listed maximum value was detected not quantifiable (DNQ); result was greater than the MDL but below the reporting limit.
- F The constituent was not detected in the majority of the PLWTP effluent samples for the listed year. The annual median value is thus listed as ND.
- G Analyses of PLWTP effluent samples collected on January 15, 2020 that were conducted by an outside contract laboratory showed the presence of chlorpyrifos and diazinon. Re-analysis of these constituents by the City's Environmental Chemistry Laboratory did not detect either constituent, although samples were past their holding time. The listed DNQ values are thus suspect. All other PLWTP effluent samples for chlorpyrifos and diazinon during 2020 were ND.

Table II.A-20:
Summary of Point Loma Effluent Quality for Calendar Year 2020
Acid Extractable Compounds

Constituent	Concentration [A] (µg/L)				Total Number of 2020 Samples	Number of DNQ or Non-Detected Samples [F]
	Highest Daily Value [B]	Average Value [C]	Median Value [D]	Maximum MDL [E]		
2-chlorophenol	ND [G]	ND [G]	ND [G]	0.451	53	53
4-chloro-3-methylphenol	ND [G]	ND [G]	ND [G]	0.443	53	53
2,4-dichlorophenol	ND [G]	ND [G]	ND [G]	0.517	53	53
2.4-dimethylphenol	ND [G]	ND [G]	ND [G]	1.93	53	53
2,4-dinitrophenol	ND [G]	ND [G]	ND [G]	1.72	53	53
2-methyl-4,6-dinitro phenol	ND [G]	ND [G]	ND [G]	1.28	53	53
2-nitrophenol	ND [G]	ND [G]	ND [G]	0.526	53	53
4-nitrophenol	ND [G]	ND [G]	ND [G]	0.603	53	53
Pentachlorophenol	ND [G]	ND [G]	ND [G]	0.88	53	53
Phenol	47.1	33.4	33.9	0.482	53	0
2-methylphenol	ND [G]	ND [G]	ND [G]	0.26	53	53
4-methylphenol	70.2	41.8	43.9	0.398	53	0
2,4,5-trichlorophenol	ND [G]	ND [G]	ND [G]	0.608	53	53
2,4,6-trichlorophenol	2.21 DNQ [H]	< 0.05 [I]	ND [J]	0.583	53	53

Table II.A-20 Notes:

A Data from monthly monitoring reports for calendar year 2020 submitted by the City to the Regional Board via CIWQS. Calendar year 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators when available per reporting requirements of Order No. R9-2017-0007.
B Highest daily average value during calendar year 2020.
C Average annual values for 2020 are computed as the arithmetic average of daily samples assuming that ND samples have a concentration of zero. Annual average values computed using this approach may differ slightly from annual average values that are computed as an average of monthly averages (such as those presented in Section 5.4 of Appendix M).
D Median value during calendar year 2020.
E Maximum MDL achieved during 2020 for the listed constituent, as reported in Section 5.4 of Appendix M. MDLs reported for individual sample dates within 2020 monthly reports may differ slightly from the maximum MDLs shown in Section 5.4 of Appendix M. Maximum MDL for total chlorinated phenols (see Section 5.4 of Appendix M) during 2020 was 0.88 µg/L. Maximum reported MDL for total non-chlorinated phenols during 2020 was 1.93 µg/L.
F Number of samples during 2020 in which the constituent was not detected (ND) or was detected but below quantifiable limits (DNQ).
G ND indicates the constituent was not detected at the listed MDL in any PLWTP effluent sample during 2020.
H The listed maximum value was detected not quantifiable (DNQ); result was greater than the MDL but below the reporting limit.
I The listed average of < 0.05 µg/L is computed on the basis of one sample with a 2.21 µg/L DNQ concentration and 52 samples with a non-detected concentration which are assumed to be zero.
J The constituent was not detected in a majority of the 2020 PLWTP effluent samples. The median 2020 value is thus ND.

**Table II.A-21:
Summary of Point Loma Effluent Quality for Calendar Years 2017-2020
Acid Extractable Compounds**

Parameter	Concentration [A] (µg/L)							
	2017		2018		2019		2020	
	Highest Daily Value [B]	Median Value [C]	Highest Daily Value [B]	Median Value [C]	Highest Daily Value [B]	Median Value [C]	Highest Daily Value [B]	Median Value [C]
2-chlorophenol	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
4-chloro-3-methylphenol	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
2,4-dichlorophenol	0.57 DNQ [E,F]	ND [G]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
2,4-dimethylphenol	1.46 [F]	ND [G]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
2,4-dinitrophenol	2.96 [F]	ND [G]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
2-methyl-4,6-dinitro phenol	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
2-nitrophenol	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
4-nitrophenol	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
Pentachlorophenol	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
Phenol	46.7	31.9	59.5	36.6	53.4	30.6	47.1	33.9
2-methylphenol	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
4-methylphenol	81.0	46.8	82.2	48.2	76.1	44.0	70.2	43.9
2,4,5-trichlorophenol	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
2,4,6-trichlorophenol	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	2.2 DNQ[E]	ND [G]

Table II.A-21 Notes:

A Data from monthly monitoring reports for calendar years 2017-2020 submitted by the City to the Regional Board via CIWQS. Calendar year 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators when available per reporting requirements of Order No. R9-2017-0007.

B Highest daily average value during the listed calendar year.

C Median (50th percentile) value for the listed calendar year.

D The constituent was not detected (ND) in any of the PLWTP effluent samples for the listed year.

E The listed maximum value was detected not quantifiable (DNQ); result was greater than the MDL but below the reporting limit.

F The listed constituent was detected in only one sample during 2017, and the second sample on that date was ND. The listed highest daily average represents half of the reported value for the detected sample, as the ND concentration is assumed to be zero.

G The constituent was not detected in only one PLWTP effluent sample for the listed year. The annual median value is thus listed as ND.

Base/Neutral Compounds. Tables II.A-22 and II.A-23 summarize PLWTP effluent results for base/neutral compounds. Diethyl phthalate, bis (2-ethylhexyl) phthalate and 2-methylnaphthalene were the only base/neutral compounds in the PLWTP effluent that were detected in quantifiable concentrations during 2017-2020. During 2020, diethyl phthalate was detected in each PLWTP effluent sample, while bis (2-ethylhexyl) phthalate was detected in 9 of 12 samples.

Table II.A-22:
Summary of Point Loma Effluent Quality for Calendar Year 2020
Base Neutral Compounds

Constituent	Concentration [A] (µg/L)				Total Number of 2020 Samples	Number of DNQ or Non-Detected Samples [F]
	Highest Daily Value [B]	Average Value [C]	Median Value [D]	Maximum MDL [E]		
Acenaphthene	ND [G]	ND [G]	ND [G]	0.507	12	12
Acenaphthylene	ND [G]	ND [G]	ND [G]	0.62	12	12
Anthracene	ND [G]	ND [G]	ND [G]	0.668	12	12
Benzidine	ND [G]	ND [G]	ND [G]	2.96	12	12
Benzo (a) anthracene	ND [G]	ND [G]	ND [G]	0.728	12	12
Benzo (a) pyrene	ND [G]	ND [G]	ND [G]	0.64	12	12
3,4-benzo(b)fluoranthene	ND [G]	ND [G]	ND [G]	0.652	12	12
Benzo (g,h,i) perylene	ND [G]	ND [G]	ND [G]	0.62	12	12
Benzo (k) fluoranthene	ND [G]	ND [G]	ND [G]	0.675	12	12
Bis (2-chloroethoxy) methane	ND [G]	ND [G]	ND [G]	0.44	12	12
Bis (2-chloroethyl) ether	ND [G]	ND [G]	ND [G]	0.523	12	12
Bis (2-chloroisopropyl) ether	ND [G]	ND [G]	ND [G]	0.568	12	12
Bis (2-ethylhexyl) phthalate	9.95	4.0	3.3 DNQ [H]	3.58	12	9
4-bromophenyl phenyl ether	ND [G]	ND [G]	ND [G]	0.601	12	12
Butyl benzyl phthalate	027 DNQ [I]	ND [G]	ND [G]	0.723	12	12
2-chloronaphthalene	ND [G]	ND [G]	ND [G]	0.577	12	12
4-chlorophenyl phenyl ether	ND [G]	ND [G]	ND [G]	0.498	12	12
Chrysene	ND [G]	ND [G]	ND [G]	0.57	12	12
di-n-butyl phthalate	ND [G]	ND [G]	ND [G]	1.28	12	12
di-n-octyl phthalate	ND [G]	ND [G]	ND [G]	0.688	12	12
Dibenzo (a,h) anthracene	ND [G]	ND [G]	ND [G]	0.574	12	12
3,3-dichlorobenzidene	ND [G]	ND [G]	ND [G]	3.27	12	12
Diethyl phthalate	3.8	3.0	2.9	1.63	12	0
Dimethyl phthalate	ND [G]	ND [G]	ND [G]	0.49	12	12
2,4-dinitrotoluene	ND [G]	ND [G]	ND [G]	0.526	12	12
2,6-dinitrotoluene	ND [G]	ND [G]	ND [G]	0.461	12	12
1,2-diphenylhydrazine	ND [G]	ND [G]	ND [G]	0.775	12	12
Fluoranthene	ND [G]	ND [G]	ND [G]	0.822	12	12
Fluorene	ND [G]	ND [G]	ND [G]	0.568	12	12
Hexachlorobenzene	ND [G]	ND [G]	ND [G]	0.666	12	12
Hexachlorobutadiene	ND [G]	ND [G]	ND [G]	0.453	12	12
Hexachlorocyclopentadiene	ND [G]	ND [G]	ND [G]	0.48	12	12
Hexachloroethane	ND [G]	ND [G]	ND [G]	0.424	12	12
Ideno (1,2,3-cd) pyrene	ND [G]	ND [G]	ND [G]	0.597	12	12
Isophorone	ND [G]	ND [G]	ND [G]	0.489	12	12
1-methylnaphthalene	ND [G]	ND [G]	ND [G]	0.767	12	12
2-methylnaphthalene	0.575	< 0.15	ND [G]	0.59	12	12
Naphthalene	ND [G]	ND [G]	ND [G]	0.513	12	12
Nitrobenzene	ND [G]	ND [G]	ND [G]	0.62	12	12
n-nitrosodi-n-propylamine	ND [G]	ND [G]	ND [G]	1.0	12	12
n-nitrosodi-methylamine	ND [G]	ND [G]	ND [G]	0.512	12	12
n-nitrosodi-phenylamine	ND [G]	ND [G]	ND [G]	0.524	12	12
Phenanthrene	ND [G]	ND [G]	ND [G]	0.512	12	12
Pyrene	ND [G]	ND [G]	ND [G]	0.649	12	12
1,2,4-trichlorobenzene	ND [G]	ND [G]	ND [G]	0.561	24	24
Table II.A-22 Notes:						

Constituent	Concentration A (µg/L)				Total Number of 2020 Samples	Number of DNQ or Non-Detected Samples F
	Highest Daily Value B	Average Value C	Median Value D	Maximum MDL E		

A Data from SDPUD (2021) for calendar year 2020. See Section 5.4 of Appendix M (Annual Pretreatment Report) for monthly PLWTP data. 2020 is the most recent year for which a complete 12-month data set is available.
B Highest daily average value during calendar year 2020.
C Average annual values for 2020 are computed as the arithmetic average of daily samples, assumes ND has concentration of zero.
D Median value during calendar year 2020.
E Maximum MDL achieved during 2020 for the listed constituent, as reported in Section 5.4 of Appendix M.
F Number of samples in which the constituent was not detected (ND) or was detected but below quantifiable limits (DNQ).
G ND indicates the constituent was not detected at the listed MDL in any PLWTP effluent sample during 2020.
H The listed median value was detected not quantifiable (DNQ); result was greater than the MDL but below the reporting limit.
I Suspect value. Method blank was outside acceptance limit.

Table II.A-23: Summary of Point Loma Effluent Quality for Calendar Years 2017-2020 Base Neutral Compounds

Parameter	Concentration A (µg/L)							
	2017		2018		2019		2020	
	Highest Daily Value B	Median Value C	Highest Daily Value B	Median Value C	Highest Daily Value B	Median Value C	Highest Daily Value B	Median Value C
Acenaphthene	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Acenaphthylene	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Anthracene	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Benzidine	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Benzo (a) anthracene	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Benzo (a) pyrene	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
3,4-benzo(b)fluoranthene	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Benzo (g,h,i) perylene	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Benzo (k) fluoranthene	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Bis (2-chloroethoxy) methane	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Bis (2-chloroethyl) ether	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Bis (2-chloroisopropyl) ether	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Bis (2-ethylhexyl) phthalate	ND D	ND D	ND D	ND D	ND D	ND D	9.95	3.3 DNQ E
4-bromophenyl phenyl ether	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Butyl benzyl phthalate	ND D	ND D	ND D	ND D	ND D	ND D	0.27 DNQ E,F	ND G
2-chloronaphthalene	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
4-chlorophenyl phenyl ether	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Chrysene	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
di-n-butyl phthalate	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
di-n-octyl phthalate	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Dibenzo (a,h) anthracene	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
3,3-dichlorobenzidene	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Diethyl phthalate	47.4	4.2	4.8	4.1	5.9 F	3.2	3.8	2.8
Dimethyl phthalate	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
2,4-dinitrotoluene	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
2,6-dinitrotoluene	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D

Parameter	Concentration [A] (µg/L)							
	2017		2018		2019		2020	
	Highest Daily Value [B]	Median Value [C]	Highest Daily Value [B]	Median Value [C]	Highest Daily Value [B]	Median Value [C]	Highest Daily Value [B]	Median Value [C]
1,2-diphenylhydrazine	ND [D]	ND [D]	ND [D]	ND[D]	ND[D]	ND [D]	ND [D]	ND [D]
Fluoranthene	ND [D]	ND [D]	ND [D]	ND[D]	ND[D]	ND [D]	ND [D]	ND [D]
Fluorene	ND [D]	ND [D]	ND [D]	ND[D]	ND[D]	ND [D]	ND [D]	ND [D]
Hexachlorobenzene	ND [D]	ND [D]	ND [D]	ND[D]	ND[D]	ND [D]	ND [D]	ND [D]
Hexachlorobutadiene	ND [D]	ND [D]	ND [D]	ND[D]	ND[D]	ND [D]	ND [D]	ND [D]
Hexachlorocyclopentadiene	ND [D]	ND [D]	ND [D]	ND[D]	ND[D]	ND [D]	ND [D]	ND [D]
Hexachloroethane	ND [D]	ND [D]	ND [D]	ND[D]	ND[D]	ND [D]	ND [D]	ND [D]
Ideno(1,2,3-cd) pyrene	ND [D]	ND [D]	ND [D]	ND[D]	ND[D]	ND [D]	ND [D]	ND [D]
Isophorone	ND [D]	ND [D]	ND [D]	ND[D]	ND[D]	ND [D]	ND [D]	ND [D]
1-methylnaphthalene	ND [D]	ND [D]	ND [D]	ND[D]	ND[D]	ND [D]	ND [D]	ND [D]
2-methylnaphthalene	ND [D]	ND [D]	ND [D]	ND[D]	ND[D]	ND [D]	ND [D]	ND [D]
Naphthalene	ND [D]	ND [D]	ND [D]	ND[D]	ND[D]	ND [D]	ND [D]	ND [D]
Nitrobenzene	ND [D]	ND [D]	ND [D]	ND[D]	ND[D]	ND [D]	ND [D]	ND [D]
n-nitrosodi-n-propylamine	ND [D]	ND [D]	ND [D]	ND[D]	ND[D]	ND [D]	ND [D]	ND [D]
n-nitrosodi-methylamine	ND [D]	ND [D]	ND [D]	ND[D]	ND[D]	ND [D]	ND [D]	ND [D]
n-nitrosodi-phenylamine	ND [D]	ND [D]	ND [D]	ND[D]	ND[D]	ND [D]	ND [D]	ND [D]
Phenanthrene	ND [D]	ND [D]	ND [D]	ND[D]	ND[D]	ND [D]	ND [D]	ND [D]
Pyrene	ND [D]	ND [D]	ND [D]	ND[D]	ND[D]	ND [D]	ND [D]	ND [D]
1,2,4-trichlorobenzene	ND [D]	ND [D]	ND [D]	ND[D]	ND[D]	ND [D]	ND [D]	ND [D]

Table II.A-23 Notes:
- A Data from SDPUD (2018, 2019, 2020, 2021) for calendar years 2017-2020. See Section 5.4 of Appendix M (Annual Pretreatment Report) for monthly PLWTP data. 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators when available per reporting requirements of Order No. R9-2017-0007.
- B Highest daily average value during the listed calendar year.
- C Median (50th percentile) value for the listed calendar year.
- D The constituent was not detected (ND) in any of the PLWTP effluent samples for the listed year.
- E The listed median was detected not quantifiable (DNQ); median value was greater than the MDL but below the reporting limit.
- F Suspect value. Method blank was outside of acceptance limit.
- G The constituent was detected (see Footnote F) in only one PLWTP effluent samples. The annual median value is thus listed as ND.

Purgeable Organic Compounds. Tables II.A-24 and II.A-25 present PLWTP effluent results for volatile (purgeable) organic compounds. As shown in the tables, the benzene-based compounds benzene, ethylbenzene and toluene were occasionally detected in the PLWTP effluent during 2020. Concentrations of benzene and ethylbenzene were below reportable limits in all samples, and nearly half of the PLWTP effluent samples contained concentrations of toluene below reportable limits.[12]

Halogenated or brominated compounds occasionally detected in the PLWTP effluent during 2020 include:

- Bromodichloromethane (dichlorobromomethane)
- Chloroethane (ethyl chloride)
- Chloroform

12 Results detected in excess of the MDL but below the Reportable Limit are reported as DNQ (detected not quantifiable).

- Chloromethane (methyl chloride)
- Dibromochloromethane (chlorodibromomethane)
- Methylene chloride (dichloromethane)

Of these compounds, only chloroform was detected above reportable limits in all 2020 PLWTP effluent samples. Chloromethane was detected above reportable limits in five of twelve 2020 PLWTP effluent samples.

**Table II.A-24:
Summary of Point Loma Effluent Quality for Calendar Year 2020
Volatile Organic Compounds**

Constituent	Concentration [A] (µg/L)				Total Number of 2020 Samples	Number of DNQ or ND Samples [F]
	Highest Daily Value [B]	Average Value [C]	Median Value [D]	Maximum MDL [E]		
Acrolein	ND [G]	ND [G]	ND [G]	1.24	12	12
Acrylonitrile	ND [G]	ND [G]	ND [G]	0.585	12	12
Benzene	0.516 DNQ[H]	0.04 DNQ[I]	ND [J]	0.354	12	12
Bromodichloromethane	0.476 DNQ[H]	0.04 DNQ[I]	ND [J]	0.445	12	12
Bromoform	ND [G]	ND [G]	ND [G]	0.477	12	12
Bromomethane	ND [G]	ND [G]	ND [G]	1.02	12	12
Carbon tetrachloride	ND [G]	ND [G]	ND [G]	0.422	12	12
Chlorobenzene	ND [G]	ND [G]	ND [G]	0.309	12	12
Chloroethane	1.12	0.31 DNQ[I]	ND [J]	0.405	12	11
Chloroform	4.1	2.7	2.8	0.446	12	0
Chloromethane	6.52	1.9 DNQ[I]	1.3 DNQ[J]	0.729	12	5
Dibromochloromethane	0.47 DNQ[H]	0.04 DNQ [I]	ND [J]	0.545	12	12
1,2-dichlorobenzene	ND [G]	ND [G]	ND [G]	0.327	12	12
1,3-dichlorobenzene	ND [G]	ND [G]	ND [G]	0.318	12	12
1,4-dichlorobenzene	ND [G]	ND [G]	ND [G]	0.319	12	12
1,1-dichloroethane	ND [G]	ND [G]	ND [G]	0.381	12	12
1,2-dichloroethane	ND [G]	ND [G]	ND [G]	0.652	12	12
1,1-dichloroethylene	ND [G]	ND [G]	ND [G]	0.375	12	12
Trans-1,2-dichloroethylene	ND [G]	ND [G]	ND [G]	0.364	12	12
1,2-dichloropropane	ND [G]	ND [G]	ND [G]	0.392	12	12
Cis-1,3-dichloropropene	ND [G]	ND [G]	ND [G]	0.392	12	12
Trans-1,3-dichloropropene	ND [G]	ND [G]	ND [G]	0.526	12	12
Ethylbenzene	0.878 DNQ[H]	0.12 DNQ[I]	ND [J]	0.26	12	12
Methylene chloride	0.895 DNQ[H]	0.53 DNQ[I]	0.65 DNQ[J]	0.563	12	12
1,1,2,2-tetrachloroethane	ND [G]	ND [G]	ND [G]	0.39	12	12
Tetrachloroethylene	ND [G]	ND [G]	ND [G]	0.482	12	12
Toluene	3.84	1.78	1.52	0.245	12	8
1,1,1-trichloroethane	ND [G]	ND [G]	ND [G]	0.335	12	12
1,1,2-trichloroethane	ND [G]	ND [G]	ND [G]	0.363	12	12
Trichloroethylene	ND [G]	ND [G]	ND [G]	0.377	12	12
Trichlorofluoromethane	ND [G]	ND [G]	ND [G]	0.411	12	12
Vinyl chloride	ND [G]	ND [G]	ND [G]	0.948	12	12

Table II.A-24 Notes:

A Data from SDPUD (2021) for calendar year 2020. See Section 5.4 of Appendix M (Annual Pretreatment Report) for monthly PLWTP data. 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators when available per reporting requirements of Order No. R9-2017-0007.

B Highest daily average value during calendar year 2020.
C Average annual values for 2020 are computed as the arithmetic average of daily samples assuming that ND samples have a concentration of zero. Annual average values computed using this approach may differ slightly from annual average values that are computed as an average of monthly averages (such as those presented in Section 5.4 of Appendix M).
D Median value during calendar year 2020.
E Maximum MDL achieved during 2020 for the listed constituent, as reported in Section 5.4 of Appendix M.
F Number of samples in which the constituent was not detected (ND) or was detected but below quantifiable limits (DNQ).
G ND indicates the constituent was not detected at the listed MDL in any PLWTP effluent sample during 2020.
H The listed maximum value was detected not quantifiable (DNQ); the result was greater than the MDL but below the reporting limit.
I DNQ values used for computing the arithmetic average.
J The listed median value was detected not quantifiable (DNQ). More than half of the values were DNQ or ND.

Table II.A-25:
Summary of Point Loma Effluent Quality for Calendar Years 2017-2020
Volatile Organic Compounds

Parameter	Concentration A (µg/L)							
	2017		2018		2019		2020	
	Highest Daily Value B	Median Value C	Highest Daily Value B	Median Value C	Highest Daily Value B	Median Value C	Highest Daily Value B	Median Value C
Acrolein	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Acrylonitrile	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Benzene	ND D	ND D	ND D	ND D	0.46 DNQE	ND F	0.516 DNQE	ND F
Bromoform	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Bromodichloromethane	1.6	ND F	0.6 DNQE	ND F	0.6 DNQE	ND F	0.476 DNQE	ND F
Bromomethane	1.2 DNQE	ND F	ND D	ND D	0.38 DNQE	ND F	ND D	ND D
Carbon tetrachloride	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Chlorobenzene	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Chloroethane	2.5	ND F	0.7 DNQE	ND F	0.4 DNQE	ND F	1.12	ND F
Chloroform	6.9	3.1	4.4	3.0	6.9	3.1	4.1	2.8
Chloromethane	4.5	1.7	4.3	1.6	3.3	1.7	6.52	1.3 DNQE
Dibromochloromethane	1.2	ND F	0.4 DNQE	ND F	0.5 DNQE	ND F	0.47 DNQE	ND F
1,2-dichlorobenzene	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
1,3-dichlorobenzene	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
1,4-dichlorobenzene	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
1,1-dichloroethane	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
1,2-dichloroethane	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
1,1-dichloroethylene	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Trans-1,2-dichloroethylene	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
1,2-dichloropropane	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Cis-1,3-dichloropropene	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Trans-1,3-dichloropropene	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Ethylbenzene	ND D	ND D	NDD	ND D	0.6 DNQE	ND F	0.878 DNQE	ND F

Parameter	Concentration A (µg/L)							
	2017		2018		2019		2020	
	Highest Daily Value B	Median Value C	Highest Daily Value B	Median Value C	Highest Daily Value B	Median Value C	Highest Daily Value B	Median Value C
Methylene Chloride G	1.9 DNQ E	1.1 DNQ E	5.69	1.1 DNQ E	3.3	0.7 DNQ E	0.895 DNQ E	0.65 DNQ E
1,1,2,2-tetrachloroethane	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Tetrachloroethylene	ND D	ND D	0.6 DNQ E	ND F	ND D	ND D	ND D	ND D
Toluene	18.0	1.7	11.2	1.3	3.8	1.85	3.84	1.52
1,1,1-trichloroethane	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
1,1,2-trichloroethane	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Trichloroethylene	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Trichlorofluoromethane	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D
Vinyl chloride	ND D	ND D	ND D	ND D	ND D	ND D	ND D	ND D

Table II.A-25 Notes (continues on next page):

A Data from SDPUD (2018, 2019, 2020, 2021) for calendar years 2017-2020. See Section 5.4 of Appendix M (Annual Pretreatment Report) for monthly PLWTP data. 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators when available per reporting requirements of Order No. R9-2017-0007.
B Highest daily average value during the listed calendar year.
C Median (50th percentile) value for the listed calendar year.
D The constituent was not detected (ND) in any of the PLWTP effluent samples for the listed year.
E The listed value was detected not quantifiable (DNQ); the concentration was greater than the MDL but below the reporting limit.
F The constituent was not detected in the majority of the PLWTP effluent samples. The annual median value is thus listed as ND.
G Also known as dichloromethane.

Tributyltin. Table II.A-26 presents concentrations of monobutyltin, dibutyltin and tributyltin in the PLWTP effluent during 2017-2020. As shown in Table II.A-26, tributyltin was not detected in any PLWTP samples during 2017-2020.[13]

Dioxins and Difurans. Table II.A-27 summarizes PLWTP effluent quality for dioxins and furans for 2020. As shown in Table II.A-27, no CDD (chlorinated dibenzodioxin) or CDF (chlorinated dibenzofuran) compounds were detected in quantifiable concentrations during 2020, but 1,2,3,4,6,7,8-hepta CDD and octa-CDD were detected in several samples at concentrations below reporting levels. Each of these isomers, however, are associated with low toxicity factors, resulting in minimal effect on computed TCDD equivalents. Demonstrating this, Table II.A-28 summarizes TCDD concentrations in the PLWTP effluent during 2017-2020. As shown in Table II.A-28, TCDD equivalents were below detection limit in all 2017-2020 samples.

13 Of these compounds, tributyltin is the only one for which a performance goal is established in Order No. R9-2017-0007.

Table II.A-26:
Summary of Point Loma Effluent Quality for Calendar Years 2017-2020, Tributyltin

Parameter	Concentration [A] (µg/L)							
	2017		2018		2019		2020	
	Highest Daily Value [B]	Median Value [C]	Highest Daily Value [B]	Median Value [C]	Highest Daily Value [B]	Median Value [C]	Highest Daily Value [B]	Median Value [C]
Dibutyltin	0.41 DNQ [E]	ND [F]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
Monobutyltin	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]
Tributyltin	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]	ND [D]

Table II.A-26 Notes:

A Data from SDPUD (2018, 2019, 2020, 2021) for calendar years 2017-2020. See Section 5.4 of Appendix M (Annual Pretreatment Report) for monthly PLWTP data. 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators when available per reporting requirements of Order No. R9-2017-0007.

B Highest daily average value during the listed calendar year.

C Median (50th percentile) value for the listed calendar year.

D The constituent was not detected (ND) in any of the PLWTP effluent samples for the listed year.

E The listed value was detected not quantifiable (DNQ); the concentration was greater than the MDL but below the reporting limit. Value is from SDPUD (2018).

F The constituent was not detected in the majority of the PLWTP effluent samples. The annual median value is thus listed as ND.

Table II.A-27: Summary of Point Loma Effluent Quality for Calendar Year 2020, Dioxins and Furans

Constituent	Number of 2020 Samples			TCDD Equivalents [A,B] (picograms per liter)			Toxicity Factor [B]
	Total Number of Samples	Number of ND Samples [C]	Number of DNQ Samples [D]	2020 Highest Daily Value [E]	2020 Annual Median [F]	Maximum MDL [G]	
2,3,7,8-tetra CDD	12	12	0	ND [H]	ND [H]	0.448	1.0
1,2,3,7,8-penta CDD	12	12	0	ND [H]	ND [H]	0.575	0.5
1,2,3,4,7,8-hexa CDD	12	12	0	ND [H]	ND [H]	0.687	0.1
1,2,3,6,7,8-hexa CDD	12	12	0	ND [H]	ND [H]	0.715	0.1
1,2,3,7,8,9-hexa CDD	12	12	0	ND [H]	ND [H]	0.663	0.1
1,2,3,4,6,7,8-hepta CDD	12	6	6	3.47 DNQ[I]	< 0.2 DNQ[I]	0.793	0.01
octa CDD	12	1	11	23 DNQ[I]	13 DNQ[I]	1.12	0.001
2,3,7,8-tetra CDF	12	12	0	ND [H]	ND [H]	0.41	0.1
1,2,3,7,8-penta CDF	12	12	0	ND [H]	ND [H]	0.522	0.05
2,3,4,7,8-penta CDF	12	12	0	ND [H]	ND [H]	0.491	0.5
1,2,3,4,7,8-hexa CDF	12	12	0	ND [H]	ND [H]	0.506	0.1
1,2,3,6,7,8-hexa CDF	12	12	0	ND [H]	ND [H]	0.52	0.1
1,2,3,7,8,9-hexa CDF	12	12	0	ND [H]	ND [H]	0.618	0.1
2,3,4,6,7,8-hexa CDF	12	12	0	ND [H]	ND [H]	0.524	0.1
1,2,3,4,6,7,8-hepta CDF	12	12	0	ND [H]	ND [H]	0.548	0.01
1,2,3,4,7,8,9-hepta CDF	12	12	0	ND [H]	ND [H]	0.735	0.01
octa CDF	12	12	0	ND [H]	ND [H]	0.992	0.001

Table II.A-27 Notes:

- A Data from SDPUD (2021) for calendar year 2020. See Section 5.4 of Appendix M (Annual Pretreatment Report) for monthly PLWTP data. 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators when available per reporting requirements of Order No. R9-2017-0007.
- B TCDD equivalents are in concentrations of picograms per liter (10^{-6} µg/L), and represent the concentration of the constituent multiplied by the respective toxicity factors. Toxicity factors are as listed on page A-12 of Attachment A to Order No. R9-2017-0007.
- C Number of PLWTP effluent samples during 2020 where the constituent was not detected (ND).
- D Number of PLWTP effluent samples during 2020 where the constituent was detected but not quantifiable (DNQ).
- E Highest daily average value reported during calendar year 2020.
- F Median (50th percentile) value of sample results during calendar year 2020.
- G Maximum MDL achieved during 2020 testing. See Section 5.4 of Appendix M.
- H ND indicates the constituent was not detected at the listed MDL in any PLWTP effluent sample during 2020.
- I Value was detected not quantifiable (DNQ) at a concentration above the MDL but below the quantifiable reporting limit. Maximum values for 1,2,3,4,7,8-hepta CDD and octa-CDD did not occurred in different samples.

Table II.A-28:
Summary of PLWTP Effluent Monthly TCDD Equivalents, 2017-2020 [A]

Month	Concentration (pg/L)							
	2017		2018		2019		2020	
	Maximum MDL	TCDD Equivalents	Maximum MDL	TCDD Equivalents	Maximum MDL	TCDD Equivalents	Maximum MDL	TCDD Equivalents
January	0.656	ND	1.01	ND	1.1	ND	1.12	ND
February	0.656	ND	1.01	ND	1.12	ND	0.97	ND
March	0.656	ND	1.1	ND	1.12	ND	0.97	ND
April	0.656	ND	1.01	ND	1.12	ND	0.985	ND
May	1.01	ND	1.1	ND	1.12	ND	1.05	ND
June	1.01	ND	1.01	ND	0.97	ND	1.05	ND
July	1.01	ND	1.01	ND	1.12	ND	1.05	ND
August	1.01	ND	1.01	ND	1.12	ND	1.05	ND
September	1.7	ND	1.01	ND	1.12	ND	0.985	ND
October	1.1	ND	1.01	ND	0.97	ND	1.05	ND
November	1.01	ND	1.01	ND	1.12	ND	1.05	ND
December	1.1	ND	1.01	ND	1.12	ND	1.05	ND

Table II.A-28 Notes:

A PLWTP effluent data from 2017-2020. 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators when available per reporting requirements of Order No. R9-2017-0007.

Radioactivity. Table II.A-29 presents the results of radioactivity monitoring of the PLWTP effluent during 2020.

Table II.A-29:
PLWTP Monthly Effluent Radiation, 2020 [A]

Month	Gross Alpha Radiation (picocuries/liter)	Gross Beta Radiation (picocuries/liter)
January	14.3 ± 2.5	18.4 ± 2.0
February	6.7 ± 1.9	15.8 ± 1.6
March	19.8 ± 2.7	13.4 ± 1.7
April	8.8 ± 1.7	12.8 ± 1.6
May	13.1 ± 1.8	17.0 ± 1.8
June	11.0 ± 2.5	11.0 ± 1.7
July	12.9 ± 2.7	11.1 ± 1.8
August	12.0 ± 2.2	9.2 ± 1.5
September	14.1 ± 2.2	11.1 ± 1.6
October	15.1 ± 2.4	14.0 ± 1.7
November	11.6 ± 2.6	10.6 ± 1.8
December	11.4 ± 2.0	10.0 ± 1.5
Annual Average	12.6 ± 2.3	12.9 ± 1.7

Table II.A-29 Notes:

A Data from SDPUD (2021) for calendar year 2020. See Section 5.4 of Appendix M. 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators when available per reporting requirements of Order No. R9-2017-0007.

Immediate Dissolved Oxygen Demand. The large applicant questionnaire (40 CFR 125, Subpart G) requires 301(h) applicants to identify the "immediate dissolved oxygen demand" (IDOD) of the discharge. The IDOD test is unreliable, and has not been an accepted test for measuring oxygen-demanding effects of a wastewater for over 45 years. As a result of the test's inherent unreliability, the 14th edition of *Standard Methods for the Examination of Water and Wastewater* (published in 1975) eliminated the IDOD test.

To satisfy the requirements of 40 CFR 125, Subpart G, the City of San Diego performed a series of IDOD tests in 1994 in accordance with procedures listed in the 13th edition of *Standard Methods* (which was published in 1971). The maximum observed IDOD from nine samples was 1.74 mg. The average IDOD value in the nine samples was 0.95 mg/L.

II.A.5. Effluent Volume and Mass Emissions [40 CFR 125.62(e)(2) and 125.67]

a. Provide detailed analyses showing projections of effluent volume (annual average, m^3/sec) and mass loadings (mt/yr) of BOD_5 and suspended solids for the design life of your treatment facility in five-year increments. If the application is based on an improved or altered discharge, the projections must be provided with and without the proposed improvements or alterations.

SUMMARY: Effluent volumes and mass emission are projected using a comprehensive hydraulic model of the Metro System collection system that is based on Series 13 population and employment projections developed by the San Diego Association of Governments (SANDAG). With implementation of the Pure Water San Diego program, PLOO discharge flows and mass emissions are projected to be less in 2036 than in year 2015.

The design life of Metro System treatment facilities varies among the treatment components. Mechanical equipment may have a design life of 20 years, while concrete structures may last for 50 years or more. A design life of 20 years (representing the replacement life for some of the onsite mechanical equipment) is used for purposes of projecting the flow and mass emission data requested by Question II.A.5(a).

As detailed in Appendix B, the City of San Diego annually updates projected future Metro System flows and loads through a comprehensive GIS-based (geographic information system) hydraulic model of Metro System and City of San Diego wastewater collection facilities. The model superimposes SANDAG (San Diego Association of Governments) Series 13 population and employment projections on grid levels as small as a city block to generate projected dry weather and wet weather flows. The model also computes system-wide TSS and BOD loads on the basis of observed historic influent data and treatment facilities performance.

Projected Dry Weather Flows. Average annual Metro System flows under dry weather conditions are estimated for two sets of conditions:

Facilities Planning Flow Projections. Conservative flow projections are developed for use in planning future Metro System facilities needs and scheduling upgrades and expansion of future Metro System facilities. To ensure that Metro System facilities have adequate capacity, Metro System flows for facilities planning purposes are estimated using a series of conservative assumptions. These conservative assumptions typically result in Metro System flow projections that are overestimated. For example, as part of the prior PLOO 301(h) application, PLOO discharge flows for year 2021 were estimated at 170 mgd, while actual year 2021 PLOO discharge flows averaged 139.7 mgd. While it is anticipated that the facilities planning flow projections will overestimate future Metro System flow, the facilities planning flow projections represent a useful tool for planning and scheduling future Metro System facilities improvements and represent the foundation for future Metro System facilities planning.

Most Probable Flow Projections. To develop a more accurate projection of future Metro System, existing flows are pro-rated forward assuming continuation of existing per capita flow and loading trends, along with population growth consistent with SANDAG Series 13 projections. These "most probable" flow estimates represent the best estimate of actual PLOO future flows for purposes of assessing future regulatory compliance and ocean discharge conditions, but the most probable flows are not used for facilities planning purposes because the most probable estimates do not provide a safety margin to address unforeseen changes in future flow and load trends.

Table II.A-30 presents projected Metro System and PLOO dry weather discharge flows and annual mass emissions under the "most probable" conditions. The most probable conditions reflect the fact that PLOO discharge flows during 2021 averaged 139.7 mgd, and the projections assume continuation of existing per capita flow and load trends (adjusted for projected population growth). As shown in Table II.A-30, projected PLOO discharge flows and mass emissions are based on attainment of the Pure Water San Diego goals of implementing 30 mgd of potable reuse by December 31, 2027 and implementing 83 mgd of cumulative potable reuse by December 31, 2035.

For comparison, Table II.A-31 presents Metro System and PLOO discharge flows and annual mass emissions using the facilities planning flow estimates used for purposes of planning and scheduling future Metro System upgrades and expansion.

Projected 10-Year Weather Flows. While the City maintains and aggressive program to limit collection system inflow and infiltration (I&I), historic I&I within the Metro System has averaged 4 to 5 percent of the average annual dry weather flow, but can be significantly higher during periods of peak hydrologic events.

Average annual Metro System flows under 10-year return wet weather conditions are estimated (see Appendix B) on the basis of historic data and a 60+ year precipitation data base, and an assumed annual increase of I&I of 1.5 percent (a value commensurate with the increase in mileage of Metro System and Participating Agency collection systems).

**Table II.A-30:
Projected Dry Weather Metro System Flows, 2022-2041
Using "Most Probable" Flow Estimates**

Year	Projection for Total Metro System				Projected PLOO Discharge					
	Projected "Most Probable" Metro System Inflow [A]		Projected Metro System Mass Load [B] (mt/yr)		Projected Average Annual PLOO Discharge [C]		Projected Average Annual PLOO Mass Emissions [D] (mt/yr)		Projected PLWTP Effluent Concentration [D] (mg/L)	
	m³/sec	mgd	TSS	BOD	m³/sec	mgd	TSS	BOD	TSS	BOD
2022	7.85	179.2	509,700	485,000	6.16	140.6	7,180	25,800	37	133
2023	7.89	180	514,200	489,200	6.19	141.2	7,410	26,100	38	134
2024	7.92	180.8	518,700	493,400	6.21	141.8	7,460	26,500	38	135
2025	7.96	181.7	523,200	497,600	6.24	142.4	7,470	26,500	38	135
2026	8.00	182.5	527,500	501,900	6.28	143.3	7,520	26,700	38	135
2027	8.04	183.5	532,000	506,200	6.31	144.0	7,750	27,200	39	137
2028 [E]	8.08	184.5	536,400	510,400	5.01 [E]	114.8 [E]	6,180	22,200	39	140
2029	8.12	185.4	540,900	514,600	5.04	115.1	6,200	22,300	39	140
2030	8.17	186.4	545,300	518,800	5.07	115.8	6,240	22,500	39	141
2031	8.21	187.3	549,700	523,000	5.11	116.6	6,280	22,700	39	141
2032	8.25	188.3	554,100	527,200	5.14	117.4	6,500	23,100	40	142
2033	8.29	189.3	558,500	531,400	5.19	118.4	6,540	23,100	40	141
2034	8.34	190.3	562,900	535,600	5.21	119.0	6,570	23,300	40	142
2035	8.38	191.3	567,300	539,800	5.25	119.8	6,620	23,500	40	142
2036 [F]	8.40	191.8	572,000	544,300	2.93 [F]	66.8 [F]	3,330	11,100	36	120
2037	8.43	192.4	576,500	548,500	2.94	67.2	3,340	11,100	36	120
2038	8.46	193.0	581,000	552,700	2.97	67.7	3,370	11,300	36	121
2039	8.48	193.6	585,500	556,900	2.98	68.1	3,390	11,400	36	121
2040	8.51	194.3	590,000	561,100	3.01	68.6	3,420	11,600	36	122
2041	8.54	194.9	594,500	565,300	3.02	69.0	3,430	11,600	36	122

Table II.A-30 Notes:

A Projected "most probable" Metro System flows are derived from the average of recent actual flow and load values and are pro-rated for future years using the same incremental population and unit generation rates as the facilities planning estimates shown in Table II.A-31. Future population growth projections are based on SANDAG Series 13 population forecasts.

B Mass load projections are conservatively based the highest waste strengths observed during the past five years. Waste strengths for future years are pro-rated based on projected in-system return flows continuation of trends in regional water conservation which reduces per capita flow but maintain per capita TSS and BOD unit mass load contributions.

C Flows discharged through the PLOO are the remaining total Metro System flows treated at the PLWTP after having been reduced by (1) upstream recycled water production and use, (2) diversion of flows to the SBWRP, City of Del Mar, Otay Water District, Padre Dam Municipal Water District, and (3) upstream production and use of purified water as part of the Pure Water San Diego program. Projected PLOO flows include reverse osmosis reject (brine) from upstream advanced water purification facilities, centrate from the MBC, and sludge from the SBWRP that are comingled with influent flow to the PLWTP.

D Estimates based on maintaining historic PLWTP TSS removal rates while influent concentrations of TSS (see footnote C) are projected to increase due to water conservation. Actual TSS mass emissions are projected to be less than those projected above; PLWTP TSS concentrations averaged 34 mg/L during 2020. Note that estimated PLWTP effluent TSS and BOD concentrations under the above "most probable" flow scenario are slightly higher than those for the "facilities planning" flow estimates, as the "facilities planning" estimates conservatively assume less water conservation (e.g., increased per capita flow contributions). Mass load projections are rounded to three significant figures, but are computed using TSS and BOD concentrations and flows that are based on more significant figures than the ones shown above.

E Point Loma discharge flows and loads reduced through implementation of 30 mgd of upstream potable reuse. Based on targeted Pure Water San Diego potable reuse implementation goal for December 31, 2027. Implementation date may be influenced economic conditions, population, and water conservation.

F PLWTP discharge flows and loads are reduced by implementation of an additional 53 mgd of upstream potable reuse (total cumulative potable reuse of 83 mgd). Based on achieving the targeted Pure Water San Diego potable reuse implementation goal for December 31, 2035. Implementation date may be influenced economic conditions, population, and water conservation.

**Table II.A-31:
Projected Dry Weather Metro System Flows, 2022-2041
Using Facilities Planning Flow Estimates**

Year	Metro System "Facilities Planning" Projection				Projected PLOO Discharge under Facilities Planning Projections					
	Estimated Metro System Inflow [A]		Estimated Metro System Mass Load [B] (mt/yr)		Projected Average Annual PLOO Discharge [C]		Projected Average Annual PLOO Mass Emissions [D] (mt/yr)		Projected PLWTP Effluent Concentration [D] (mg/L)	
	m^3/sec	mgd	TSS	BOD	m^3/sec	mgd	TSS	BOD	TSS	BOD
2022	7.85	179.2	509,700	485,000	6.78	154.7	8,930	27,800	46	143
2023	7.89	180	514,200	489,200	6.81	155.4	9,360	28,700	47	144
2024	7.92	180.8	518,700	493,400	6.84	156.1	9,230	28,500	47	145
2025	7.96	181.7	523,200	497,600	6.87	156.8	9,240	28,500	47	145
2026	8.00	182.5	527,500	501,900	6.91	157.7	9,300	28,700	47	145
2027	8.04	183.5	532,000	506,200	6.94	158.5	9,540	29,000	48	146
2028 [E]	8.08	184.5	536,400	510,400	5.65 [E]	128.9 [E]	7,760	23,600	49	149
2029	8.12	185.4	540,900	514,600	5.68	129.7	7,790	23,700	49	149
2030	8.17	186.4	545,300	518,800	5.72	130.5	7,830	24,000	49	150
2031	8.21	187.3	549,700	523,000	5.76	131.4	7,890	24,200	49	150
2032	8.25	188.3	554,100	527,200	5.80	132.3	8,130	24,500	50	151
2033	8.29	189.3	558,500	531,400	5.83	133	8,170	24,700	50	151
2034	8.34	190.3	562,900	535,600	5.87	134	8,220	25,000	50	152
2035	8.38	191.3	567,300	539,800	5.91	134.9	8,270	25,100	50	152
2036 [F]	8.40	191.8	572,000	544,300	3.59 [F]	81.9 [F]	4,250	12,000	46	130
2037	8.43	192.4	576,500	548,500	3.61	82.3	4,270	12,100	46	130
2038	8.46	193.0	581,000	552,700	3.63	82.9	4,300	12,200	46	131
2039	8.48	193.6	585,500	556,900	3.65	83.4	4,330	12,300	46	131
2040	8.51	194.3	590,000	561,100	3.68	84	4,370	12,500	46	132
2041	8.54	194.9	594,500	565,300	3.70	84.5	4,380	12,600	46	132

Table II.A-31 Notes:

A Conservatively projected Metro System flows used for facilities planning purposes. The facilities planning flow estimates employ a series of conservative assumptions designed to represent worst-case conditions and to ensure that future Metro System upgrades and expansions are planned and scheduled to meet any anticipated changes in flow and load trends. Planning flow and load projections are expressed as annual average daily flows and include wet weather impacts expressed as an I & I component reflective of 10-year storm events. Waste load projections are conservatively based on the highest waste strengths observed during the past five years.

B Mass load projections are conservatively based the highest waste strengths observed during the past five years. Waste strengths for future years are pro-rated based on projected in-system return flows continuation of trends in regional water conservation which reduces per capita flow but maintain per capita TSS and BOD unit mass load contributions.

C Flows discharged through the PLOO are the remaining total Metro System flows treated at the PLWTP after having been reduced by (1) upstream recycled water production and use, (2) diversion of flows to the SBWRP, City of Del Mar, Otay Water District, Padre Dam Municipal Water District, and (3) upstream production and use of purified water as part of the Pure Water San Diego program. Projected PLOO flows include reverse osmosis reject (brine) from upstream advanced water purification facilities, centrate from the Metropolitan Biosolids Facilities, and sludge from the SBWRP that are comingled with influent flow to the PLWTP.

D Estimates conservatively based on maintaining historic PLWTP TSS removal rates and existing per capita TSS and BOD contributions. Influent concentrations of TSS and BOD are projected to increase due to water conservation (e.g., increased per capita flow contributions). Actual TSS mass emissions are projected to be less than those projected above; PLWTP TSS concentrations averaged 34 mg/L during 2020. Mass load projections are rounded to three significant figures, but are computed using TSS and BOD concentrations and flows that are based on more significant figures than the ones shown above.

E Point Loma discharge flows and loads reduced through implementation of 30 mgd of upstream potable reuse. Based on targeted Pure Water San Diego potable reuse implementation goal for December 31, 2027. Implementation date may be influenced economic conditions, population, and water conservation.

F PLWTP discharge flows and loads are reduced by implementation of an additional 53 mgd of upstream potable reuse (total cumulative potable reuse of 83 mgd). Based on achieving the targeted *Pure Water San Diego* potable reuse implementation goal for December 31, 2035. Implementation date may be influenced economic conditions, population, and water conservation.

Table II.A-32 presents average annual flows under 10-year return wet weather conditions for 2022 through 2041. To be conservative, the 10-year wet weather storm flows shown in Table II.A-32 are based on the "facilities planning" dry weather flows presented in Table II.A-31.

Table II.A-32:
Projected Wet-Weather Metro System Flows, 2022-2041
During a 10-Year Storm Event

Year	Projected Wet Weather Metro System Flow for a 10-Year Storm Event [A]		Projected Wet Weather PLWTP Flow for a 10-Year Storm Event [A,B]	
	m^3/sec	mgd	m^3/sec	mgd
2022	15.70	358.4	14.80	337.9
2023	15.77	360.0	14.87	339.5
2024	15.84	361.7	14.95	341.2
2025	15.92	363.3	15.02	342.8
2026	16.00	365.1	15.10	344.5
2027	16.08	367.0	15.17	346.1
2028 [C]	16.17	369.0	13.76 [C]	314.1 [C]
2029	16.25	370.9	13.85	316.0
2030	16.34	372.9	13.93	318.0
2031	16.42	374.8	14.02	319.9
2032	16.51	376.8	14.10	321.9
2033	16.59	378.7	14.19	323.8
2034	16.68	380.7	14.27	325.8
2035	16.76	382.6	14.36	327.7
2036 [D]	16.81	383.6	12.06 [D]	275.2 [D]
2037	16.84	384.3	12.09	275.9
2038	16.87	384.9	12.12	276.5
2039	16.89	385.6	12.15	277.2
2040	16.92	386.3	12.17	277.9
2041	16.95	386.9	12.20	278.5

Table II.A-32 Notes:

A Conservatively based on dry weather "facilities planning" flows shown in Table II.A-31, pro-rated on the basis of projected inflow and infiltration (I&I) associated with a 10-year return storm event. I&I projections for a 10-year storm event are based on historic Metro System inflow data. As noted in Table II.A-31, the dry weather facilities planning flow estimates employ a series of conservative assumptions designed to represent worst-case conditions and to ensure that future Metro System upgrades and expansions are planned and scheduled to meet any anticipated changes in flow and load trends.

B Projected flows discharged to the PLOO under 10-year return storm events, as reduced by (1) non-potable recycled water use that is independent of weather, (2) Metro System flows treated at the SBWRP, and (3) production and use of purified water. Projected PLOO flows include reverse osmosis reject (brine) from upstream advanced water purification facilities constructed as part of the Pure Water San Diego program. (See footnotes C and D).

C Point Loma discharge flows and loads reduced through implementation of 30 mgd of upstream potable reuse. Based on targeted Pure Water San Diego potable reuse implementation goal for December 31, 2027. Implementation date may be influenced economic conditions, population, and water conservation.

D PLWTP discharge flows and loads are reduced by implementation of an additional 53 mgd of upstream potable reuse (total cumulative potable reuse of 83 mgd). Based on achieving the targeted Pure Water San Diego potable reuse implementation goal for December 31, 2035. Implementation date may be influenced economic conditions, population, and water conservation.

As shown in Table II.A-32, PLOO 10-year return wet weather flows are estimated to be nearly double the corresponding projected dry weather flows under the "most probable" conditions shown in Table II.A-30. Projected 10-year storm daily average wet weather PLWTP inflows, however, are projected to be well below the PLWTP wet-weather design capacity of 432 mgd.[14]

b. Provide projections for the end of your five-year permit term for 1) the treatment facility contributing population and 2) the average daily total discharge flow for the maximum month of the dry weather season.

SUMMARY: Population within the Metro System service area is projected at 2.34 million in year 2027 (the end of the five-year NPDES permit term). The 2027 population within the NCWRP/PLWTP service area is projected at approximately 2.23 million. The annual average PLOO discharge flow under "most probable" flow conditions in year 2027 is projected at 4.99 m³/sec (113.9 mgd), as Phase 1 of the Pure Water San Diego program will offload an annual average of 30 mgd of flow from the PLWTP and PLOO. Additionally, peak non-potable recycled water demands during the maximum month of the dry weather season is projected to offload an additional 4 mgd or more of flow from the PLWTP and PLOO.

Population and Average Annual Flows in 2027. Table II.A-33 presents projected year-by-year Metro System population, estimated Metro System population tributary to the SBWRP, and estimated Metro System population tributary to the PLWTP and NCWRP. As shown in Table II.A-33, the Metro System population at the end of the five-year NPDES permit (year 2027) within the tributary area of the NCWRP and PLWTP is estimated at approximately 2.23 million.

Table II.A-33:
Projected Treatment Facility Contributing Population, 2022-2027

Year	Projected Population (millions)		
	Tributary to Metro System Facilities [A]	Tributary to the SBWRP [B]	Tributary to the NCWRP and PLWTP [C]
2022	2.31	0.11	2.21
2023	2.32	0.11	2.21
2024	2.33	0.12	2.22
2025	2.34	0.12	2.23
2026	2.35	0.13	2.23
2027	2.36	0.13	2.23

Table II.A-33 Notes:

A Estimated population tributary to Metro System treatment facilities. Excludes the portion of the Metro System (Rancho Bernardo) that is tributary to the Escondido Hale Avenue Resource Recovery Facility.

B Estimated population tributary to the SBWRP. Based on estimated population of 0.11 million (per the 2020 South Bay Water Reclamation Plant Annual Pretreatment Report) escalated at an annual rate of 0.5 percent.

C Estimated as the difference between population tributary to the SBWRP and the total projected Metro System population. Metro System flows in this tributary area that are not diverted to the NCWRP flow directly to the PLWTP.

14 Order No. R9-2017-0007 establishes a monthly average discharge flow limitation of 240 mgd, and notes that the PLWTP has rated capacities of 240 MGD (10.5 m³/sec) average annual daily flow and 432 mgd (18.9 m³/sec) peak wet weather flow.

Maximum Month Dry Season Flow. The projected average annual PLOO discharge flows presented in Tables II.A-30 and II.A-31 take into account average annual recycled water use at the City's NCWRP and SBWRP. PLOO flows, however, are less during dry summer months than this annual average value due to seasonal variation in non-potable recycled water demands for NCWRP recycled water.[15]

Table II.A-34 presents estimated daily PLOO flows for the five-year NPDES permit period during the maximum month of the dry season based on the "most probable" average annual PLWTP flows shown in Table II.A-30, adjusted to account for increased non-potable recycled water use during the maximum month.

Table II.A-34:
Estimated Average Daily PLWTP Flow
For the Maximum Month of the Dry Season, 2022-2027

Year	Projected Average Annual PLWTP Flow [A]		Estimated Difference between Average Annual Recycled Water Demand and Maximum Dry Season Demand [B,C]		Estimated Average Daily PLWTP Flow for the Maximum Month of the Dry Season [D]	
	m^3/sec	mgd	m^3/sec	mgd	m^3/sec	mgd
2022	6.16	140.6	0.18	4.0	5.98	136.6
2023	6.19	141.2	0.18	4.1	6.01	137.1
2024	6.21	141.8	0.18	4.2	6.03	137.6
2025	6.24	142.4	0.19	4.2	6.05	138.2
2026	6.28	143.3	0.19	4.3	6.09	139.0
2027	6.31	144.0	0.19	4.4	6.12	139.6

Table II.A-34 Notes:

A Projected average annual PLWTP flow based on the "most probable" flow estimation scenario presented in Table II.A-30. Flows discharged through the PLOO are the remaining total Metro System flows treated at the PLWTP after having been reduced by (1) upstream recycled water production and use, (2) diversion of flows to the SBWRP, City of Del Mar, Otay Water District, Padre Dam Municipal Water District, and (3) upstream production and use of purified water as part of the Pure Water San Diego program. Projected PLOO flows include reverse osmosis reject (brine) from upstream advanced water purification facilities, centrate from the MBC, and sludge from the SBWRP that are comingled with influent flow to the PLWTP.

B Based on average annual NCWRP non-potable water demands of 8 mgd and a peaking factor (peak month to average month) of 1.5, per the *2020 Recycled Water Master Plan Update* (City of San Diego and HDR, 2020). For year 2022, maximum month recycled water demands are thus estimated at 4.0 mgd (0.18 m3/sec) higher than average annual non-potable demands. For estimation purposes, the 2022 value is escalated by 2 percent per year to account for future increased non-potable reuse.

C Does not account for any potential differences between annual average and peak monthly discharges to the Metro System by the Padre Dam Municipal Water District (PDMWD) as a result of PDMWD recycled water use.

D Difference between projected average annual flow and peak month flow, taking into account projected maximum month summer non-potable reuse demands.

Current average annual NCWRP non-potable demands are approximately 8 mgd (0.35 m^3/sec). At a peaking factor of 1.5 between average annual and maximum month recycled water demand, PLWTP flows during the maximum dry season month are likely to be reduced by

15 During peak summer irrigation months, additional PLWTP flows are offloaded as a result of increased recycled water production and use (compared to average annual conditions) within the NCWRP recycled water use area. Current average annual NCWRP recycled water use is approximately 8 mgd, and peak month demands are approximately a factor of 1.5 above the average annual demand.

roughly 4 mgd compared to the average annual PLWTP flow. Allowing a 2 percent annual escalation of NCWRP non-potable recycled water use, PLWTP flows during the maximum month of the dry season are estimated at approximately 136.6 mgd during 2022. Maximum monthly PLWTP dry season flows by year 2027 are estimated at 109.5 mgd due to significant offloads associated with implementation of Phase 1 of the Pure Water San Diego program.

II.A.6. Average Daily Industrial Flow (m^3/sec) [40 CFR 125.64] Provide or estimate the average daily industrial inflow to your treatment facility for the same time increments as in Question II.A.5(a) above.

SUMMARY: Industrial flows from all Metro System permitted industrial dischargers during 2020 were 0.21 m^3/sec (4.7 mgd). This includes 0.016 m^3/sec (0.36 mgd) from Categorical Industrial Users (CIUs) and 0.19 m^3/sec (4.3 mgd) from other Significant Industrial Users (SIUs). Total Metro System industrial flows through the next 20 years are projected to remain flat at approximately 0.21 m^3/sec (4.7 mgd).

Appendix M (Volume IX) presents a detailed breakdown of the distribution of industrial flow by type of industry for calendar year 2020. Table II.A-35 summarizes the number of permitted industrial users and flows from IUs during 2020.

As documented in Appendix M, reductions in both the number of industrial dischargers and in total industrial discharge flows have occurred during the past decade. While the number and type of future Metro System industrial discharges will be dependent on economic conditions, to be conservative, it is projected that the number of industrial dischargers and total industrial discharge flows will remain relatively flat over the next 20 years. Under this assumption, Table II.A-35 summarizes projected industrial flow contributions to the Metro System for the next 20 years.

As shown in the table, it is projected that future combined SIU and CIU flows within the Metro System are projected to remain steady at 0.21 m^3/sec (4.7 mgd).

As shown in Table II.A-35, Metro System industrial flows currently contribute less than 5 percent of total Metro System flows. Flows from industries for which federal categorical standards have been established comprise less than one-quarter of one percent of the total Metro System flow. As Metro System flows increase in the future, it is projected that industrial flows will contribute a reduced percent of total Metro System flows.

**Table II.A-35:
Existing and Projected Flows and Industrial Users**

Category	Parameter	Year					
		Current Totals	Projected Future Totals				
		2020	2022	2027	2032	2037	2042
Number of Industries	Number of CIUs [A]	36 [B]	36 [C]	36 [C]	36 [C]	36 [C]	36 [C]
	Number of SIUs [D]	38 [B]	38 [C]	38 [C]	38 [C]	38 [C]	38 [C]
	Total Number of Industrial User (IU) Permits [E]	1,436 [F]	1,436 [C]	1,436 [C]	1,436 [C]	1,436 [C]	1,436 [C]
Industrial Flows	CIUs [A]	0.36 mgd [G]	0.36 mgd [C]	0.36 mgd [C]	0.36 mgd [C]	0.36 mgd [C]	0.36 mgd [C]
	SIUs [B]	3.3 mgd [G]	4.3 mgd [C]	4.3 mgd [C]	4.3 mgd [C]	4.3 mgd [C]	4.3 mgd [C]
	Total Flows from Permitted IUs [C]	4.7 mgd [G]	4.7 mgd [C]	4.7 mgd [C]	4.7 mgd [C]	4.7 mgd [C]	4.7 mgd [C]
Industrial Flows as Percent of Total Metro System Flows	Total Metro System Flows [H]	160.7	162.1	165.5	169.4	172.8	205
	Percent CIU Flow [I]	0.22%	0.22%	0.22%	0.21%	0.21%	0.18%
	Percent SIU Flow [I]	2.7%	2.7%	2.6%	2.5%	2.5%	2.1%
	Percent Industrial Flow [I]	2.9%	2.9%	2.8%	2.8%	2.7%	2.3%

Table II.A-35 Notes:

A Categorical Industrial Users (CIUs) subject to federal technology-based categorical pretreatment standards.

B Year 2020 CIU and SIU totals are from Section 3.7 of Appendix M.

C Projections beyond 2022 will depend on economic conditions. The above estimates assume "flat growth" (zero change) in number of industries and industrial flows beyond 2022.

D Additional non-CIU dischargers designated as Significant Industrial Users (SIUs).

E Includes permits for Class 1, Class 2, Class 3 IUs, along with permits for trucked waste haulers and permits for IUs regulated under Best Management Practices.

F Total number of permitted industrial users from Table 3.7-1 of Appendix M.

G Flow data for 2020 is from Table 3.11-1 of Appendix M.

H Total projected Metro System dry weather flow under the “most probable” flow conditions. Includes flows directed to the NCWRP, the SBWRP and PLWTP. See Table II.A-30.

I Percent expressed as a percent of total Metro System flows.

II.A.7. Combined Sewer Overflows [40 CFR 125.65(b)]

a. Does (will) your collection and treatment system include combined sewer overflows?

No. The City of San Diego maintains separate collection systems for storm water and sewage.

b. If yes, provide a description of your plan for minimizing combined sewer overflows to the receiving water.

Not applicable.

II.A.8. Outfall/Diffuser Design. Provide the following data for your current discharge as well as for the modified discharge, if different from the current discharge: [40 CFR 125.61(a)(1)]

- Diameter and length of the outfall(s) (meters)
- Angles of port orientations from horizontal (degrees)
- Port diameter(s) in meters and the orifice contraction coefficients(s), if known
- Vertical distance in meters from mean lower low water (or mean low water) surface and outfall centerline (meters)
- Number of ports
- Port spacing (meters)
- Design flow rate for each port if multiple ports are used (m^3/sec)

Appendix A presents a detailed description of the PLOO. No changes in outfall design parameters or configuration are proposed as part of this current NPDES application. As documented in Appendix A, the PLOO consists of original outfall pipe and a larger extended section added in 1994. Basic design criteria of the PLOO include:

- The original section is a 3,422 m (11,226 ft), reinforced concrete pipe with an internal diameter of 2.74 m (9 ft). The PLOO extension, also constructed of reinforced concrete pipe, has an internal diameter of 3.66 m (12 ft) and a length of 3,732 m (12,246 ft).
- The total length of the outfall system is 7,154 m (23,472 ft). The orientation of the extension is S 78° 40' W.
- The "Y" shaped diffuser system for the outfall extension has two legs that are each 760.8 m (2,496 ft) in length.
- The internal diameter of each diffuser leg is reduced from 2.13 m to 1.22 m (7 ft to 4 ft) over the length of the diffuser leg.
- The compass directions (proceeding from the "Y" structure) for the two diffuser legs are N 17° 13' W. and S 11° 16' W, respectively.
- The diffuser ports are positioned 15.2 cm (6 inches) above pipe springline.

- The angle of port orientation is 5° below horizontal, and perpendicular to the pipe. The port diameters are 9.53 cm (3.75 inch) in the 7-foot diffuser sections, 10.80 cm (4.25 inch) in the 5.5-foot sections, and 12.07 cm (4.75 inch) in the 4-foot sections.
- The respective number of ports in each diffuser leg are: 84, 70, and 54.
- The orifice contraction coefficient varies from 0.970 to 0.975.
- The vertical distance from the ocean surface (mean lower low water) to the outfall port centerline varies from 93.3 m to 95.4 m (306 to 313 ft).
- There are a total of 416 diffuser ports (208 ports on each diffuser leg), all of which are open.
- The port spacing is 7.32 m (24 ft), measured on each side of the pipe.
- Ports are positioned opposite each other on the two sides of the diffuser pipes (i.e., not staggered).

Table II.A-36 summarizes overall port design criteria. As shown in the table, the design maximum flow rate for each port varies from 0.0477 m^3/sec to 0.0503 m^3/sec (1.09 mgd to 1.15 mgd). At the annual average PLWTP capacity of 10.5 m^3/sec (240 mgd), the average discharge flow per outfall port is projected at approximately 0.0253 m^3/sec (0.58 mgd).

Table II.A-36:
Point Loma Ocean Outfall Diffuser Configuration

Section [A]	Length Per Leg (meters)	Internal Diameter (meters)	Pipe Thickness (cm)	Port Spacing [B] (meters)	Port Diameter (cm)	Number of Ports Per Leg	Approx. Range of Depth [C] MLLW (meters)	Port Design Flow Rate (m^3/sec) (max)
1	307.2	2.13	22.86	7.32	9.53	84 [D]	93.3 - 94.2	0.048
2	256.0	1.68	22.86	7.32	10.80	70 [D]	94.2 - 94.8	0.050
3	197.5	1.22	22.86	7.32	12.07	54 [D]	94.8 - 95.4	0.049
Total (each leg)	760	---	---	---	---	208 [D]	---	---
Approximate discharge flow per port for maximum dry weather flow - 10.5 m^3/sec (240 mgd) [E]								0.025
Approximate discharge flow per port for peak hour flow - 19.76 m^3/sec (451 mgd) [E]								0.048

Table II.A-36 Notes:
- A Each diffuser leg is comprised of three sections of pipe, each with a successively decreasing diameter.
- B Port spacing shown is for ports on the same side of diffuser leg. Ports are located on both sides on the diffuser leg.
- C Elevation from the centerline of the ports to the ocean surface at Mean Lower Low Water (MLLW).
- D All ports are open.
- E Nominal diffuser port discharge flow based on listed maximum dry weather and maximum peak hour flows, divided by 416 ports. Actual flows through individual ports under these load conditions will vary with port diameter. Discharge flows through the ports will be within design limits for both maximum dry weather and peak hour flows.

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II.B. RECEIVING WATER DESCRIPTION

II.B.1. Are you applying for a modification based on a discharge to the ocean or to a saline estuary (40 CFR 125.58(q))? [40 CFR 125.59(a)]

This application for modification of secondary treatment requirements is based on a discharge to the ocean.

II.B.2. Is your current discharge or modified discharge to stressed waters? If yes, what are the pollution sources contributing to the stress? [40 CFR 125.61(f)]

SUMMARY: Receiving waters in the vicinity of PLOO are not stressed.

The City's prior 301(h) applications demonstrate that waters off the coast of Point Loma are of excellent quality and provide a healthy habitat for fish and wildlife. Since the City's original 1995 NPDES 301(h) permit[1] was approved, comprehensive water quality monitoring, sediment monitoring, benthic species monitoring, fish abundance, and bioassay monitoring continue to demonstrate the excellent quality of waters and habitat off the coast of Point Loma. As documented in Appendices C and D, and in the responses to Question III.D, this comprehensive monitoring record demonstrates that:

- Receiving waters in the Point Loma area continue to comply with water quality objectives established in the Ocean Plan for the protection of marine species and human health.
- Dissolved oxygen concentrations in receiving waters are typical for waters of the Southern California Bight (SCB).
- Concentrations of contaminants and the organic content of the sediments remain in the range of background conditions.
- Key species parameters such as infaunal abundance, species diversity, Benthic Response Index (BRI), and the numbers and populations of indicator species are maintained within the limits of variability that typify natural benthic communities of the Southern California Bight.
- Macrofaunal assemblages off Point Loma are comparable to natural, balanced indigenous populations elsewhere in the SCB.
- Macrobenthic species abundance, richness, and diversity in the vicinity of the outfall are characteristic of natural ranges for the San Diego region.

1 Order No. 95-06 (Regional Board and EPA, 1995).

- Fish are abundant, and no statistical differences exist between fish caught in the discharge zone and fish caught in areas far removed from the PLOO with respect to disease, tumors, abnormalities, or fin erosion.
- Contaminants in fish distributed throughout the region are within ranges reported elsewhere for southern California fish.
- The discharge is highly diluted, almost never surfaces, and has not resulted in any harmful algae blooms.[2]
- A balanced indigenous population (BIP) of fish, shellfish, and wildlife exist beyond the zone of initial dilution (ZID).

The City collects and analyzes receiving water quality in the Point Loma area as part of a comprehensive water quality monitoring program. Detailed receiving water monitoring information has previously been submitted to the Regional Board as part of monthly, quarterly, semiannual, and annual reports. The City has also transmitted water quality monitoring data to EPA as part of this application for renewal of 301(h) requirements.

Detailed descriptions of sediment chemistry and benthic infauna during the period 2017-2020 are presented in Appendix C. Appendix C also presents a comprehensive assessment of ocean and sediment conditions during pre-discharge years (1991-1993) and post-discharge years (1994-2000). Within Appendix C, Appendix C1 summarizes benthic sediments, invertebrates and fish. Appendix C2 presents benthic tolerance intervals, while Appendix C3 presents an assessment of sediment chemistry and comparison of sediment quality among PLOO and reference stations. Appendix C4 presents an assessment of macrobenthic communities, and Appendix C5 assesses bioaccumulation in fish liver and muscle tissue.

As documented in the attached appendices and in the responses to Questionnaire Sections III.B and III.D, receiving waters in the Point Loma area continue to be of excellent quality, and are not stressed.

II.B.3. Provide a description and data on the seasonal circulation patterns in the vicinity of your current and modified discharge(s). [40 CFR 125.61(a)]

SUMMARY: The PLOO discharge produces a submerged wastefield, and the minimum depth to the top of the wastefield is typically 30 m (98 ft) and typical depths are 40 to 60 m (131 to 197 feet). Currents at this depth are dominated by longshore (upcoast and downcoast) motion. Net currents at this depth are typically upcoast (northwestward) at a few centimeters per second (cm/sec). Short-period cross-currents occur but are of limited duration.

2 As discussed herein, the PLOO discharge plume is most heavily trapped 40 to 60 meters (m) below the surface during spring and summer months when the potential for algae blooms in surface waters is greatest.

A detailed characterization of seasonal circulation patterns in the Point Loma vicinity was presented in the City's 1995 301(h) application which included a description of:

- Regional and local bathymetry.
- Regional ocean current patterns.
- Currents in the Point Loma shelf area.

Data collected by the City since 1995 continue to show consistency with the ocean current and stratification information described in the City's original 301(h) application. The City routinely collects depth profile data at over forty receiving water monitoring stations.[3] Depth profile data collected at each of these stations includes temperature, pH, salinity, DO, light transmittance, chlorophyll α, and colored dissolved organic matter (CDOM). Depth profile data are collected weekly at kelp bed stations and quarterly at offshore stations. Additionally, as detailed in Appendix D (Plume Behavior and Tracking), the City has collected oceanographic data through:

- Non-telemetered moored temperature loggers (thermistor strings) and static mooring Acoustic Doppler Current Profilers (ADCPs).[4]
- Real-Time Oceanographic Mooring Systems (RTOMS).[5]
- Remotely Operated Towed Vehicles (ROTVs) or autonomous underwater vehicles (AUVs).[6]

Appendix D summarizes the specialized monitoring techniques used to collect oceanographic data surrounding the PLOO and the results of this data collection effort. Appendix P presents a summary of oceanographic information collected in the vicinity of the PLOO in recent years. As documented in Appendices D and P, oceanographic conditions in the PLOO area remain as described in the City's original 1995 301(h) application. General oceanographic conditions in the vicinity of the PLOO are summarized below.

Seasonal Patterns. Local ocean current circulation in the vicinity of the PLOO discharge occurs within a larger circulation of the California Current, California Undercurrent, and Southern California Undercurrent. These currents are graphically represented in Figure II.B-1.

3 PLOO receiving water monitoring stations where depth profile data are collected include 36 offshore stations (Stations F1 through F36) and eight kelp stations (Stations A1, A6, A7 and C4 through C8). The offshore stations are at depths of 18 m (Stations F1 through F3), 60 m (Stations F4 through F14), 80 m (Stations F15 through F25) and 98 m (Stations F26 through F36). The kelp stations are at depths of 9 m and 18 m.

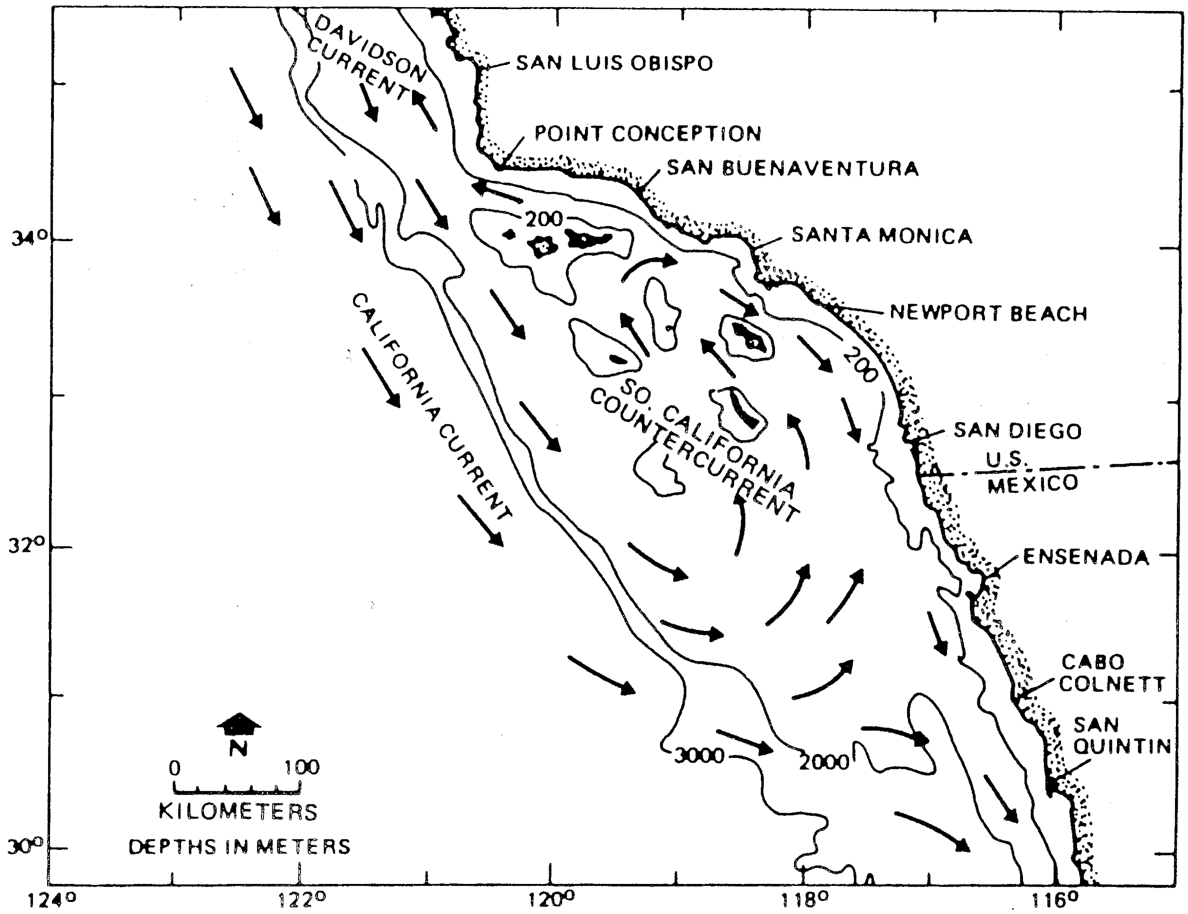
4 Non-telemetered moored temperature logger sand non-telemetered ADCPs collect data which must be periodically downloaded.

5 ROTMs provide real-time telemetered data at the mooring sites.

6 Includes ROTVs operated by the City and UAV surveys conducted by Scripps Institution of Oceanography under contract with the City.

The California Current is a broad current that typically moves at a velocity of 10 to 20 centimeters per second (cm/sec). Surface circulation within the Southern California Bight is dominated by the Southern California Countercurrent, a counter-clockwise circulation between the California Current and the coast. Flow rates of this current vary by season, but are typically greatest during the spring. The California Undercurrent is a northward flow beneath the Southern California Countercurrent.

Figure II.B-1:
Primary Currents of the Southern California Bight



Mainland Shelf Currents. As documented in prior PLOO 301(h) applications, key characteristics of mainland shelf currents off the coast of Point Loma include:

- The net subsurface flow is upcoast (northwesterly) at several cm/sec.
- Current velocities tend to decrease with depth.
- Variations in the longshore currents occur on time intervals longer than tidal periods.
- Variations in cross-shore currents are dominated by tidal cycles but can also be influenced by internal waves.

- Typical transport distances associated with tidal cycles are approximately 1 to 3 km (0.6 to 1.9 miles).
- Waters along the near-shore shelf are dispersed with offshore waters on time scales of weeks.
- Long-term variability in currents can equal or exceed the seasonal variability.

II.B.4 Oceanographic conditions in the vicinity of the current and proposed modified discharge(s). Provide data on the following: [40 CFR 125.62(a)]

- **Lowest ten percentile current speed (m/sec)**
- **Predominant current speed (m/sec) and direction (true) during the four seasons**
- **Period(s) of maximum stratification (months)**
- **Periods of natural upwelling events (duration and frequency, months)**
- **Density profiles during period(s) of maximum stratification**

SUMMARY: A characterization of the oceanographic conditions in the vicinity of PLOO is presented in Appendix P. Lowest ten percentile current speeds in the vicinity of the discharge are approximately 2 to 3 cm/sec. Predominant (net) currents are upcoast and also typically range from 2 to 3 cm/sec. The period of maximum stratification depth is typically January and February, but can occur earlier during some years. Stratification is typically weakest (allowing the potential for upwelling) during early spring months before surface waters warm and the thermocline becomes strengthened.

A detailed characterization of oceanographic conditions in the vicinity of the PLOO discharge was presented in the City's 1995 301(h) application. This characterization remains valid, and is updated with more recent data within Appendix P. General oceanographic conditions are summarized below.

Lowest Ten Percentile Speed. Ocean current studies performed during the early 1990s prior to construction of the extended PLOO remain valid in characterizing the lowest ten percentile current speed. Table II.B-1 summarizes 10th percentile, 50th percentile (median), and 90th percentile of current speeds within the typical depth range of the PLOO wastefield, based on pre-construction ocean current monitoring at the PLOO site. As shown in Table II.B-1, 10th percentile current speeds are typically 2 to 4 cm/sec.

More recent ocean current data collected using static moored ADCPs and RTOMS (see Appendix P) are consistent with the pre-construction ocean current data collected during the early 1990s. Seasonal mean ocean current velocities during 2014-2020 ranged from a low of 5 to 17 cm/sec, with the highest velocities typically occurring in surface waters during the spring. Static mooring ADCP data show a consistent pattern of higher speed and more variable currents at shallower depths (i.e., depths of less than 20 m). Slower but more consistent speeds occur in deeper waters near the terminus of the PLOO. Mean seasonal current velocities (average of all depths) during 2014-2020 ranged from:

- 4.5 to 15.5 cm/sec in winter.

- 4.6 to 17.0 cm/sec during spring.
- 4.8 to 15.0 cm/sec in summer.
- 5.6 to 13.2 cm/sec during fall.[7]

Table II.B-1:
Statistical Characterization of Ocean Currents in Vicinity of the PLOO

Statistical Parameter	Depth (meters)	Ocean Current Speed (cm/sec) [A]				
		Winter 1990	Spring 1990	Summer 1990	Fall 1990	Winter 1991
10th Percentile	60	3.5	3.2	3.1	2.1	2.8
	80	4.0	3.4	1.8	2.8	2.5
Median	60	9.4	9.3	7.8	8.1	7.6
	80	12.5	9.5	8.5	7.6	7.5
90th Percentile	60	18.5	19.2	16.8	15.2	15.8
	80	20.9	18.3	17.7	14.8	15.7

Table II.B-1 Notes:
A From pre-discharge oceanographic studies of the extended PLOO. See Appendix P for a summary of ocean currents in the PLOO vicinity and Appendix D for information on present-day ocean current monitoring.

Predominant Seasonal Current Speeds and Directions. Seasonal ocean currents in the PLOO area can be described in terms of net flow and variations about the net flow. Based on ocean current data collected prior to construction of the PLOO, Table II.B-2 summarizes net flow by season, and Table II.B-3 summarizes variations about the net flow. As shown in Table II.B-2, net speeds are highest during fall, winter, and spring months. Currents are predominantly longshore during these times.

As shown in Table II.B-3, longshore currents vary over longer time intervals (intervals greater than tidal cycles), while cross-shore currents are dominated by tidal influences. Because cross-shore currents occur over shorter periods of time (and reverse with tidal events), no realistic potential exists for sustained onshore transport of the PLOO wastefield. Net currents are thus dominated by the longshore currents.

7 See Appendix P and SDPUD (2018, 2019, 2021a, 2021b).

Table II.B-2:
Net Current Speeds by Season in the Vicinity of the PLOO[A]

Season	60 m Depth		80 m Depth	
	Current Speed (cm/sec)	Direction [B] (degrees north)	Current Speed (cm/sec)	Direction [B] (degrees north)
Winter [C]	4.9	020	6.5	005
Spring [C]	4.6	018	5.1	008
Summer [C]	2.0	081	0.7	123
Fall [C]	3.3	033	2.6	004
Winter [D]	2.1	029	1.3	029

Table II.B-2 Notes:

A From pre-discharge oceanographic studies of the PLOO extension. See Appendix P for a summary of ocean currents in the PLOO vicinity and Appendix D for information on present-day ocean current monitoring technology.

B Direction in degrees from north: northward is 000, eastward is 090, southward is 180 and westward is 270.

C Ocean current data from 1990 prior to construction of the extended PLOO.

D Ocean current data from 1991 prior to construction of the extended PLOO.

Table II.B-3:
Variances by Season and Frequency

Season	Subtidal Frequency [A]				Tidal Plus Super-Tidal Frequency [A]			
	Longshore Variation (cm^2/sec^2)		Cross-Shore Variation (cm^2/sec^2)		Longshore Variation (cm^2/sec^2)		Cross-Shore Variation (cm^2/sec^2)	
	60 m	80 m	60 m	80 m	60 m	80 m	60 m	80 m
Winter [B]	32.9	23.8	8.4	8.6	30.8	20.6	23.5	37.3
Spring [B]	64.0	50.9	9.7	8.1	21.1	19.5	22.2	30.4
Summer [B]	55.5	55.9	7.2	7.0	26.5	26.7	14.5	27.2
Fall [B]	33.3	15.8	2.0	0.9	27.3	29.4	31.5	36.5
Winter [C]	52.8	40.9	5.2	6.0	30.5	32.6	18.4	63.2

Table II.B-3 Notes:

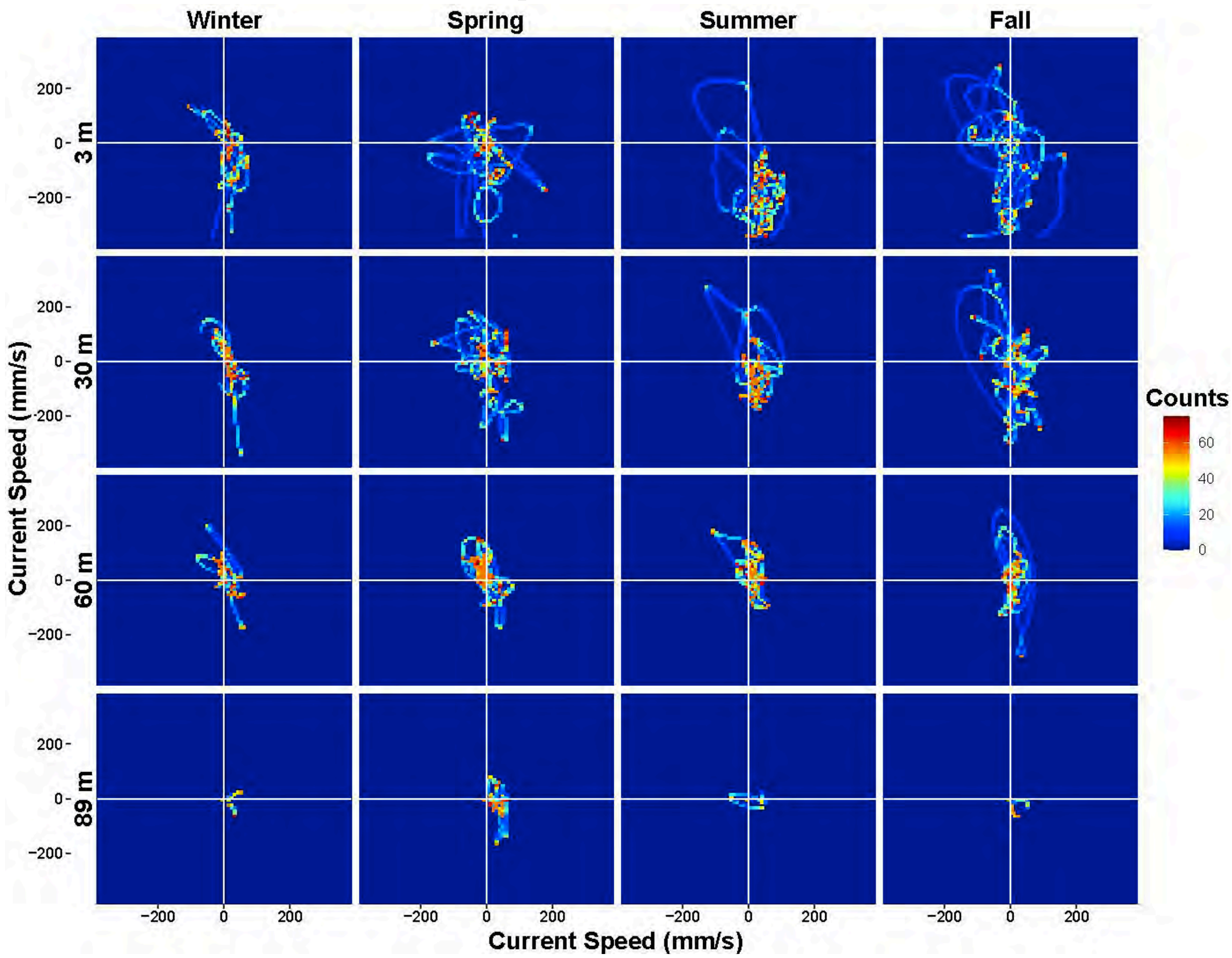
A From pre-construction oceanographic studies of the PLOO extension. See Appendix P for a summary of ocean currents in the PLOO vicinity and Appendix D for information on present-day ocean current monitoring.

B Ocean current data from 1990 prior to construction of the extended PLOO.

C Ocean current data from 1991 prior to construction of the extended PLOO.

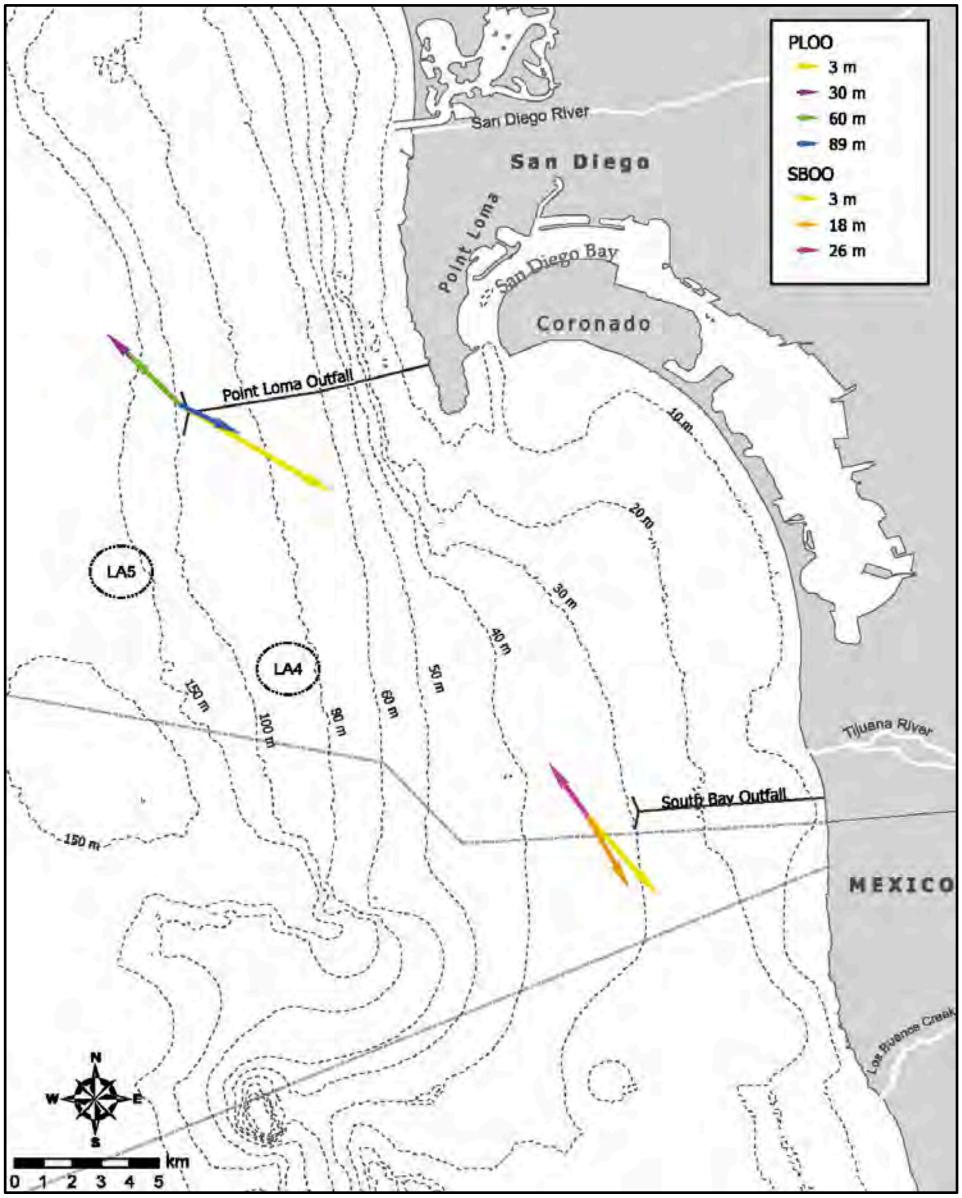
More recent ocean current data collected using static moored ADCPs and RTOMs (see Appendix P) are consistent with the pre-construction ocean current data shown in Tables II.B-2 and II.B-3. Demonstrating this, Figures II.B-2 and Figure II.B-3 summarize the results of RTOMs ocean current data for the period March 2018 through March 2019. As shown in the figures, current velocities in the vicinity of the PLOO decrease with increasing depth. Ocean currents at the 60 m and 89 m depths (depths within the typical height-of-rise of the PLOO plume) are predominantly northwest-southeast. At these depths, net current flow oscillates between northwest and southeast throughout the year.

Figure II.B-2:
Ocean Current Speed and Direction, 2018-2019[8]



8 Frequency distribution of ocean currents by season of low-pass filtered (tides removed) from the PLOO RTOMS deployment from March 2018 through March 2019. On the x-axis, positive values indicate an eastward direction and negative values indicate westward. On the y-axis, positive values indicate a northward direction and negative values indicate southward. From *Biennial Receiving Waters Monitoring and Assessment Report for the Point Loma and South Bay Ocean Outfalls*, 2018-2019 (SDPUD, 2021).

**Figure II.B-3:
Dominant Ocean Current Direction, 2018-2019[9]**



Period of Maximum Stratification. Maximum stratification occurs when the thermocline depth is great and density gradients across the thermocline remain sufficiently strong to trap the discharged waste plume.[10] The City's 1995 301(h) application characterized temperature

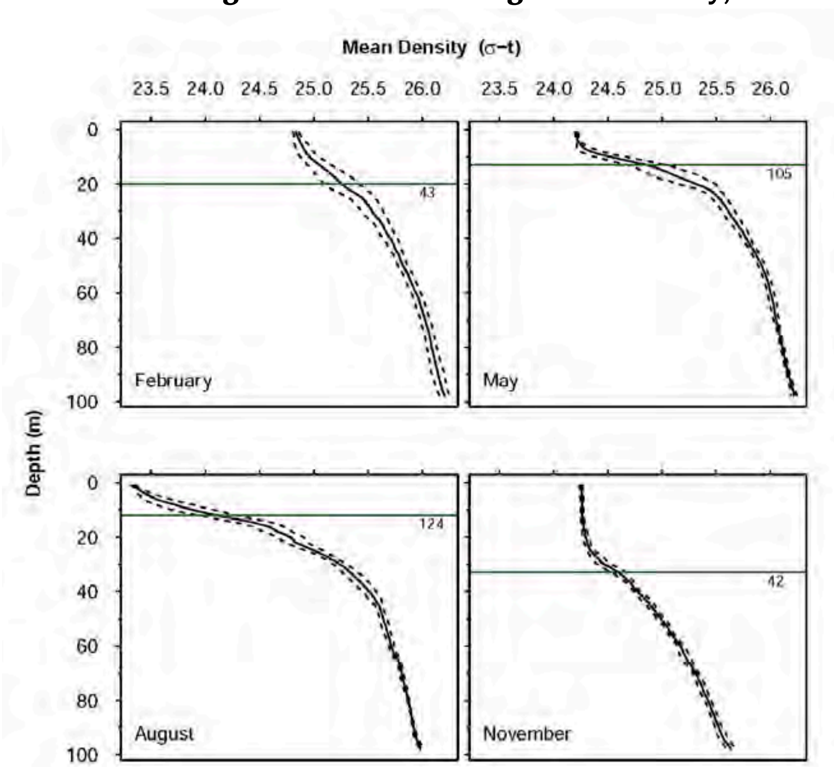
9 From *Biennial Receiving Waters Monitoring and Assessment Report for the Point Loma and South Bay Ocean Outfalls, 2018-2019* (SDPUD, 2021).

10 It should be noted that the term "maximum stratification" is used to denote the maximum depth at which the PLOO plume is trapped, not the strength (temperature/salinity) gradient across the thermocline. Maximum plume trapping levels typically occur late fall or winter then the thermocline is deepest. Strongest temperature/salinity gradients across the thermocline typically occur in summer months.

density profiles, and described how the thermocline depth (as measured from the ocean surface) increases during summer and autumn months) and reaches a maximum depth typically in early winter.[11]

Since construction of the PLOO, the City has continuously collected temperature, salinity and density data at several dozen stations in the vicinity of the PLOO. This additional data is consistent with seasonal conclusions presented in the City's original 1995 301(h) application, but variations can occur on a year-to-year basis. Demonstrating this, Figures II.B-4 through II.B-9 characterize seasonal changes in ocean density in the PLOO vicinity during 2012-2019.

Figure II.B-4:
Seasonal Changes in PLOO Receiving Water Density, 2012[12]



11 Computer modeling using these density data was used to confirm that the minimum plume height-of-rise occurs during as part of the 1995 301(h) application. Appendix Q presents stratification analyses and initial dilution modeling that were included within the City's original 1995 301(h) application.

12 Solid black lines in Figures II.B-4 represent mean values and dotted lines represent 95 percent confidence intervals. Horizontal green lines indicate the depth of maximum buoyancy frequency (BF), which is a measure of the water column's static stability and can be used as a proxy for the depth of the thermocline. Data are from SDPUD (2013).

Figure II.B-5:
Seasonal Changes in PLOO Receiving Water Density, 2013[12]

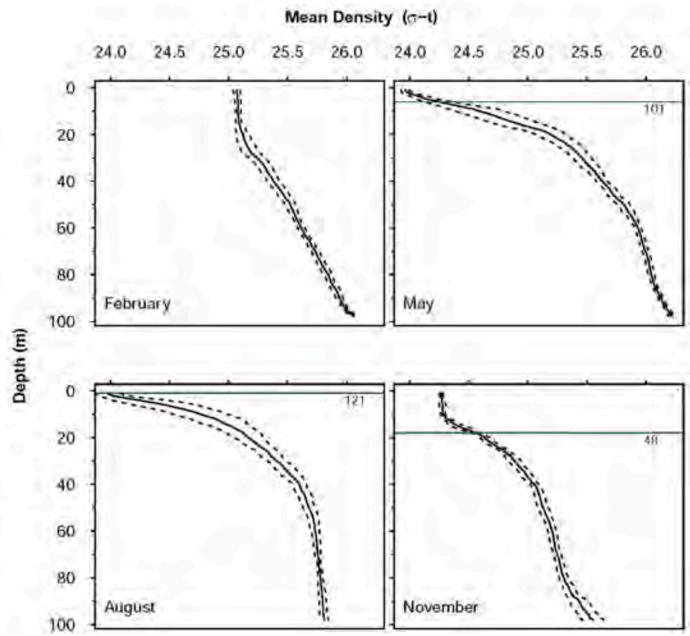
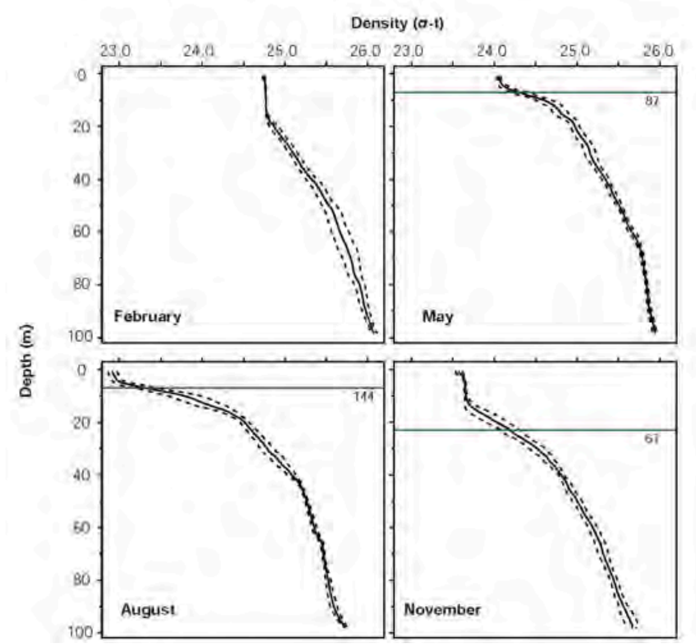
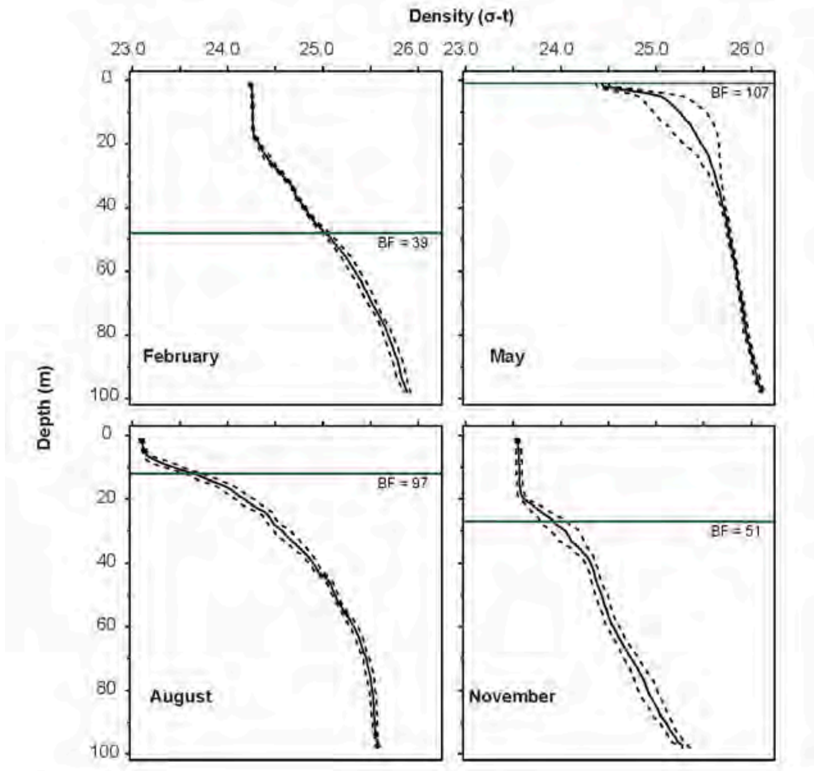


Figure II.B-6:
Seasonal Changes in PLOO Receiving Water Density, 2014[13]



13 Solid black lines in Figures II.B-5 and II.B-6 represent mean values and dotted lines represent 95 percent confidence intervals. Horizontal green lines indicate the depth of maximum buoyancy frequency (BF), which is a measure of the water column's static stability and can be used as a proxy for the depth of the thermocline. Data are from SDPUD (2014,2015).

Figure II.B-7:
Seasonal Changes in PLOO Receiving Water Density, 2015[14]



14 Solid black lines in Figure II.B-7 represent mean values and dotted lines represent 95 percent confidence intervals. Horizontal green lines indicate the depth of maximum buoyancy frequency (BF), which is a measure of the water column's static stability and can be used as a proxy for the depth of the thermocline. Data are from SDPUD (2016).

Figure II.B-8:
Seasonal Changes in PLOO Receiving Water Density, 2016-2017[15]

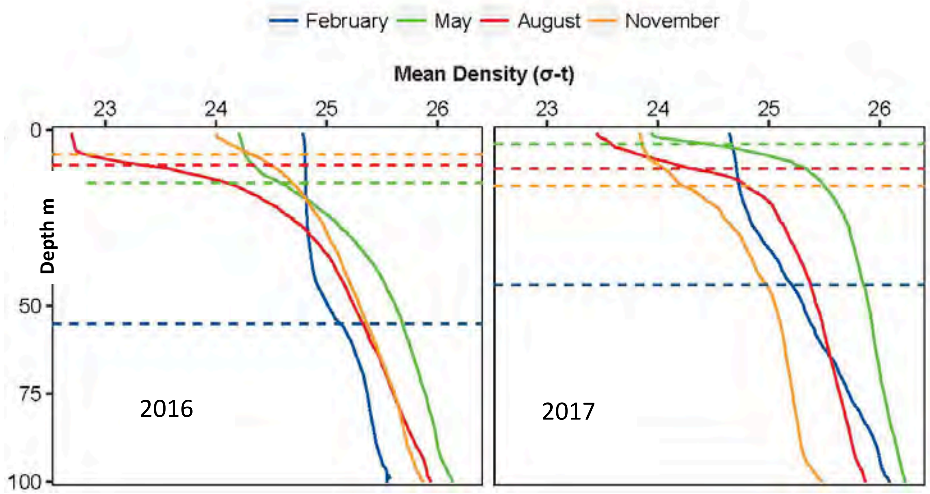


Figure II.B-9:
Seasonal Changes in PLOO Receiving Water Density, 2018-2019[16]

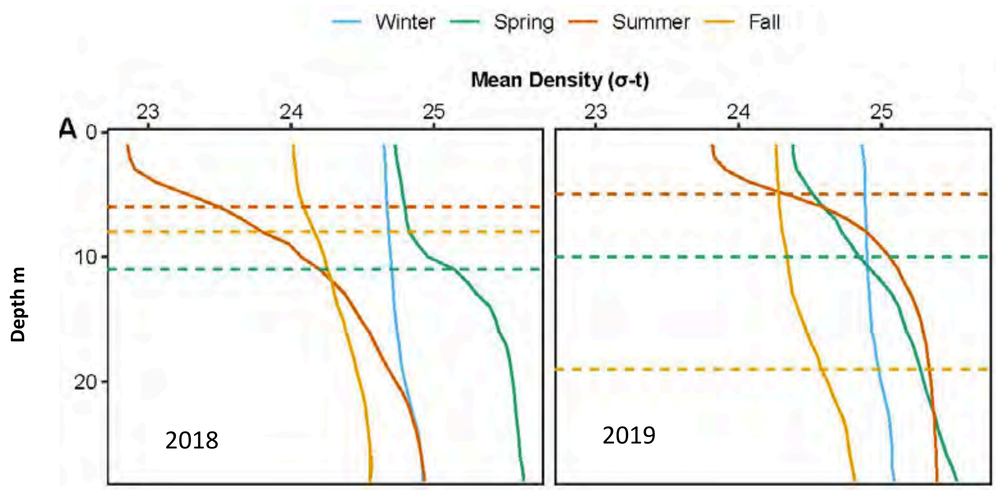


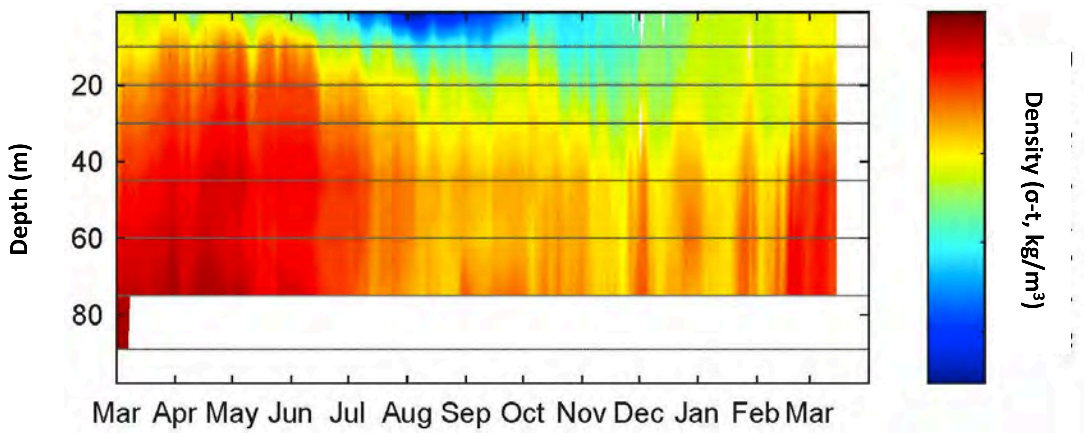
Figure II.B-10 shows density gradients during 2018-2019 which are consistent with the above-described seasonal stratification trends for 2012-2019. As shown in Figure II.B-10, thermocline depths during 2018-2019 increased to a maximum in late fall/early winter, at

15 Solid lines in Figure II.B-8 represent mean values for 11 PLOO 100 m stations. Horizontal lines indicate the depth of maximum buoyancy frequency (BF), which is a measure of the water column's static stability and can be used as a proxy for the depth of the thermocline. Data are from SDPUD (2018).

16 Solid lines in Figure II.B-9 represent mean values for 11 PLOO 100 m stations. Horizontal lines indicate the depth of maximum buoyancy frequency (BF), which is a measure of the water column's static stability and can be used as a proxy for the depth of the thermocline. Data are from SDPUD (2021).

which time density gradients weakened and the seasonal thermal stratification cycle began anew.

Figure II.B-10:
Seasonal Density Profiles at the PLOO, 2018-2019[17]



Period of Natural Upwelling Events. Temperature/salinity/depth data collected at more than three dozen PLOO receiving water monitoring stations over the past three decades are useful for assessing upwelling. Indications of upwelling events can include (1) reductions in temperatures below the thermocline (e.g., in waters not influenced by surface conditions) or (2) changes in the thermocline depth which run contrary to typical seasonal patterns. General upwelling conclusions that are evident on the basis of the more than three decades of temperature/depth data at the PLOO receiving water monitoring stations include:

- Upwelling events (e.g., near-vertical currents from deep offshore waters) can be interspersed with downwelling events.
- The frequency, duration and persistence of upwelling events in the vicinity of the PLOO can vary greatly from year to year.
- Upwelling events can be highly localized (e.g., limited to effects surrounding a single monitoring station where little correlation exists between temperature/depth data at two adjacent stations) or broader in scale (e.g., simultaneously affecting a wide geographic range of monitoring stations).
- Time-scales of such upwelling events can vary from a few days to months.
- The potential for upwelling is highest during periods of weaker stratification that can occur in late winter or spring as surface waters in the epilimnion warm and a thermocline becomes established.

17 From SDPUD (2021).

- Upwelling events during summer or fall months can result in a temporary rise in the elevation of the thermocline.
- Upwelling events during the late winter or spring can cause weakening or dissipation of the thermocline.
- Local upwelling (vertical currents) can occur in waters beneath the thermocline without significantly disturbing the depth or strength of the thermocline. Such upwelling events are typically localized and can be interspersed with similar episodes of downwelling.
- The potential for upwelling may be reduced during El Niño conditions, where region-wide warmer-than-normal ocean waters occur, but may be increased during La Niña (cooler-than-normal ocean water) conditions.

Density Profiles During Periods of Maximum Stratification. Density profiles during typical periods of maximum stratification are presented in Figures II.B-4 through II.B-10.

Additional information on density profiles during periods of maximum stratification are presented within:

- Prior PLOO 301(h) applications submitted by the City.
- Monthly and quarterly receiving water monitoring reports submitted by the City to EPA and the Regional Board via the California Integrated Water Quality System (CIWQS).[18]
- Annual PLOO ocean monitoring reports submitted per requirements established in Order No. R9-2009-0002.
- Biennial PLOO ocean monitoring reports submitted per requirements established in Order No. R9-2017-0007.[19]

II.B.5. Do the receiving waters for your discharge contain significant amounts of effluent previously discharged from the treatment works for which you are applying for a section 301(h) modified permit? [40 CFR 125.57(a)(9)]

SUMMARY: No. The effectiveness of the PLOO is not significantly affected by re-entrainment; receiving waters for the PLOO discharge do not contain significant amounts of previously discharged effluent.

The City's 1995 301(h) waiver application evaluated re-entrainment for a wastewater flow of 240 mgd (10.5 m^3/sec). Results from this detailed re-entrainment modeling study remain valid, and are presented in updated form within Appendix O. As documented in Appendix O, deep-water ocean currents off the coast of Point Loma are predominantly longshore. Typical

18 Pursuant to requirements established within Order No. R9-2017-0007, PLOO effluent, influent and receiving water data are electronically submitted to the State of California via the California Integrated Water Quality System (CWQIS).

19 Includes biennial receiving water monitoring reports for 2016-2017 (SDPUD, 2018) and 2018-2019 (SDPUD, 2021).

current speeds range from 7.5 m/sec to 12.5 cm/sec.[20] Such current speeds advect the wastefield away from the vicinity of the outfall. Intermittent re-entrainment can, however, occur during periods of current reversals if previously discharged wastewater is transported back into the ZID. During such episodes, the temporary overall "effective" initial dilution could be diminished as a result of this re-entrainment.

As documented in Appendix O, a volumetric mass-distribution model was used to evaluate potential re-entrainment effects for the 240 mgd (10.5 m^3/sec) PLOO discharge. A total of 13,757 time-series cases were investigated to determine the amount of effluent that re-enters the initial dilution zone during any 30-day period. Any time effluent is carried back into the initial dilution zone, the "effective" initial dilution is reduced. Table II.B-4 summarizes the results of the modeling for the 13,757 time-series cases. As shown in the table, little overall difference exists between the computed effective initial dilution (dilution including the effects of re-entrainment) and the median initial dilution (for the 13,757 test cases) that would have occurred in the absence of any re-entrainment.

It should be noted that the "effective" dilutions after re-entrainment shown in Table II.B-4 occur under short-term conditions (when current reversals may transport previously discharged wastewater back toward the PLOO) and should not be compared with minimum month initial dilutions as defined within the Ocean Plan (which represent monthly average conditions during the minimum month. On a monthly time scale, re-entrainment effects are negligible and the 204:1 initial dilution assigned in Order No. R9-2017-0007 remains valid.

Table II.B-4:
Effective Initial Dilutions Considering Re-Entrainment
240 mgd (10.5 m^3/sec) PLOO Discharge)

PLOO Discharge Flow	Computed Median Month Volumetric Initial Dilution [A,C]	Computed Median Month Effective Dilution Including Re-entrainment [B,C]
240 mgd (10.5 m^3/sec)	338:1	317:1
205 mgd (8.98 m^3/sec)	365:1	317:1

Table II.B-4 Notes:

A Volumetric initial dilution is the initial dilution that would occur in the absence of any re-entrainment. From Appendix M of City of San Diego (1995).

B Computed effective initial dilution (initial dilution incorporating the effects of re-entrainment) for 13,757 time-series cases. Computed for an average background concentration at 67 m (220 ft) depth.

C Values shown above are from Table O-3 within Appendix O.

20 Median current speeds at the 80 m depth. See Table II.B-1.

II.B.6. Ambient Water Quality Conditions During the Period(s) of Maximum Stratification: at the zone of initial dilution (ZID) boundary, at other areas of potential impact, and at control stations: [40 CFR 125.61(a)(2)]

a. Provide profiles (with depth) on the following for the current discharge location and for the modified discharge location, if different from the current discharge:

- **BOD_5 (mg/L)**
- **Dissolved oxygen (mg/L)**
- **Suspended solids (mg/L)**
- **pH**
- **Temperature (°C)**
- **Salinity (ppt)**
- **Transparency (turbidity, percent light transmittance)**
- **Other significant parameters (e.g., nutrients, toxic pollutants and pesticides, fecal coliforms)**

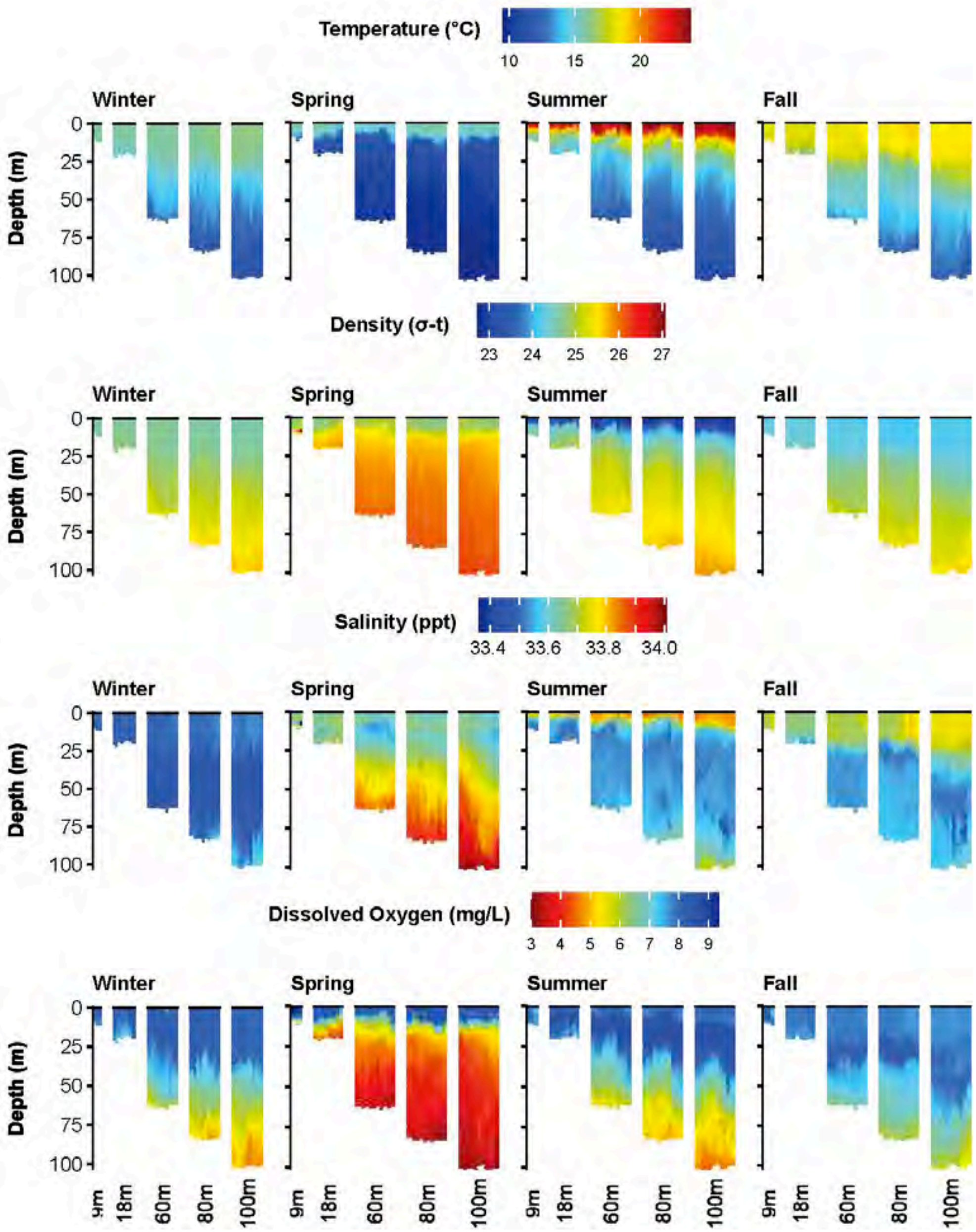
Receiving water quality data collected is electronically submitted to the Regional Board and State Board in monthly, quarterly, and biennial monitoring reports.[21] Within the biennial receiving water reports, City scientists analyze the data and develop conclusions relative to data trends and causative factors. These monitoring reports are incorporated by reference into this 301(h) application. In accordance with an agreement with EPA, these monitoring reports are not reproduced herein, but the City has transmitted these data in electronic format to EPA for review.[22]

Receiving water seasonal depth profiles during 2018 and 2019 for temperature, salinity, DO, pH and chlorophyll α are summarized in Figures II.B-11 through II.B-14. As documented in submitted PLOO biennial receiving water monitoring reports, no discernible differences exist between the ZID station profiles and reference station profiles for DO, TSS, pH, temperature, salinity, percent light transmittance, or other significant parameters.

21 Data are electronically transmitted to regulators via the State of California CIWQS and are summarized in biennial receiving water reports that both present and analyze data. The most recent biennial reports include reports for 2016-2017 (SDPUD, 2018) and 2018-2019 (SDPUD, 2021).

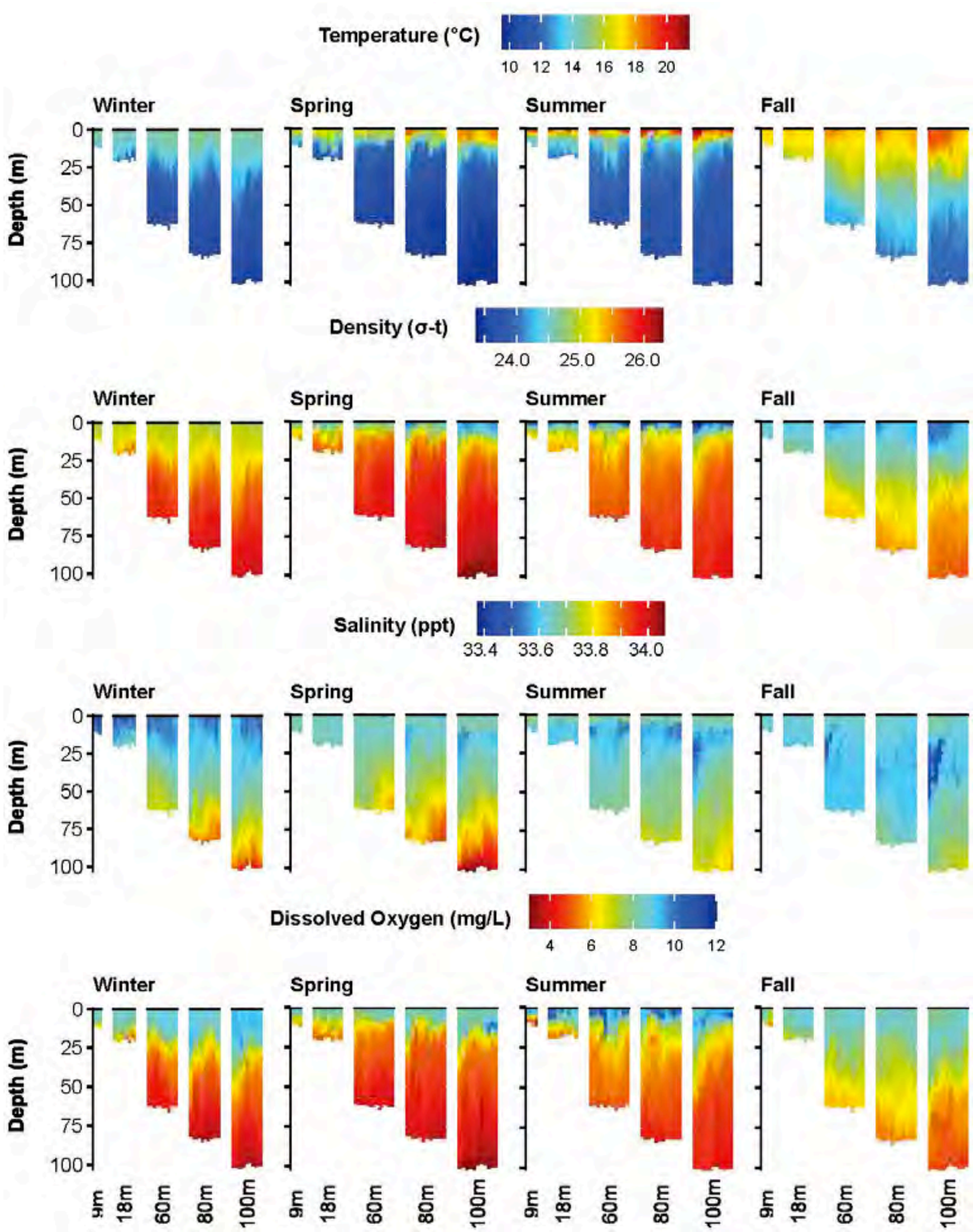
22 Order No. R9-2017-0007 requires the collection of receiving water DO (as a surrogate for BOD) and transmissivity (as a surrogate for TSS).

Figure II.B-11:
PLOO Temperature, Density, Salinity and DO Depth Profiles for Year 2018[23]



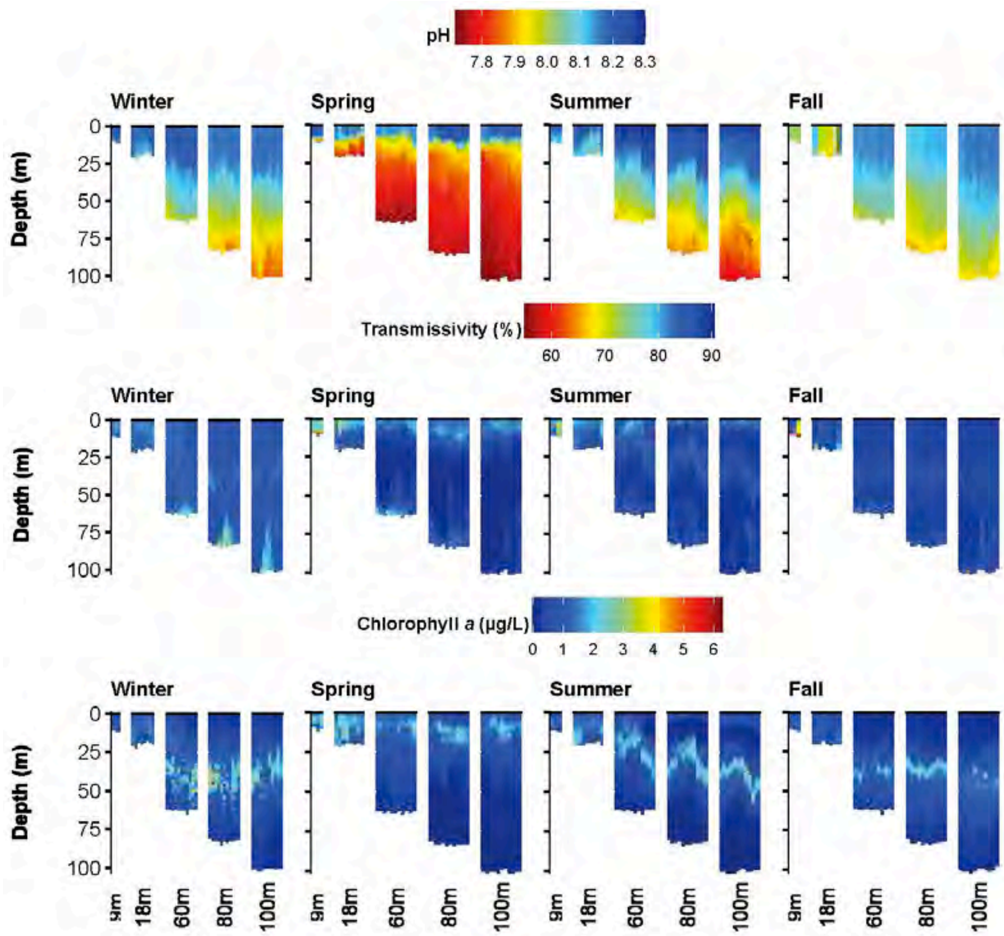
23 From City of San Diego (2021). Within each contour, stations are ordered from most northerly (at right of each seasonal contour group) to most southerly (at left of each seasonal contour group). Stations along the 98 m depth contour (labeled as 100 m in the above figure) include Stations F26 (most southerly) to F36 (most northerly). Stations along the 80 m depth contour include Stations F15 (most southerly) to F25 (most northerly). Stations along the 60 m depth contour include Stations F04 (most southerly) to F14 (most northerly). Stations along the 18 m depth contour include F01, A1, A7, A6, C7, C8, F2 and F3 (most northerly).

**Figure II.B-12:
PLOO Temperature, Density, Salinity and DO Depth Profiles for 2019[24]**



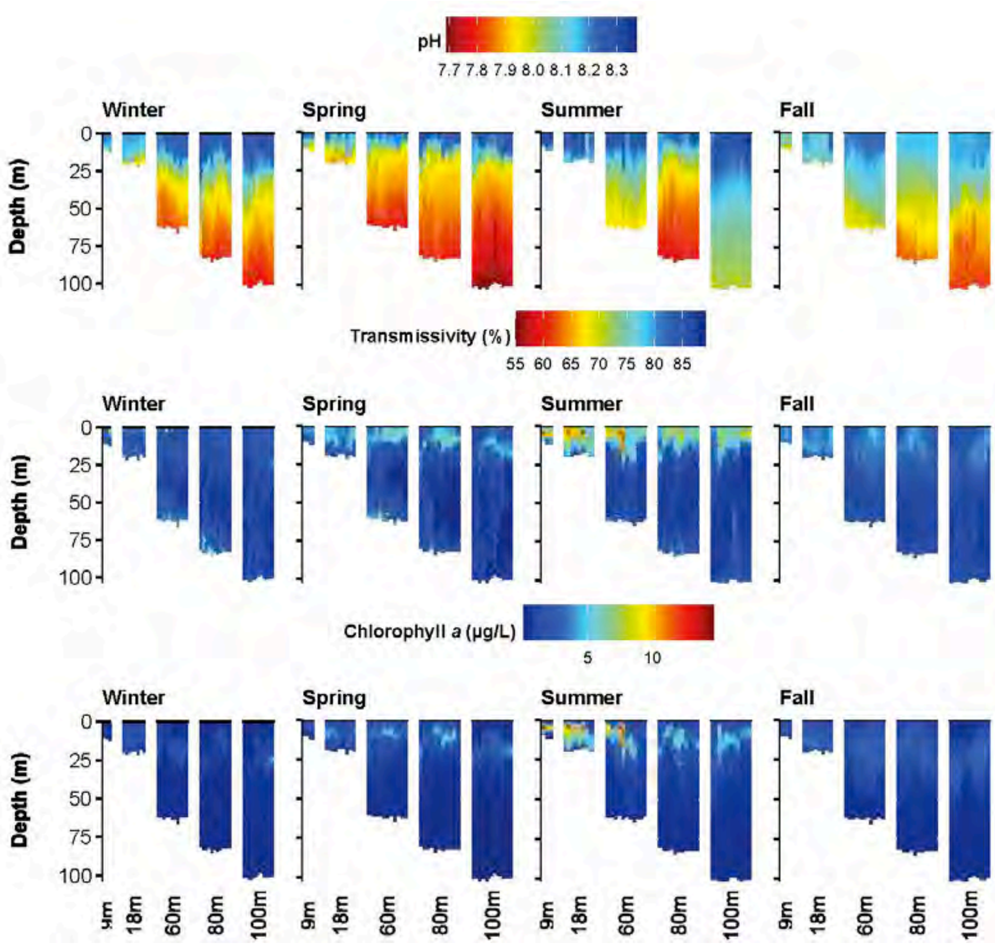
24 From City of San Diego (2021). Within each contour, stations are ordered from most northerly (at right of each seasonal contour group) to most southerly (at left of each seasonal contour group). Stations along the 98 m depth contour (labeled as 100 m in the above figure) include Stations F26 (most southerly) to F36 (most northerly). Stations along the 80 m depth contour include Stations F15 (most southerly) to F25 (most northerly). Stations along the 60 m depth contour include Stations F04 (most southerly) to F14 (most northerly). Stations along the 18 m depth contour include F01, A1, A7, A6, C7, C8, F2 and F3 (most northerly).

Figure II.B-13:
PLOO pH, Transmissivity and Chlorophyll α Depth Profiles for 2018[25]



25 From City of San Diego (2021). Within each contour, stations are ordered from most northerly (at right of each seasonal contour group) to most southerly (at left of each seasonal contour group). Stations along the 98 m depth contour (labeled as 100 m in the above figure) include Stations F26 (most southerly) to F36 (most northerly). Stations along the 80 m depth contour include Stations F15 (most southerly) to F25 (most northerly). Stations along the 60 m depth contour include Stations F04 (most southerly) to F14 (most northerly). Stations along the 18 m depth contour include F01, A1, A7, A6, C7, C8, F2 and F3 (most northerly).

Figure II.B-14:
PLOO pH, Transmissivity and Chlorophyll α Depth Profiles for 2019[26]



26 From City of San Diego (2021). Within each contour, stations are ordered from most northerly (at right of each seasonal contour group) to most southerly (at left of each seasonal contour group). Stations along the 98 m depth contour (labeled as 100 m in the above figure) include Stations F26 (most southerly) to F36 (most northerly). Stations along the 80 m depth contour include Stations F15 (most southerly) to F25 (most northerly). Stations along the 60 m depth contour include Stations F04 (most southerly) to F14 (most northerly). Stations along the 18 m depth contour include F01, A1, A7, A6, C7, C8, F2 and F3 (most northerly).

b. Are there other periods when receiving water quality conditions may be more critical than the period(s) of maximum stratification? If so, describe these other critical periods and provide the data requested in 5.a for the other critical periods. [40 CFR 125.61(a)]

No. The period of maximum stratification represents the most critical period.

The City's 1995 waiver application assessed a number of potentially critical water quality periods for the 10.5 m^3/sec (240 mgd) PLOO discharge, including:

- Periods of maximum stratification.
- Periods of maximum hydraulic loading.
- Potential critical periods associated with seasonal or temporary changes in water quality.
- Potential critical periods associated with exceptional biological activity.
- Potential critical periods associated with low circulation or flushing.

Analyses presented in these 1995 studies remain valid. Appendix P presents a summary of oceanographic conditions and Appendix Q presents the stratification/initial dilution modeling studies. As documented in Appendices P and Q, stratification is the key factor in affecting the degree of initial dilution achieved by the PLOO.[27]

No other factors affect the critical period. No significant seasonal changes in hydraulic loading occur, and no periods of low flushing or low circulation occur in the discharge zone.

Ambient receiving water quality off the coast of Point Loma consistently complies with Ocean Plan water quality objectives, and no water quality-related critical periods occur. None of these factors has as much impact on water quality as the period of maximum stratification.

Maximum thermocline depth typically occurs in or near January or February, which results in minimum initial dilution.[28]

27 Initial dilution can also be significantly affected (increased) by ocean currents, but the Ocean Plan specifies that initial dilution is to be computed assuming zero ocean currents.

28 As the thermocline depth increases, the PLOO discharge is trapped within a smaller volume of water resulting in reduced initial dilution. While maximum thermocline depths typically occur in January or February (sometimes December), temperature gradients across the thermocline are at their minimum during these months as epilimnion waters cool. Thus, the period of greatest thermocline depth typically coincides with the lowest temperature gradient across the thermocline. As surface waters continue to cool, the thermocline can weaken to the point where it is overcome by vertical advective forces associated with surface winds, upwelling, internal waves or buoyant discharges.

As discussed in the response to Question III.A.1, minimum month initial dilution for a flow of 10.5 m^3/sec (240 mgd) is more than 50 percent lower than the projected 338 to 1 median initial dilution. Since no critical periods exist due to seasonal changes in hydraulic loading, water quality, biological activity, or ocean currents, the period of maximum stratification is concluded to represent "worst case" receiving water conditions.

II.B.7. Provide data on steady-state sediment dissolved oxygen demand and dissolved oxygen demand due to resuspension of sediments in the vicinity of your current and modified discharge(s) (mg/L/day).

The City's 1995 301(h) application evaluated steady-state sediment dissolved oxygen demand and dissolved oxygen demand due to resuspension in accordance with computational procedures established within the ATSD.[29]

Theoretical Steady-State Oxygen Demand. As documented within the City's 1995 301(h) application, the initial oxygen demand within the near bottom layer was theoretically computed at 0.096 mg/L/day for a PLOO flow of 205 mgd and 0.102 mg/L/day for a PLOO flow of 240 mgd. Potential organic accumulations downcurrent from the PLOO were estimated at 15.9 g/m^2 for a PLOO flow of 205 mgd to 17.1 g/m^2 for a PLOO flow of 240 mgd.[30] Using computational procedures set forth in Appendix B of the ATSD, the computed sediment demand per square meter of sediments was computed at 170 mg/m^2/day for a PLOO flow of 205 mgd and 183 mg/m^2/day for a PLOO flow of 240 mgd.[31]

Theoretical Resuspension Oxygen Demand. As also documented within the City's 1995 301(h) application, average oxygen demand due to resuspended sediments was estimated to be approximately 0.32 mg/L/day for a PLOO flow of 205 mgd and 0.37 mg/L/day for a PLOO flow of 240 mgd. Potential organic accumulations downcurrent from the PLOO were computed at 18.3 g/m^2 for a PLOO flow of 205 mgd and 20.9 g/m^2 for a PLOO flow of 240 mgd.[32] Using computational assumptions and coefficients specified in the ATSD, the corresponding theoretical oxygen demand of resuspended sediments was computed at 1960 mg/m^2/day for a PLOO flow of 205 mgd and 2240 mg/m^2/day for a PLOO flow of 240 mgd.

No Evidence of Discernible Solids Accumulation. Video surveillance conducted in the PLOO region subsequent to 1995 shows no evidence of visible accumulation of sediment or organic material near the PLOO or upcoast or downcoast from the PLOO. Additionally, receiving water quality

29 EPA (1994). The ATSD sets forth computational procedures for addressing questions within the 301(h) Large Applicant Questionnaire.

30 Computed averages along a 2.6 - 2.7 km path downcurrent from the PLOO diffuser. See Volume III, page III-88 of City of San Diego (1995).

31 These estimates are based on the ATSD-specified assumptions of a sediment decay rate of 0.1 per day and a stoichiometric coefficient of 1.07 mg O_2 per mg of sediment.

32 Computed averages within a zone approximately 1.2 by 0.6 km that surrounds the point of theoretical maximum particle accumulation. See Volume III, page III-89 of City of San Diego (1995).

monitoring and sediment chemistry monitoring show no evidence of any significant particulate accumulation. As a result, the sediment dissolved oxygen demand estimates computed per the ATSD computational procedures represent theoretical values that (1) appear to be overestimated and (2) are not are consistent with visual observations, receiving water quality monitoring, or sediment chemistry monitoring that indicate negligible sedimentation rates. Actual outfall-related sediment dissolved oxygen demand in the vicinity of the PLOO is thus likely nearer to zero than to the above theoretical values computed using procedures set forth in the ATSD.

Supporting this conclusion, Table II.B-5 presents 2020 sediment BOD data for ocean monitoring stations along the 98 m depth contour (the approximate depth of the PLOO discharge). As shown in Table II.B-5, no significant differences existed between winter or summer sediment BOD concentrations in the immediate vicinity of the PLOO diffuser compared to reference stations or stations upcoast or downcoast from the PLOO diffuser.

Table II.B-5:
Sediment BOD Concentrations in 2018 Along the 98 m Depth Contour

Station	Approximate Distance from the Midpoint of the PLOO Diffuser [B]	Sediment BOD Concentration, 2018-2019 [A] (mg/L)		
		Average Value	Maximum Value	Minimum Value
B12 [C]	12.7 km north	416	543	256
B9 [D]	10.6 km north	283	375	213
E26	7.4 km north	268	378	210
E25	4.6 km north	288	367	227
E23	2.9 km north	295	351	246
E20	1.9 km north	272	358	215
E17 [E]	1.0 km north	256	299	181
E14 [F]	0	351	577	204
E11 [G]	1.0 km south	242	270	213
E8	1.9 km south	255	351	202
E5	2.9 km south	221	295	165
E2	4.7 km south	259	325	159

Table II.B-5 Notes:

A Data for years 2018-2019 from Appendix F.5 of San Diego (2021a, 2021b).

B Distance of the listed stations from the mid-point of "wye" PLOO diffuser. Distances are computed using latitude and longitude coordinates of the stations, as defined within Table E-1 of the Monitoring and Reporting Program of Order No. R9-2017-0007.

C Reference station located north of the PLOO off the coast of La Jolla.

D Reference station located north of the PLOO off the coast of Pacific Beach.

E Station located 250 m (820 ft) north of the north end of the north PLOO diffuser leg.

F Station located near the boundary of the PLOO ZID at the wye junction of the PLOO diffuser legs.

G Station located 250 m (820 ft) south of the south end of the south PLOO diffuser leg.

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Regional Water Quality Control Board, San Diego Region (Regional Board) and U.S. Environmental Protection Agency (EPA). 2017. *Order No. R9-2017-0007, NPDES No. CA0107409, Waste Discharge Requirements and National Pollutant Discharge Elimination System Permit for the City of San Diego E.W. Blom Point Loma Wastewater Treatment Plant Discharge to the Pacific Ocean through the PLOO, San Diego County.*

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II.C. BIOLOGICAL CONDITIONS

II.C.1. Provide a detailed description of representative biological community (e.g., plankton, macrobenthos, demersal fish, etc.) in the vicinity of your current and modified discharge(s): Within the ZID, at the ZID boundary, at other areas of potential, discharge-related impact, and at reference (control) sites. Community characteristics to be described shall include (but not be limited to) species composition; abundance; dominance and diversity; spatial and temporal distribution; growth and reproduction; disease frequency; trophic structure and productivity patterns; presence of opportunistic species; bioaccumulation of toxic materials; and the occurrence of mass mortalities.

SUMMARY: A detailed characterization of the pre-discharge biological community within the vicinity of the PLOO discharge was presented in the City's 1995 301(h) waiver application. No significant changes in these communities have occurred in the years after the PLOO discharge was initiated. Current biological conditions in the vicinity of the PLOO are presented in Appendices C1 through C5.

The City's 1995 301(h) application presented a detailed description of the pre-discharge biological community that existed in the PLOO region. Included in this 1995 pre-discharge characterization of the Point Loma biological community were the following:

- A description of the plankton, phytoplankton, zooplankton, macrobenthic invertebrates, demersal fish, the Point Loma kelp bed, marine birds and marine mammals. (Appendix T, Volume XIII of the 1995 waiver application).
- A description of the sediment characteristics and the infaunal and hard bottom communities within and outside the ZID (presented in Appendix U, Volume XIV of the 1995 waiver application).
- An assessment of the bioaccumulation of toxic materials in rig and trawl caught fish (presented in Appendix V, Volume XV of the 1995 waiver application).
- A description of threatened and endangered species found within the Point Loma region (presented in Appendix W, Volume XV of the 1995 waiver application).

Since submittal of the City's 1995 waiver application, the City has continued to conduct a comprehensive monitoring program that assesses water quality, sediment chemistry, benthic organisms, rig-caught fish, and trawl caught organisms. Appendices C1 through C5 present detailed evaluations of how the overall biological communities in the Point Loma area have remained consistent with regional averages.

Appendix H presents an evaluation of beneficial uses, including fisheries, habitat, and recreation. Appendix I presents a detailed description of endangered species that may be found in the PLOO vicinity.

The discharge through the extended PLOO was initiated in November 1993, and pre-discharge monitoring began in 1991, so over three decades of monitoring data are available to assess water quality, sediment, benthic and fish conditions in the vicinity of the PLOO. As documented in Section III.D, the PLOO discharge has not significantly altered the biological communities in the vicinity of the PLOO discharge. Benthic communities around the PLOO continue to be dominated by ophiuroid-polychaete based assemblages. Polychaetes continue to account for the greatest number of species and individuals, and similar assemblages dominate much of the Southern California benthos. Species that dominated prior to construction of the PLOO have remained dominant after more than a quarter century of discharge through the extended PLOO.[1] Since the PLOO discharge was initiated, an increase in species richness has occurred which was initially most pronounced near the outfall, contrary to what would be expected if environmental degradation were occurring.[2]

The PLOO discharge has not significantly affected sediment quality in the vicinity of the PLOO. Post-discharge sediment monitoring shows no visible accumulation of organic material in the vicinity of the PLOO and no significant differences in sediment composition or quality compared to pre-discharge conditions. While a slight increase in coarser sediments was observed in and immediately near the PLOO ZID after the PLOO discharge began, after more than a quarter-century of discharge, there is little evidence of any organic or contaminant loading in the PLOO area. Further, in the more than 28 years since the PLOO discharge was initiated, PLOO mass emissions of solids have decreased significantly, and PLOO mass emissions of metals have decreased to an even greater extent.

Populations of fish in the PLOO vicinity have remained consistently within the range of natural variability found within the SCB, and available evidence (see Section III.D) indicates that fish populations have remained healthy throughout the PLOO area.

II.C.2. a. Are distinctive habitats of limited distribution such as kelp beds or coral reefs) located in areas potentially affected by the modified discharge? [40 CFR 125.61(c)]
b. If yes, provide information on type, extent, and location of habitats.

SUMMARY: The Point Loma kelp bed is the only distinctive habitat of limited distribution in the general vicinity of the discharge point. Several distinctive habitats of limited distribution are located in excess of 4.2 miles (6.8 km) from the discharge point.

Point Loma Kelp Bed. The Point Loma kelp bed is an underwater forest of giant kelp (*Macrocystis pyrifera*) that grows on a mudstone/sandstone terrace from depths of about 7.6 m (25 ft) to about 27 m (89 ft) between 0.8 km (0.5 statute miles or 0.4 nautical miles [nm]) and 1.6 km (1.0 miles or 0.9 nm) from shore. The main portion of the kelp bed is bounded by the southern tip of Point Loma (to the south) and the San Diego River (to the north). The PLOO is 5.6 km (3.5 miles or 3.0 nm) beyond the outer edge of the Point Loma kelp bed. The overall extent of the Point Loma kelp bed varies with oceanographic conditions. A full description of the Point Loma kelp bed and its beneficial uses are provided in Appendix H. Appendix E presents a summary of kelp bed monitoring results for 2014-2020.

1 Dominant polychaetes surrounding the PLOO continue to include the spinoid Spiophanes duplex and the terebellids Proclea sp. and Phisidia sanctamariae. The ophiuroid Amphiodia urtica (brittle star) continues to be the dominant echinoderm in the PLOO region.

2 In recent years, species richness values at near-ZID and more distant stations have been similar.

Underwater research has been conducted in the Point Loma kelp bed since the mid-1950s when Wheeler North of the California Institute of Technology and his associates at SIO began long-term investigations of kelp bed ecology.[3] Professors Paul Dayton and associates at SIO have performed ecological surveys at fixed locations in the Point Loma kelp bed since 1971.[4] These descriptive and experimental studies have established a database unique in the world, and have demonstrated that large-scale, low-frequency episodic changes in oceanographic climate ultimately control kelp forest community structure.

Local biological processes, like recruitment, growth, survivorship, and reproduction, may be driven by small-scale ecological patterns and decade-long shifts in climate (between cold water, nutrient-rich La Niñas and warm water, nutrient-stressed El Niños). Along with these influences, catastrophic storms have been the principal forces governing the diversity and productivity of the kelp forest community at Point Loma. With the single exception of a temporary break in the pipeline conveying wastewater to the offshore outfall whose impact was limited in magnitude and extent, there has been no indication in the extensive research on the Point Loma kelp bed ecosystem of any impact of discharged wastewater. [5,6]

Macrocystis kelp beds have been mapped quarterly in by the Region Nine Kelp Survey Consortium (RNKSC) since 1983.[7] The kelp survey also tracks the ecological impact of anthropogenic and natural influences on local kelp beds including the effects of ocean wastewater discharges.

Table II.C-1 summarizes the results of kelp bed surveys during 2010-2020. For reference, Table II.C-1 also depicts the extent of the La Jolla kelp bed which is removed from the influence of the PLOO. As shown in Table II.C-1, kelp bed size varies significantly from year to year. Factors affecting kelp bed canopy coverage, in part, include ocean temperature, storms, nutrient availability.[8] The Point Loma kelp bed canopy was relatively large (more than 5 km^2) during 2013 through 2015, but decreased in 2016 and 2017 to the smallest sizes measured since 2006. In 2018, the Point Loma kelp bed increased in size considerably, reaching the maximum size observed since the RNKSC surveys began in 1983. Even with the decrease in size observed in 2019, the Point Loma kelp bed remained larger in 2019 than in 2016 or 2017.[9]

3 Early kelp bed studies include: Neushul (1959); North (1964); North and Hubbs (1968).

4 SIO studies include Dayton and Tegner (1984, 1990); Dayton et al. (1992, 2003); Tegner et al. (1995, 1996, 1997); Tegner and Dayton (1987, 1991); Steneck et al. (2002); Graham (2000, 2004); Hewitt et al. (2007); Parnell and Riser (2012); Parnell et al. (2005, 2008, 2010).

5 See Tegner et al. (1995) for an assessment of effects of the PLOO pipeline break.

6 See Appendix E, Kelp Forest Ecosystem Monitoring Summary.

7 *Status of the Kelp Beds in 2019, Orange and San Diego Counties* (MBC Aquatic Sciences, 2020).

8 Tegner et al. (1996).

9 MBC Aquatic Sciences (2020).

Table II.C-1:
Summary of Kelp Bed Canopy Area, 2010-2019 [A]

Year	Kelp Bed Canopy Area (km²)	
	Point Loma Kelp Bed	La Jolla Kelp Bed [B]
2010	3.98	2.78
2011	4.21	2.57
2012	5.34	1.57
2013	5.03	4.01
2014	5.12	2.79
2015	5.81	2.97
2016	3.04	0.93
2017	1.79	0.69
2018	7.92	1.56
2019	3.92	1.23

Table II.C-1 Notes:

A Source: *Status of the Kelp Beds in 2019, Orange and San Diego Counties* (MBC Aquatic Sciences, 2020).

B Data for the La Jolla kelp bed (which is located more than 15 km north of the PLOO) is presented for reference purposes to show the effects of natural oceanographic phenomena on kelp canopy coverage.

The giant kelp surface canopy has been harvested from the Point Loma kelp bed since 1929. During the 1980s and 1990s it was the single most valuable fishery in the vicinity of Point Loma because of the high value of products created from it. The Point Loma kelp bed, the largest kelp bed in San Diego County, was particularly important because of its proximity to the Kelco kelp processing plant in San Diego Bay. In 2005, after 76 years of operation, Kelco shut down kelp harvesting and processing operations.

Kelp harvesting in California is regulated by the California Department of Fish and Wildlife (CDFW). Since 2013, Knocean Sciences has maintained a CDFW lease for harvesting kelp from the southern tip of Point Loma to the south jetty of Mission Bay. In renewing its lease in 2018, Knocean Sciences proposed to harvest a maximum of 200 tons per year of giant kelp during the first two years of the five-year lease renewal, and 2,000 tons per year during years three through five. Knocean Sciences harvests giant kelp from May through November via mechanical harvesting from vessels specially modified for this purpose.[10]

The Point Loma kelp bed is a prime recreational destination for anglers and divers. Appendix H summarizes kelp bed beneficial uses by divers and anglers.

Other Habitats of Limited Distribution. In addition to the Point Loma kelp bed, a number of Areas of Special Biological Significance (ASBS) exist offshore from San Diego. They are located a minimum of 4.2 miles (6.8 km) from the PLOO discharge point. Designated ASBS include

10 Source: MBC Aquatic Sciences (2020).

marine reserves, marine conservation areas, underwater parks, and water quality protection areas and are described in detail in Appendix H and in the response to Question II.D.3.

II.C.3 a. Are commercial or recreational fisheries located in areas potentially affected by the discharge? [40 JCFR 125.61(c)]

b. If yes, provide information on types, location, and value of the fisheries.

SUMMARY: Both commercial and recreational fishing occurs in areas in and near the PLOO discharge. These commercial and recreational fisheries catch a variety of species and represent a multi-million-dollar industry. The various types of fisheries are not affected by the PLOO discharge.

Commercial Fishing. The commercial fishing industry in San Diego is an important element of the regional economy. A full description of San Diego area fisheries is provided in Appendix H.

Fishery catch statistics are reported for large fishery blocks that are 17 km by 20 km (9.2 nm by 10.8 nm) in size. Fish Block 860 is off the coast of Point Loma and includes the PLOO and vicinity. As documented within Appendix H, more than 50 species of fish have been taken in Block 860 in the past five years.

Not all fish caught from Block 860 are brought to port (landed) in San Diego. For example, the large catch of market squid from Block 860 is normally taken by Los Angeles area fishing vessels that return to ports in that area to offload their catch. Since landing data specific to Point Loma are not available, commercial catch values from Block 860 are not known. Landing data that are collected at two harbors adjacent to Point Loma (Mission Bay and San Diego Bay), however, provide a reasonable estimate of the economic contribution of Point Loma's fisheries.

As reported by CDFW (see Figure II.C-1), the value of commercial fish landings at Mission and San Diego Bay exceeded $10 million in 2019. Table II.C-2 summarizes the annual dollar value for the top six commercial fisheries species landed at Mission Bay and San Diego Bay from 2015-2019. Lobster, bigeye tuna and spot prawn were among the most valuable commercial fisheries species during this time period. In 2019, the value of lobster and bigeye tuna accounted for approximately half of the total commercial fisheries value.

Swordfish are also a commercially valuable catch, but swordfish are taken in offshore waters, well beyond the influence of the PLOO. Since the prohibition against trawl nets went into effect in 2003, most spot prawn are now caught in traps set on the sea floor at depths of 183 m to 366 m (600 to 1200 ft). Much of the spot prawn catch off Point Loma goes to supply restaurants featuring live display.

**Figure II.C-1:
Commercial Fisheries Value Landings in San Diego Mission Bay[11]**

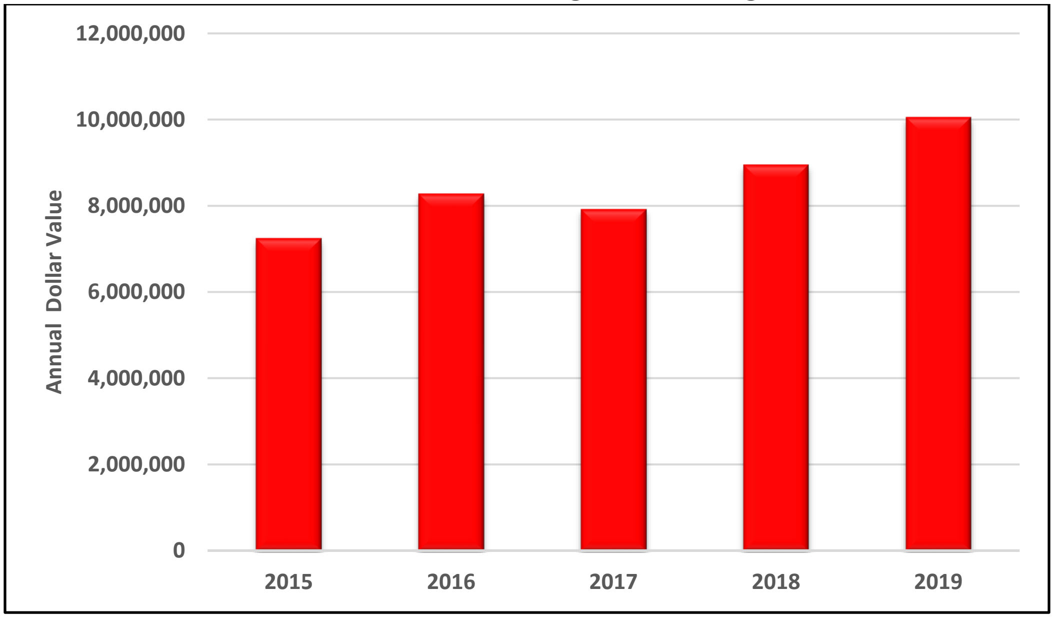


**Table II.C-2:
Top Fisheries Species Value at Mission and San Diego Bay 2015-2019**

Species	Fisheries Value ($) Landed at Mission and San Diego Bay[A,B]				
	2015	2016	2017	2018	2019
Lobster	$2,804,978	$2,431,036	$2,499,424	$2,207,285	$1,441,296
Tuna, Bigeye	$1,715,853	$2,002,529	$2,007,305	$2,704,457	$3,475,039
Urchin	$549,172	$305,114	$187,979	$222,592	$813,155
Spot Prawn	$473,774	$1,032,791	$921,480	$1,011,066	$741,451
Swordfish	$ 330,962	$874,290	$ 706,135	$ 838,031	$ 766,890
Opah	$385,881	$475,907	$350,589	$475,907	$565,132

Table II.C-2 Notes:
A Data from CDFW (2016, 2017, 2018, 2019, 2020).
B Fish landed at Mission Bay or San Diego Bay. Totals include fish harvested from Block 860 as well as other fisheries blocks.

11 Data from CDFW (2016, 2017, 2018, 2019, 2020).

During the past thirty years demand has increased for "live" finfish, primarily to serve markets and restaurants. The primary target species generally weigh 0.5-1.4 kg (1-3 lb) and include sheephead, halibut, scorpionfish, cabezon, lingcod, and several members of the genus *Sebastes* (rockfish). These live fish, presented in saltwater aquaria for individual selection, bring several times the value of their filleted colleagues.

Other notable commercial fisheries in San Diego marine waters include, rock crabs, sea cucumbers, Kellet's Whelk, rockfish, thornyheads, white seabass, California halibut, albacore, thresher shark, sablefish, hagfish, market squid, sardines, anchovies, mackerel, giant kelp, and mariculture. These fisheries are detailed in Appendix H.

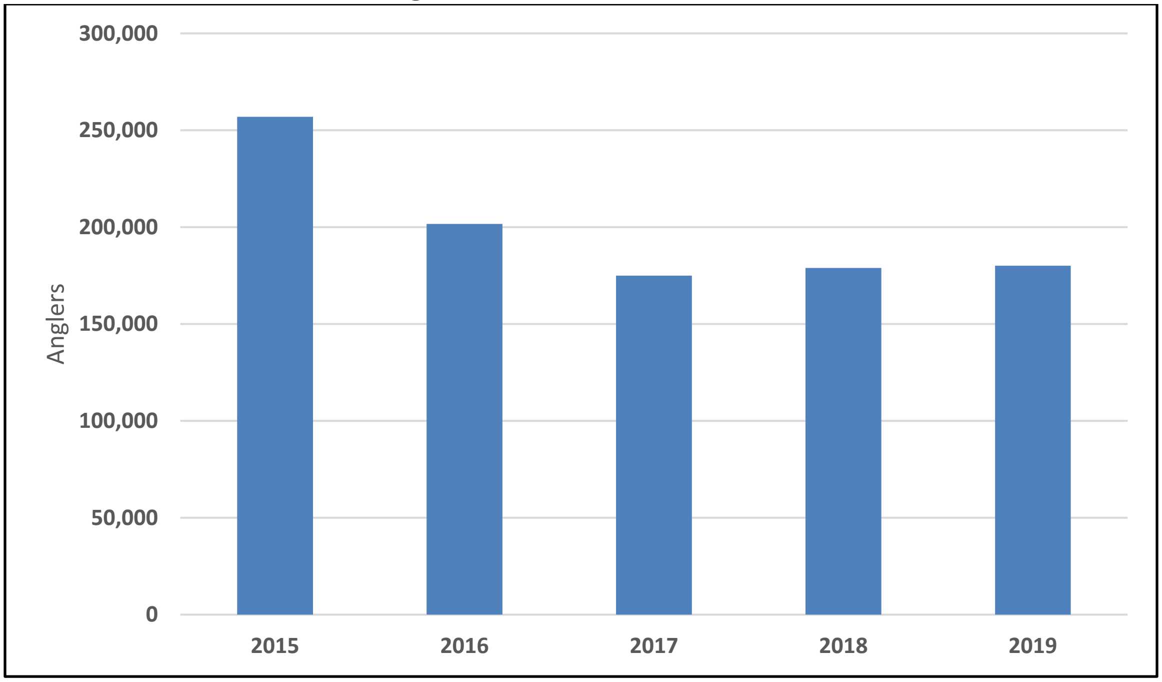
Recreational Fishing. Appendix H summarizes recreational fishing in the Point Loma area. Marine recreational fishing and diving activities along the San Diego coast include surf and shoreline fishing, pier fishing, party boat fishing, private boat fishing, snorkeling, and SCUBA diving. Typical species targeted by recreational anglers include rockfish, Pacific mackerel, kelp bass, sand bass, California barracuda, Pacific bonito, California sheephead, white seabass, California halibut, yellowtail, rockfish, and seasonal, migratory species like tunas.

Much of Point Loma is a military reservation with restricted shoreline access. As a result, shore fishing is limited, and the vast majority of sport fishing is from boats. Recreational boat fishing occurs year-round, although effort markedly increases in the summer months, peaking in July.

At Point Loma, recreational fishing is primarily focused on the extensive Point Loma kelp bed. A flourishing commercial passenger and private fishing vessel fleet (based in San Diego Bay and Mission Bay) operates in the vicinity of Point Loma. Commercial Passenger Fishing Vessels, (CPFVs, commonly called party boats) provide bait, gear rental, food service, fish cleaning, and transportation to fishing grounds for paying passengers on half-day and full day trips. CPFVs mainly fish the outside edge of the kelp bed, as do the majority of private sport fishing boats. Figure II.C-2 summarizes the number of anglers on CPFVs during 2015-2019.

As documented within Appendix H, the vast majority of fish caught by CPFV anglers in 2019 were rockfish (various species). Barred sand bass, kelp bass, dolphin fish, bonito, and scorpionfish were also caught in abundance.

Figure II.C-2:
Number of Anglers Annually Carried by CPFVs
San Diego and Mission Bay CPFV Fleets[12]



In addition to the CFPVs, a number of charter fishing boats also operate out of Mission and San Diego Bay that specialize in half-day and full-day charters. The half-day and full-day charter boats typically fish nearshore areas and kelp beds and target sand and kelp bass and California halibut.

Fishing from private boats typically concentrates on the kelp bed (often mirroring CPFVs positions). This results in private boats and CPFVs landing similar species, with the exception of shellfish species (lobster, crab, rock scallops, and sea urchin) which are taken by sport divers in the nearshore zone. Sport fishing by free divers and SCUBA divers also takes place in and around the Point Loma kelp bed. Abalone can no longer be collected, but lobster and scallops continue to be harvested by hand and a variety of fish are taken by spear. The rip rap boulders covering the outfall pipeline form an artificial reef that contributes to the nearshore recreational fishery catch.

Recreational fishermen are also allowed to take lobsters using hoop nets, which can be deployed by divers or from boats. Kayaks are increasingly being used to fish for lobster using hoop nets.

Sport diving and spearfishing activities mostly occur in the nearshore waters where marine life flourishes, especially in kelp beds and rocky areas. Some of the premier diving in San Diego includes trips to locations only accessible by boat, including the outer reaches of kelp beds,

12 Data from CDFW (2016, 2017, 2018, 2019, 2020).

vessels intentionally sunk as artificial reefs in "Wreck Alley" off of Mission Beach, and offshore islands and banks. Shoreline diving is also popular.

Recreational fishing varies seasonally and is weather related, especially boat fishing off the coast of Point Loma. Summer months have greatest fishing activity. Recreational fishing gradual increases throughout the calendar year beginning in March and diminishing in late fall.

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II.D. STATE AND FEDERAL LAWS

II.D.1. Are there any water quality standards applicable to the following pollutants for which a modified discharge is requested?

- **Biochemical oxygen demand or dissolved oxygen?**
- **Suspended solids, turbidity, light transmission, light scattering, or maintenance of the euphotic zone?**
- **pH of the receiving water?**

SUMMARY. The Ocean Plan establishes numerical effluent limitations, numerical receiving water quality objectives, and narrative receiving water quality objectives to prevent impacts to designated beneficial uses of the state's ocean waters. The Ocean Plan establishes specific objectives that address potential impacts from the discharge of wastewater that contains BOD, TSS, or other pollutants that may inhibit light transmittance and maintenance of the euphotic zone.

Ocean Plan. As noted in the response to Questionnaire Section II.A.4, this application requests modified water quality requirements for BOD and TSS. The Ocean Plan establishes water quality objectives to ensure that discharges of BOD and TSS do not impact beneficial uses of State of California ocean waters.[1] A copy of the 2019 version of the Ocean Plan is presented as Appendix T. The Ocean Plan defines ocean waters as follows:

> *OCEAN WATERS are the territorial marine waters of the State as defined by California law to the extent that these waters are outside of enclosed bays, estuaries, and coastal lagoons. If a discharge outside the territorial waters of the State could affect the quality of the waters of the State, the discharge may be regulated to assure no violation of the Ocean Plan will occur in ocean waters.*

California law defines territorial waters of the state as marine waters that extend to 3.0 nm (3.5 statute miles or 5.6 km) offshore from the coast.

The Ocean Plan establishes numerical effluent limitations, numerical receiving water quality objectives, and narrative receiving water quality objectives to protect beneficial uses of the state's ocean waters. Provision I.A of the Ocean Plan states:

> *Beneficial uses of the ocean waters of the State that shall be protected include industrial water supply; water contact and non-contact recreation, including aesthetic enjoyment; navigation; commercial and sport fishing; mariculture; preservation and enhancement of designated Areas of Special Biological Significance (ASBS); rare and endangered species; marine habitat; fish migration; fish spawning and shellfish harvesting.*

Standards Related to BOD. The discharge of BOD or other oxygen demanding pollutants to the marine environment may potentially:

1 Ocean Plan water quality objectives have been approved by EPA and represent water quality standards as defined within and enforceable under the CWA.

- Result in reduced dissolved oxygen concentrations in sediments or receiving waters
- Increase dissolved sulfide concentrations in sediments
- Provide a source of nutrition that leads to algae blooms or nuisance growth that in turn causes reduction in receiving water dissolved oxygen concentrations, reduced light transmittance, water discoloration, aesthetic impacts, or other objectionable impacts

The degree to which the discharge of BOD may affect the marine environment is dependent on a number of discharge- and site-specific factors, in part including:

- Depth and location of discharge
- Outfall design, ocean currents, temperature and stratification conditions
- Ambient water quality and light transmittance characteristics
- Discharge flow, concentration, and mass emissions of oxygen-demanding pollutants
- Size and settling characteristics of discharged organic particulate matter
- Sediment conditions
- Receiving water assimilative capacity
- Benthic and biological communities in the vicinity of the discharge

The Ocean Plan recognizes that a "one size fits all" BOD effluent concentration standard does not necessarily address or prevent impacts to receiving water quality and beneficial uses. As a result, in lieu of establishing an effluent BOD standard, the Ocean Plan establishes a series of numerical receiving water requirements designed to ensure that the discharge of oxygen-demanding wastes does not adversely impact receiving water quality and beneficial uses. Table II.D-1 presents 2019 Ocean Plan water quality objectives related to wastewater discharges of BOD or other oxygen-demanding wastes.

As shown in Table II.D-1, Ocean Plan receiving water quality objectives related to BOD (or other oxygen-demanding wastes) include receiving water objectives for dissolved oxygen, dissolved sulfides, organic material in sediments, nutrients, and light transmittance. Additionally, the Ocean Plan establishes objectives to prevent degradation (as statistically defined in the Ocean Plan) of marine communities due to the discharge of oxygen-demanding wastes or any other pollutants.

Table II.D-1:
Ocean Plan Objectives to Regulate the Discharge of BOD to Ocean Waters of California

Requirement No.[A,B]	Regulated Parameter [A]	Ocean Plan Water Quality Objective [A]
II.C.2	Receiving water color	The discharge of waste [C] shall not cause aesthetically undesirable discoloration of the ocean surface.
II.C.3	Light transmittance	Natural light shall not be significantly [D] reduced at any point outside the initial dilution zone as a result of the discharge of waste.
II.D.1	Receiving water dissolved oxygen	The dissolved oxygen concentration shall not at any time be depressed more than 10 percent from that which occurs naturally, as a result of the discharge of oxygen demanding waste [C] materials.
II.D.3	Receiving water dissolved sulfides	The dissolved sulfide concentration of waters in and near sediments shall not be significantly [D] increased to levels which would degrade [E] indigenous biota.
II.D.5	Organic materials in marine sediments	The concentration of organic materials in marine sediments shall not be increased to levels that would degrade [E] marine life.
II.D.6	Nutrients	Nutrient materials shall not cause objectionable growths or degrade [E] indigenous biota.
II.E.l	Biological characteristics	Marine communities, including vertebrate, invertebrate, and plant species, shall not be degraded. [E]

Table II.D-1 Notes:

A Water quality objectives established in the 2019 Ocean Plan. See Appendix T.

B Section number within the Ocean Plan where the requirements is established.

C The Ocean Plan defines "waste" as the discharger's total discharge of whatever origin, i.e., gross, not net, discharge.

D As defined by the 2019 Ocean Plan: "Significant difference is defined as a statistically significant difference in the means of two distributions of sampling results at the 95 percent confidence level."

E The Ocean Plan defines degradation as follows: "Degradation shall be determined by comparison of the waste field and reference site(s) for characteristic species diversity, population density, contamination, growth anomalies, debility, or supplanting of normal species by undesirable plant and animal species. Degradation occurs if there are significant differences in any of three major biotic groups, namely, demersal fish, benthic invertebrates, or attached algae."

Standards Related to TSS. The Ocean Plan establishes both effluent and receiving water quality objectives to prevent discharges of suspended solids from adversely impacting beneficial uses of marine waters. Table II.D-2 summarizes Ocean Plan water quality objectives related to the discharge of suspended solids.

Table II.D-2:
Ocean Plan Water Quality Objectives to Regulate the Discharge of TSS to Ocean Waters of California [A]

Requirement No.[A,B]	Regulated Parameter [A]	Ocean Plan Water Quality Objective [A]
II.C.1	Floating particulates	Floating particulates and grease and oil shall not be visible.
II.C.2	Receiving water color	The discharge of waste [C] shall not cause aesthetically undesirable discoloration of the ocean surface.
II.C.3	Receiving water light transmittance	Natural light shall not be significantly [D] reduced at any point outside the initial dilution zone as a result of the discharge of waste.
II.C.4	Solid's deposition in receiving waters	The rate of deposition of inert solids and the characteristics of inert solids in ocean sediments shall not be changed such that benthic communities are degraded. [E]
II.D.6	Nutrients	Nutrient materials shall not cause objectionable growths or degrade [E] indigenous biota.
II.E.l	Biological characteristics	Marine communities, including vertebrate, invertebrate, and plant species, shall not be degraded. [E]
III.B [F]	Effluent TSS and TSS removal	Dischargers shall, as a 30-day average, remove 75% of suspended solids from the influent stream before discharging wastewaters to the ocean, except that the effluent limitation shall not be lower than 60 mg/L.
III.B [F]	Settleable solids	Effluent settleable solids shall not exceed an instantaneous maximum of 3.0 milliliters per liter (ml/L), a weekly (7-day) average of 1.5 ml/L, nor a monthly (30-day) average of 1.0 ml/L.
III.B [F]	Effluent turbidity	Effluent turbidity shall not exceed a maximum of 225 Nephelometric Turbidity Units (NTU), a weekly (7-day) average of 100 NTU, or a monthly (30-day) average of 75 NTU.

Table II.D-2 Notes:

A Water quality objectives established in the 2019 Ocean Plan. See Appendix T.

B Section number within the Ocean Plan where the requirement is established.

C The Ocean Plan defines "waste" as the discharger's total discharge of whatever origin (i.e., gross, not net, discharge).

D As defined by the Ocean Plan: "Significant difference is defined as a statistically significant difference in the means of two distributions of sampling results at the 95 percent confidence level."

E The Ocean Plan defines degradation as follows: "Degradation shall be determined by comparison of the waste field and reference site(s) for characteristic species diversity, population density, contamination, growth anomalies, debility, or supplanting of normal species by undesirable plant and animal species. Degradation occurs if there are significant differences in any of three major biotic groups, namely, demersal fish, benthic invertebrates, or attached algae."

F Section III.B, Table 4 of the Ocean Plan establishes numerical limits governing effluent TSS, TSS removal, settleable solids and turbidity.

State of California Thermal Plan. Requirements governing temperature in wastewater discharges to state-regulated waters are established by the State Board within the *Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California* (Thermal Plan).[2] The Thermal Plan, in part, requires:

- That the maximum temperature of waste discharges shall not exceed the natural temperature of the receiving waters by more than 20° F (6.67° C).
- No discharge shall cause a surface water temperature rise greater than 4° F (2.2° C) above the natural temperature of the receiving water at any time or place.

The PLOO discharge consistently complies with each of the requirements established within the Thermal Plan.

San Diego Region Basin Plan. The Regional Board establishes beneficial uses for the San Diego Region and regional water quality Biology objectives to protect the beneficial uses within the *Water Quality Control Plan for the San Diego* Basin (Basin Plan).[3] To protect designated regional beneficial uses of state-regulated marine waters, the Basin Plan incorporates effluent and receiving water quality objectives established in the Ocean Plan, as follows:

> ***Ocean Plan and Thermal Plan Water Quality Objective***
>
> *The terms and conditions of the State Board's "Water Quality Control Plan for Ocean Waters of California" (Ocean Plan), "Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California" (Thermal Plan) and any revisions thereto are incorporated into this Basin Plan by reference. The terms and conditions of the Ocean Plan and Thermal Plan apply to ocean waters within this Region.*

II.D.2. If yes, what is the water use classification for your discharge area? What are the applicable standards for your discharge area for each of the parameters for which a modification is requested? Provide a copy of all applicable water quality standards or a citation to where they can be found.

SUMMARY: No federal or state water use classification has been established for the discharge area. The Ocean Plan establishes effluent and receiving water quality objectives to prevent the discharge of BOD and TSS from impacting beneficial uses of marine waters. Appendix T presents a copy of the 2019 Ocean Plan.

Water Use Classification. No federal or state water use classification has been established for the discharge area.

Ocean Plan Requirements. As discussed in the response to Questionnaire Section II.D.1, the Ocean Plan establishes a number of effluent limitations and receiving water quality objectives to prevent the discharge of BOD and TSS from adversely impacting beneficial uses of marine waters. Appendix T presents a copy of the current 2019 version of the Ocean Plan.

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2 The Thermal Plan (State Board, 1975) was adopted by the State Board on September 18, 1975.

3 The current version of the Basin Plan (Regional Board, 2021) includes amendments adopted prior to September 1, 2021.

Specific effluent limitations and receiving water quality objectives applicable to discharges of BOD and TSS (and citations where they may be found) are presented in Tables II.D-1 and II.D-2.

II.D.3. Will the modified discharge: [40 CFR 125.59(b)(3)]

- **a. Be consistent with applicable State coastal zone management program(s) approved under the Coastal Zone Management Act as amended 16 U.S.C. 1451 *et seq*? (See 16 U.S.C. 1456(c)(3)(A))**
- **b. Be located in a marine sanctuary designated under Title III of the Marine Protection, Research and Sanctuaries Act (MPRSA) as amended, 16 U.S.C. 1431 *et seq*. or in an estuarine sanctuary designated under the Coastal Zone Management Act as amended, 16 U.S.C. 1461? If located in a marine sanctuary designated under Title III of the MPRSA, attach a copy of any certification or permit required under regulations governing such marine sanctuary (See 16 U.S.C. 1432(f)(2))**
- **c. Be consistent with the Endangered Species Act, as amended, 16 U.S.C. 1531 *et seq*? Provide the names of any threatened or endangered species that inhabit or obtain nutrients from waters that may be affected by the modified discharge. Identify any critical habitat that may be affected by the modified discharge and evaluate whether the modified discharge will affect threatened or endangered species or modify a critical habitat (See 16 U.S.C. 1536(a)(2)).**

SUMMARY: The PLOO discharge will be consistent with provisions of the Coastal Management Act, Marine Protection, Research, and Sanctuaries Act, and Endangered Species Act.

Coastal Management. The State of California regulates activities within a designated coastal zone through seven regional Coastal Commissions. Coastal Commission regulatory authority over waste discharges to the ocean is limited to:

- Considering treatment plant siting issues
- Treatment plant aesthetics
- New volumes of sewage originating within the coastal zone

The PLWTP and PLOO are within the coastal zone regulated by the San Diego Coast Region of the State Coastal Commission. Each of these existing facilities was constructed and operates in accordance with permits issued by the San Diego Coast Region. Additionally, improvements to these facilities have been implemented in accordance with San Diego Coast Region permits. The City's prior 301(h) waiver application presented information on prior Coastal Development permits for existing PLWTP treatment, conveyance, disposal facilities, or improvement projects.

Table II.D-3 summarizes the status of coastal development permits for recent or ongoing PLWTP maintenance/improvement projects.

Table II.D-3: Coastal Development Permits, Exemptions and Waivers PLWTP Maintenance or Improvement Projects

Coastal Development Permit Number	Type of Action	Point Loma Facility or Project	Effective Date
6-02-0134	Coastal Development Permit	Demolish old headworks building, construct new headworks building with grit removal facilities	March 4, 2003
6-11-041-W	Permit Waiver	Outfall piping anode bed	July 14, 2011
6-13-0220-X	Exemption letter	Building roof repairs	May 7, 2013
6-13-0766-W	Permit waiver	PLWTP retaining wall; extension of footing and railings	January 10, 2014
6-16-0094-W	Permit waiver	Cleaning, hauling and disposing of digester sludge residuals from Digesters 7, S1 and S2	April 28, 2016
6-18-0334-X	Exemption letter	Erosion control curb	September 13, 2018
6-19-0355-W	De minimis waiver	Construct concrete slab and three 10-foot-high storage units	August 8, 2019
6-19-0398-X	Exemption letter	Cleaning, hauling and disposing of digester sludge residuals from Digesters C1 and C2	November 22, 2019
6-21-0339-X	Exemption letter	Geotechnical potholes and borings	November 16, 2021

Upon EPA issuance of the EPA Tentative Decision on the PLOO 301(h) application for modified secondary treatment requirements, the City of San Diego will request that the California Coastal Commission, San Diego Coast Region, provide a determination that the existing and proposed discharge is in accordance with applicable coastal zone management requirements.

Marine Sanctuary. The PLOO discharge is not located in a marine sanctuary. A number of Marine Protected Areas (MPAs), however, exist within San Diego County. These include marine reserves, marine conservation areas, underwater parks, ASBS, and water quality protection areas. These reserves and protected areas are located a minimum of 6.8 km (4.2 miles) from the PLOO discharge point. A full description of these MPAs is provided in Appendix H.

MPAs are discrete geographic marine or estuarine areas seaward of the mean high tide line or the mouth of a coastal river, including any area of intertidal or subtidal terrain, together with its overlying water and associated flora and fauna, that have been designated by law or administrative action to protect or conserve marine life and habitat.

ASBS are areas of the ocean that support a unique variety of marine life and have been designated as particularly worthy of protection from pollution and degraded water quality. The State Board designates and manages ASBS, and the Ocean Plan prohibits discharge of waste into an ASBS and requires that outfalls be located at a sufficient distance away from an ASBS to assure the maintenance of natural water quality conditions.

In addition, California State Water Quality Protection Areas (SWQPAs) are designated to protect marine species or biological communities from an undesirable alteration in natural water quality. All State Board ASBS designations are now also classified as a subset of SWQPAs and require special protections afforded by the Ocean Plan. Six ocean MPAs are within 24 km (15 miles) of Point Loma:

- *The Tijuana River Mouth State Marine Conservation Area* extends along the shoreline from Imperial Beach 3.7 km (2.3 miles) south to the Mexican Border and offshore to a depth of 17 m (55 ft). It is geographically connected with Tijuana River National Estuarine Research Reserve and the Tijuana Slough National Wildlife Refuge creating the most intact contiguous estuarine/marine complex in southern California.
- *The Cabrillo State Marine Reserve* extends 2 km (1.3 miles) along the southern Point Loma shore and out to a depth of 9 m (30 ft). It incorporates the previously established Mia J. Tegner Point Loma State Marine Conservation Area. The Cabrillo State Marine Reserve (SMR) includes a nearshore portion of the Point Loma kelp bed, along with rocky, sandy beach and intertidal habitat, surf grass, and shallow rock reef habitat. It is adjacent to and contiguous with the Cabrillo National Monument. The seaward boundary of the Cabrillo SMR is approximately 6.8 km (4.2 miles or 3.7 nm) inshore from the Point Loma outfall.
- *South La Jolla State Marine Conservation Area* lies adjacent to and west of the South La Jolla SMR and extends to the limit of state jurisdiction 5.6 km (3.5 miles or 3 nm) offshore in depths from 54 m to 84 m (177 to 275 ft). The South La Jolla State Marine Conservation Area (SMCA) has a shared northern and southern boundary with the South La Jolla SMR Reserve: from Palomar Avenue in La Jolla to Diamond Street in Pacific Beach, encompassing 3.2 km (2 miles) of shoreline.
- *South La Jolla State Marine Reserve* is adjacent to and east of the South La Jolla SMCA with a shared northern and southern boundary: from Palomar Avenue in La Jolla to Diamond Street in Pacific Beach. It ranges in depth from 0 to 54 m (0 to 177 ft).
- *Matlahuayl State Marine Reserve* is just north of Point La Jolla. It has an alongshore span of 1.9 km (1.2 miles) with depths ranging from 0 to 101 m (0 to 331 ft). Approximately 22.2 km (13.8 miles or 12 nm) north of the PLOO, the Matlahuayl SMR protects near-shore habitat that supports research activities of the Scripps Institution of Oceanography (SIO). It encompasses the San Diego-La Jolla Ecological Reserve ASBS. This is the closest ASBS/SWQPA to the PLOO. The other ASBS/SWQPA in San Diego County is part of the San Diego-Scripps Coastal State Marine Conservation Area to the north. The Matlahuayl SMR is part of the 5,977-acre (9.3 square miles) San Diego-La Jolla Underwater Park which was dedicated by the San Diego City Council in 1970 to protect the natural ecology and environment. The Park extends from Alligator Point in La Jolla north to Del Mar and out to a distance of 2440 m (8,000 ft) from shore.
- *San Diego-Scripps Coastal State Marine Conservation Area* is adjacent to and north of the Matlahuayl SMR. The SMR spans 1.8 km (1.1 mi) of shoreline and extends across depths of 3 to 112 m (10 to 368 ft). It incorporates the San Diego Marine Life Refuge adjacent to the SIO. In 1929, the California State Legislature granted the University of California "sole possession, occupation, and use" of the intertidal zone and subtidal zone to 300

m (1,000 ft) offshore along the 789 m (2,600-foot-long) SIO oceanfront. This area was designated as the San Diego Marine Life Refuge in 1957 and was included in the University of California's Natural Reserve System in 1965. It is also part of the San Diego-La Jolla Underwater Park and incorporates the San Diego-Scripps ASBS/SWQPA.

Endangered Species. Detailed descriptions of endangered species possibly occurring in the vicinity of the PLOO, and potential outfall impacts are presented in Appendices H and I. State and federal regulations to identify and protect endangered or threatened species include the following:

Endangered Species Act. The Endangered Species Act (ESA) of 1973 (16 U.S.C. §§ 1531 et seq.) establishes protection over and conservation of endangered species and the ecosystems on which they depend. An endangered species is a species that is in danger of extinction throughout all or a significant portion of its range. The ESA establishes procedures for nominating species for protection and prohibits actions that would jeopardize their continued existence. All federal agencies are required to implement protection programs for endangered species and to use their authority to further the purposes of the ESA.

Marine Mammal Protection Act. The Marine Mammal Protection Act (MMPA) of 1972 (16 U.S.C. §§ 1361 et seq.) creates the authority to protect marine mammals in waters or on lands under U.S. jurisdiction. The MMPA defines federal responsibility for conserving marine mammals (whales, dolphins, porpoises, seals, sea lions, and sea otters). The MMPA prohibits harassing, capturing, disturbing, or, killing marine mammals except under special permit. It creates a Marine Mammal Commission, Regional offices, and Fisheries Science Centers to implement research and protection.

California Endangered Species Act. The California ESA of 1970, amended in 1984, is part of the California Fish and Wildlife Code and is administered by the CDFW. The California ESA establishes measures to conserve, protect, restore, and enhance endangered species and their habitats. Certain species that are not recognized as endangered under the federal ESA may be listed as endangered under the California ESA. The provisions included in the California ESA generally parallel those in the federal ESA, but also apply to species petitioned for listing (i.e., state candidates).

As shown in Table II.D-4, twenty-eight endangered species covered under the federal ESA, the federal MMPA, and/or the California ESA may occur in the vicinity of Point Loma. These include eight marine mammals, seven birds, five sea turtles, six fish, and two invertebrates. Their status and distribution are summarized in the following paragraphs and discussed in detail in Appendices H and I.

Marine Mammals. Two types of marine mammals pass through or inhabit San Diego coastal waters: cetaceans and pinnipeds. Cetaceans include whales, dolphins and porpoises, while pinnipeds include sea lions and seals. There are no endangered dolphins or porpoises in the San Diego area. Of the eight species of great whales that may pass by Point Loma, seven are endangered: the blue whale, the fin whale, the humpback whale, the right whale, the sei whale, the sperm whale, and the western North Pacific stock of the gray whale.

Two geographic distributions of gray whales exist in the North Pacific. The eastern North Pacific stock found along the Pacific coast of North America and the western North Pacific stock primarily found along the coast of eastern Asia. The eastern North Pacific stock was once listed as endangered under the ESA but was delisted in 1994 based on evidence that the population had nearly recovered to its estimated original population size and was not in danger of extinction throughout all or a significant portion of its range. The western North Pacific stock of gray whales has not recovered. It is listed as endangered under the ESA and depleted under the MMPA. Although western and eastern stocks of gray whales were thought to be relatively isolated from each other, recent satellite tagging data and photo-identification and genetic matches have shown that some western North Pacific gray whales may migrate across the northern Gulf of Alaska to join the eastern stock which may pass by Point Loma toward their calving grounds along Baja California, Mexico.

Table II.D-4:
Endangered and Threatened Species that May Occur in the Vicinity of Point Loma [A]

Category	Common Name	Species Name	Status
Marine Mammals	Blue Whale	*Balaenoptera musculus*	Endangered
	Fin Whale	*Balaenoptera physalus*	Endangered
	Guadalupe Fur Seal	*Arctocephalus townsendi*	Threatened
	Humpback Whale	*Meaptera novaeangliae*	Endangered
	Northern Right Whale	*Eubalaena japonica*	Endangered
	Sei Whale	*Balaenoptera borealis*	Endangered
	Sperm Whale	*Physeter macrocephalus*	Endangered
	Western North Pacific Gray Whale	*Eschrichtius robustus*	Endangered
Birds	California Least tern	*Sterna antillarum browni*	Endangered
	Light-footed Clapper Rail	*Rallus longirostris levipes*	Endangered
	Guadalupe Murrelet	*Synthliboramphus hypoleucus*	Threatened
	Marbled Murrelet	*Brachyramphus marmaoratus*	Threatened
	Scripp's Murrelet	*Synthlibramphus scrippsi*	Threatened
	Short-tailed Albatross	*Phoebastria albatross*	Endangered
	Western Snowy Plover	*Charadrius alexandrines nivosus*	Threatened
Sea Turtles	Green Sea Turtle	*Celonia mydas*	Endangered
	Hawkbill Sea Turtle	*Eretmochelys imbricata*	Endangered
	Leatherback Sea Turtle	*Dermochelys coriacea*	Endangered
	Loggerhead Sea Turtle	*Caretta Colonia*	Endangered
	Olive Ridley Sea Turtle	*Lepidochelys olivacea*	Endangered
Fish	Chinook Salmon	*Oncorhynchus tshawytscha*	Threatened
	Giant Manta Ray	*Manta birostris*	Threatened
	Green Sturgeon	*Acipenser medirostris*	Threatened
	Ocean Whitetip Shark	*Carcharhinus longimanus*	Threatened
	Scalloped Hammerhead Shark	*Sphyrna lewini*	Endangered

Category	Common Name	Species Name	Status
	Steelhead Trout	*Oncorhynchus mykiss*	Endangered
Mollusks	White Abalone	*Haliotis sorenseni*	Endangered
	Black Abalone	*Haliotis cracherodii*	Candidate

Table II.D-4 Notes:
A See Appendices H and I for details.

Seals and Sea Lions. Numerous sea lions and seals inhabit coastal waters off Point Loma, and regularly haul out on land to rest, breed, and give birth. The Guadalupe fur seal (*Arctocephalus townsendi*) is the only listed pinniped that may be an occasional (albeit uncommon) visitor to San Diego offshore waters. Severely reduced by hunting in the 1800s, Guadalupe fur seal population is now in the process of recovering[4] and is listed as threatened under the ESA and depleted under the MMPA.

Birds. Of the seven species of endangered birds in Table II.D-4, only the California least tern is regularly encountered in marine waters off Point Loma. California least terns are distributed along the U. S. Pacific Coast from San Francisco to Baja California and forage in nearshore ocean waters, bays, and salt marshes. They plunge-dive to capture prey, usually within 1.6 km (1.0 miles or 0.9 nm) from shore in waters less than 18 m (60 ft) deep. Prey species include anchovies, smelt, and gobies. The California least tern was federally listed as endangered in 1970 and was listed as endangered by the State of California in 1971.

Two endangered bird species inhabit coastal shore areas. The light-footed clapper rail inhabits coastal marshes and wetlands while the western snowy plover inhabits, feeds and breeds on coastal beaches. Western snowy plovers' nest in San Diego Bay along the Silver Strand and at the south San Diego Bay Saltworks. They are occasional visitors to the Point Loma shoreline.

The last four bird species in Table II.D-4 (the Guadalupe murrelet, marbled murrelet, Scripps' murrelet, and short-tailed albatross) are strictly sea birds, usually found well offshore in southern California waters.[5] These endangered birds would rarely be seen in the Point Loma area.[6]

Sea Turtles. The five species of sea turtles that occasionally visit San Diego ocean waters include the green, loggerhead, leatherback, olive Ridley, and hawksbill turtles. Each of these species are listed as endangered under the ESA, but no critical turtle habitat has been designated within the San Diego Region. NOAA Fisheries[7] (also known as the National Marine Fisheries Service, or NMFS) and the U.S. Fish and Wildlife Service[8] (USFWS) share federal jurisdiction for sea turtles, with NOAA Fisheries having lead responsibility in the marine environment and USFWS having lead responsibility on nesting beaches.

4 Gallo (1994).
5 USDON (2013).
6 UCSD (2013).
7 NOAA Fisheries, also known as the National Marine Fisheries Service, is an office of the National Oceanic and Atmospheric Administration (NOAA) within the Department of Commerce.
8 USFWS is within the Department of the Interior.

All five species of sea turtles forage along the California coast in the summer and early fall when sea temperatures are warmest.[9] No known sea turtle nesting sites exist in the San Diego area or anywhere on the west coast of the United States.[10]

Most commonly seen in San Diego marine waters, the east Pacific green sea turtle nests on beaches of the Pacific coast of Mexico and ranges throughout the north Pacific Ocean. In the past, green sea turtles have aggregated at the southern end of San Diego Bay at the South San Diego Bay National Wildlife Refuge, which provides a protected foraging and rest area. Turtles had been attracted to the South Bay area because of the warm water effluent from the South Bay Power Plant. The power plant closed in 2010, however, which may impact the movement of resident turtles. The turtles are known to be part of the eastern Pacific DPS (Distinct Population Segment) which migrate thousands of miles to lay their eggs on beaches in Mexico. Collisions with boats represents the largest threat to the turtles in San Diego Bay.[11]

Loggerhead turtles in the northern Pacific are only known to nest in southern Japan. Most recorded sightings in California are juveniles. The majority of loggerheads observed in the eastern North Pacific Ocean are juveniles, believed to have come from nesting beaches in Japan.[12]

While most sea turtles prefer to live in warm waters, the leatherback can be found in colder waters in higher latitudes.[13] These large sea turtles feed mostly on jellyfish and nest in the tropics and subtropics. Along the western U.S. coast, leatherbacks are mostly seen in waters over the continental slope, with greatest densities off central California.[14]

The olive Ridley turtle is the smallest sea turtle in Pacific waters. In San Diego waters, loggerheads, leatherbacks, and olive Ridleys are most often seen well offshore, unlike green sea turtles which tend to hug the shoreline.[15]

Like other Pacific sea turtles, the hawksbill turtle makes vast oceanic excursions and can occur off the U. S. west coast.[16] There have been few hawksbill sightings north of Baja California Sur and its appearance in San Diego waters would be extremely unlikely.[17]

Fish. Two species of fish are listed as endangered, and four species are listed as threatened. Endangered species include the hammerhead shark and steelhead trout. The scalloped hammerhead shark is ESA endangered for the eastern Pacific DPS. While this shark has a global distribution, it is threatened by overfishing and bycatch.[18]

Steelhead occurred historically in all San Diego County watersheds that drain into the ocean.[19] Currently, steelhead in southern California range only as far south as San Mateo Creek in

9 Eckert (1993).
10 USDON (2013).
11 SPAWAR (2016).
12 USDON (2013).
13 Dutton (2006).
14 NMFS (2021a).
15 USDON (2013).
16 NMFS (2021b).
17 USDON (2013).
18 USFWS (2021).
19 NMFS (2021c).

northern San Diego County.[20] Both steelhead and chinook salmon are occasionally caught in ocean waters off San Diego but do not enter streams in the San Diego Metropolitan area.

Threatened species include the chinook salmon, giant manta ray, green sturgeon and ocean white-tipped shark. The Oceanic Whitetip Shark is ESA threatened throughout its range that includes the west coast. Their main threat is bycatch in commercial fisheries combined with demand for its fins. The Giant Manta Ray is the world's largest ray and exists in sparse populations distributed across the world. The main threat to manta rays is commercial fishing, both overfishing and bycatch.

The Green Sturgeon lives both fresh and salt water. Populations of green sturgeon have significantly declined in the past century to loss of freshwater spawning habitat, contaminants, bycatch, poaching, invasive species, impassable barriers and unfavorable water conditions. The species was listed as threatened in 2007 and critical habitat was designated in 2009. None of the critical habitat exists in the Point Loma area.[21]

Mollusks. White abalone was historically found from Punta Abreojos, Baja California, Mexico, to Point Conception, California.[22] Inhabiting deeper water than any other abalone species, white abalone in southern California typically occur from 18 m to 59 m (60 to 195 ft), with the highest densities between 40 m and 50 m (131 and 164 ft).[23] The State of California suspended all forms of harvesting of the white abalone in 1996 and, in 1997 imposed an indefinite moratorium on the harvesting of all abalone in central and Southern California.[24] The white abalone was federally listed as an endangered species on 29 May 2001.[25] Except for some isolated survivors, the species is currently distributed only around the Santa Barbara Channel Islands, San Clemente Island, and along various banks far offshore from Point Loma.[26]

Black abalone inhabits the intertidal and shallow subtidal zones where it has been easily targeted for exploitation by recreational and commercial fishing.[27] The State of California imposed a moratorium on black abalone harvesting 1993 and adopted an Abalone Recovery Management Plan 2005.[28] The black abalone was listed as endangered under the ESA in 2009.[29] Critical habitat was designated for black abalone in 2011, which extends north of the Palos Verdes Peninsula and in waters surrounding Santa Catalina Island and the Channel Islands.[30]

Effects of PLOO Discharge on Endangered Species. Endangered and threatened species in southern California are subject to a variety of natural and human influences that may have the potential to:

- Alter the physiology, behavior, growth, and reproduction of individual species

20 USDON (2013).
21 NMFS (2021d).
22 NMFS (2021e).
23 Butler et al. (2006).
24 NMFS (2008).
25 NMFS (2001).
26 Stierhoff et al. (2012, 2014).
27 NMFS (2021f).
28 California Department of Fish and Game (2005).
29 NMFS (2009).
30 NMFS (2011).

- Shift patterns of larval dispersal and recruitment
- Modify the composition of ecological communities
- Change the structure, function, productivity, and resilience of marine ecosystems

Natural and human influences that may cause such impacts may include:

- Changes in climate or wide-scale oceanographic regimes
- Deterioration, destruction or modification of marine habitat
- Fishing (overfishing, entanglement in fishing gear)
- Vessel strikes
- Noise
- Disease and parasitism
- Bioaccumulation of natural or synthetic toxic chemicals
- Algal blooms

The PLOO has no discernible influence on the climate, wide-scale oceanographic regimes, fishing-related effects on endangered species, vessel strikes or noise.[31] Long-term assessment of rig-caught fish also show no evidence of disease and parasitism in the vicinity of the PLOO.

Bioaccumulation. Marine organisms can absorb dissolved chemicals directly from seawater (by the gills or epidermis), and indirectly through contact with sediment, by ingesting sediment particles or suspended particulate matter, and through assimilation from food organisms.[32] Chemical compounds accumulate in an organism's tissue if they cannot be metabolized and eliminated faster than they are absorbed. Tissue concentration can also increase as these chemicals are passed through the food web from lower to higher trophic levels.[33] The degree to which bioaccumulation occurs depends on the solubility, particle affinity, oxidation state, volatility, and degradability of the specific chemical.[34] These differences determine how chemical compounds are distributed within biological communities and throughout the environment.[35] The potential impacts of bioaccumulation by marine organisms include comprised immune response and disease resistance, altered behavior, diminished breeding success, developmental abnormalities, population declines via direct mortality, and shifts in the composition of communities by affecting top predators and keystone species.[36]

31 While PLOO monitoring requirements necessitate numerous boat trips to collect receiving water, sediment and biological data, no evidence exists that this monitoring activity has any discernible effect on endangered or threatened species. No evidence also exists that the PLOO causes changes in commercial or recreational fishing that could impact endangered species.

32 Newman (2009).

33 Bienfang et al. (2013); Daley et al. (2014); Weis (2014).

34 Laws (2013).

35 Whitacre (2014).

36 Newman (2009); NAVFAC (2013).

The species most at risk from bioaccumulation of toxic compounds are those at the highest trophic levels, especially marine mammals.[37] Marine mammals are vulnerable to bioaccumulation because they have long life spans and large blubber stores that can serve as repositories for lipophilic chemicals.[38] Birds and other fish-eating species may also be subject to potential bioaccumulation effects. In addition to direct effects, bioaccumulation of anthropogenic contaminants may also increase susceptibility to other stressors including parasitism and disease.[39]

Regional evaluations have shown that virtually all bottom-dwelling fish populations in southern California have detectable levels of DDT and PCBs as a result of discharge practices long-since discontinued.[40] The highest concentrations are on or near the Palos Verdes shelf off Whites Point in Los Angeles, an area with highly contaminated sediments caused by historical discharge practices. Fish tissue burdens of DDT and PCBs decline to the north and south across the SCB. Concentrations of chlorinated hydrocarbons in fish from reference areas are now less than 5 percent of levels measured two decades ago.[41] As documented in Appendix C5, contaminant burdens in fish tissues at Point Loma are comparable to those at reference sites beyond the influence of the PLOO. As a result, species feeding in the Point Loma area should not be exposed to a higher risk of bioaccumulation from the discharge of treated wastewater.

The term "Contaminants of Emerging Concern" (CEC) is being used to describe a variety of anthropogenic contaminants that may potentially pose an environmental threat. A significant number of substances are considered as CECs, including a variety of pharmaceuticals, veterinary medicines, personal-care-products, antifoulants, biocides, hormones, hormone-like substances, flame retardants, and industrial chemicals among others. It is estimated that over 100,000 of these constituents are currently on the world-wide market, with thousands of new ones being introduced every year.[42] Urbanization of coastal locations can result in the discharge of CECs into the marine environment. Sources may include industries, non-point source urban runoff, treated wastewater discharges and agriculture runoff.[43] Whereas marine research and monitoring has historically focused on legacy toxic pollutants such as DDT and PCBs etc., marine monitoring programs are being upgraded to analyze for CECs. Monitoring for CECs is challenging, as approved analytical methods do not exist for many CECs. Additionally, a lack of toxicological information on the effects of many CECs renders it difficult to evaluate monitoring results and identify potential impact thresholds.[44]

No definitive information is available that indicates that endangered species are affected by CECs as a result of the discharge through the PLOO. Additionally, the potential CEC-related risk associated with the PLOO discharge is reduced as:

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37 O'Hara and O'Shea (2005); Tornero et al. (2014).
38 Moore et al. (2013).
39 O'Hara and O'Shea (2005); Bossart (2011).
40 SCCWRP (2012).
41 Allen et al. (2011)
42 Bellas et al. (2020).
43 Scott et al. (2012).
44 *Ibid.*

- None of the endangered or threatened species are permanent residents of the PLOO area,
- Endangered species that may be temporarily present in the PLOO area are either rarely present or are transitory in nature,
- Receiving water quality in the vicinity of the PLOO is similar to receiving water quality at reference stations beyond the influence of the PLOO for all monitored physical, chemical and toxic parameters,
- Tissue monitoring in fish caught in the PLOO area (see Appendix C5) show no effects of bioaccumulation with respect to toxic metals, chlorinated hydrocarbons, pesticides, or polyaromatic hydrocarbons, and fish tissue contaminant levels in the Point Loma area are similar to those at reference sites beyond the influence of the PLOO,
- Fish populations in the PLOO area are healthy and lack physical abnormalities such as fin erosion or tumors,
- Sediment monitoring in the PLOO area (see Appendices C1 and C3) shows no discernible accumulation of toxics,
- Kelp forest monitoring in the PLOO area (see Appendix E) shows no discernible adverse effects on the kelp bed or kelp bed habitat,
- Analyses of bottom dwelling fish and trawl-caught invertebrates reveal no spatial or temporal patterns that can be ascribed to effects of wastewater discharge. Instead, historical data indicate that patterns of change in benthic communities are related to large-scale oceanographic events or specific site conditions (e.g., near dredge material disposal sites),
- Benthic monitoring in the PLOO area (see Appendices C2 and C4) for environmental indicator indices (such as the BRI) continue to indicate that benthic invertebrate communities in the Point Loma region remain characteristic of natural conditions, and
- Benthic monitoring in the PLOO area (see Appendices C2 and C4) continue to show that a BIP of shellfish, fish, benthic organism and wildlife exists beyond the PLOO ZID.

Recognizing that CECs are present in treated wastewater discharges and that routine monitoring for them has not been a part of past monitoring programs, the City is coordinating with regulators and researchers to identify the potential means for (1) monitoring CECs or CEC surrogates, and (2) assessing data for including appropriate chemical compounds in future monitoring efforts.

It should be noted that the Pure Water San Diego program (see Appendices A and B) will result in a significant reduction in flow discharged to the PLOO in future years, as well as a reduction in mass emissions of solids, conventional pollutants and CECs. As a result, while no evidence exists that the PLOO is currently harming aquatic habitat or endangered species, future reductions in PLOO flows and mass loads will further reduce the potential for impact.

Algae Blooms. Marine phytoplankton populations can undergo periods of explosive growth (algae blooms) in response to favorable environmental conditions. Some species of phytoplankton can produce potentially harmful toxins that can affect wildlife including birds, fish, shellfish, and mammals.[45]

Harmful Algal Blooms (HABs) are defined as algal blooms that are harmful to humans or biological resources. Harmful algae are generally present year-round in the water column in very small amounts, but only become a problem for humans and animals when the phytoplankton populations reach particularly high levels. Algal blooms and HABs are often visible due to pigments produced by the phytoplankton and may also be referred to as "red tides".

Phytoplankton growth is at least partly regulated by the availability of light and nutrients[46] with most of the nutrient supply to well-illuminated surface waters coming from the mixing and upwelling of cold, nutrient-rich water from below.[47] Enhanced stratification can suppress nutrient exchange by limiting vertical mixing, while surface cooling favors elevated vertical mixing, which may result in greater primary productivity.[48]

Large-scale climatic drivers, such as El Niño, strongly influence algal production.[49] Along the California coast, El Niño events affect production through the strengthening of wind-generated coastal upwelling[50] and increased nutrient loading in deep waters.[51] Each of these effects will likely be intensified by the effects of climate change.[52] Furthermore, climate change is resulting in less frequent, but more extreme, precipitation events in the Northwestern United States.[53] These intense events are causing more significant coastal flooding, resulting in increased nutrient influx from rivers and estuaries that can fuel phytoplankton blooms.

As a result of these factors, the extent of algal blooms in the SCB has increased significantly over the last two decades.[54] Factors described above such as nutrient concentration, light availability, and water mass mixing likely have a significant effect on phytoplankton productivity.[55] The SCB region is also strongly affected by seasonal coastal upwelling and productive waters from the Subarctic Pacific.[56] Furthermore, anthropogenic sources of nitrogen from coastal runoff and discharge from wastewater outfalls have also been implicated as contributing factors in the increased prevalence of algal blooms.[57]

The PLOO discharge has been in operation for over 27 years at its current location. During this time, City staff have been onsite monitoring PLOO receiving waters approximately 150-200 days each year. This long-term monitoring demonstrates that the depth of the PLOO discharge (approximately 100 m) combined with thermal stratification inhibits wastewater from

45 Scholin et al. (2000); Gulland et al. (2002); Kim et al. (2009); Carter et al. (2013); Schnetzer et al. (2013); Kudela et al. (2003).
46 Sunagawa et al. (2015).
47 Dugdale and Goering (1967).
48 Behrenfeld et al. (2006); Longhurst (1995).
49 Cloern (2001).
50 Bakun (1990); Bakun et al. (2010); Di Lorenzo (2015).
51 Bograd et al. (2015); Rykaczewski and Dunne (2010).
52 Gobler et al. (2017).
53 Gershunov et al. (2019).
54 Kahru et al. (2012); Nezlin et al. (2012).
55 Messié and Chavez (2015).
56 Hickey (1979); Lynn and Simpson (1987).
57 Howard et al. (2014); Reifel et al. (2013); Schnetzer et al. (2013).

reaching surface waters; the PLOO discharge is typically trapped offshore at depths of 40 to 60 m (131 to 197 ft) below the surface.[58] During spring and summer months when algal blooms are most prevalent in the SCB region, thermal stratification is strongest and plume trapping depths are greatest.[59] Thus, the PLOO contribution to nutrient concentrations in surface waters is at its lowest (or non-existent) when algal blooms are most prevalent in the region's surface waters.

The euphotic zone is the layer of the water column close to the surface that receives enough light for photosynthesis to occur. The combination of light and excess nutrients within this zone may result in the over production of phytoplankton and, thus, an algal bloom. Beneath the euphotic zone lies the disphotic zone, which is illuminated but poorly enough that rates of respiration exceed those of photosynthesis.

Subsurface Chlorophyll-a (a proxy for phytoplankton abundance and primary productivity) in the San Diego region show peaks in concentration at depths of 25 m to 36 m.[60] Although data are not available to conclusively identify the depth of the euphotic zone in the PLOO area, chlorophyll-a concentrations can be used as a proxy to indicate that primary production is largely limited to the surface waters above the depth at which the PLOO plume is trapped. Thus, through a combination of stratification and dilution at the PLOO, plume nutrients are likely not mixed into surface waters for primary producers to assimilate into their biomass. Furthermore, the PLOO achieves minimum instantaneous dilutions in excess of 100:1 and monthly average dilutions in excess of despotic 204:1. This dilution amounts to at least a two-fold dilution of nutrient concentrations in the PLOO discharge. Consequently, nutrient concentrations near the PLOO are not detectably different from concentrations in ambient waters.[61] As a result, PLOO effluent nutrients likely have minimal effect on phytoplankton production during much of the year, with regional ocean dynamics being a more significant driver.[62,63]

Finally, satellite imagery from 2002 through 2020 show no red tide events associated with the PLOO.[64] It is noteworthy that red tides have been recorded in the SCB region for over a century. Yet, there is no evidence of changes in their frequency, intensity, or spatial coverage in recent history that might indicate a correlation with wastewater ocean discharge flows or mass

58 SDPUD (2018, 2019, 2021); Rogowski et al. (2012, 2013). Svejkovsky (2003-2018).
59 Bartlett et al. (2004).
60 Nezlin et al. (2018).
61 Bartlet et al. (2004).
62 Svejkovsky (2003-2018).
63 It should be noted that Howard et al. (2014) suggested (on the basis of computer modeling and the associated model assumptions) that total nitrogen flux from the PLOO is approximately three times larger than the total nitrogen flux from upwelling in the region. However, Howard et al. (2014) also stated that the model which they used to develop these inferences had failed validation testing for offshore waters (such as those in the vicinity of the PLOO). As a result, the Howard et al. researchers acknowledged that the location of the PLOO was at the edge of the model's validated boundary, which resulted in "a large amount of uncertainty".
64 Svejkovsky (2003-2018); Hess (2019-2020).

emissions.[65] Instead, climate change, coastal runoff, rainfall events, and upwelling are more likely to be major contributing factors.[66]

Cumulative Effects. Cumulative impacts are defined in the National Environmental Protection Act (42 USC § 4321 *et seq*. and 32 CFR 775 respectively) as: the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR § 1508.7).

In general, the effects of a particular action or group of actions must meet all of the following criteria to be considered cumulative impacts:

- Effects of several actions occur in a common locale or region
- Effects on a particular resource are similar in nature, such that the same specific element of a resource is affected in the same specific way
- Effects are long-term as short-term impacts dissipate over time and cease to contribute to cumulative impacts

The discharge of wastewater from commercial activities, including municipal wastewater treatment plants, power generating stations, industrial plants (e.g., desalination plants), and storm water from drains into open ocean waters, bays, or estuaries can introduce chemical and biological constituents potentially detrimental to estuarine and marine habitats.[67] These constituents include pathogens, nutrients, sediments, heavy metals, oxygen demanding substances, and toxic chemical compounds.[68] Historically, wastewater discharges have been one of the largest inputs of these constituents into coastal waters. However, wastewater discharges have been regulated under increasingly stringent requirements over the last 40 years and mass emissions of most constituents have been significantly reduced. Nonpoint source/storm water runoff, on the other hand, has not been managed as effectively and continues to be a substantial remaining source of contamination of coastal areas and the ocean.[69]

A number of factors influence water quality and marine ecology in the Point Loma area. Key potential influences on water quality include the PLOO discharge, regional non-point source discharges, local river outflows, and other local non-point sources such as harbors, marinas, storm drains, and urban runoff.[70]

65 Allen (1933); Horner et al. (1997); Kim et al. (2009); McGowan et al. (1998, 2017); Svejkovsky (2003-2018); Torrey (1902).
66 Gershunov et al. (2019); Gobler et al. (2017); Messié and Chavez (2015); Wells et al. (2015).
67 Hutchinson et al. (2013).
68 Stein and Cadien (2009); Setty et al. (2012).
69 Setty et al. (2012); Howard et al. (2014).
70 Bartlett et al. (2004); Parnell et al. (2008); Parnell and Riser (2012).

The effects of the PLOO discharge on water quality and biological conditions are evident only in deep waters within or near the ZID.[71] No significant organic enrichment[72] of the sediments due to the PLOO discharge is evident outside the PLOO ZID, and a BIP of shellfish, fish and wildlife exist immediately beyond the ZID boundary.

The PLOO discharge of treated wastewater Loma would therefore make a minimal, insignificant contribution to regional cumulative impacts on benthic or aquatic habitat.

Conclusions

Operation of the PLOO could potentially impact endangered species if the PLOO discharge were to cause changes in environmental conditions that affect the species or their habitat. Three decades of ocean monitoring data and research, however, demonstrate that the PLOO discharge does not adversely impact environmental conditions or habitat. The only discernible outfall-related effects are seen in deep waters immediately at outfall diffuser where minor (and almost non-discernible) water and sediment quality alterations have been observed. Marine communities in the Point Loma area remain characteristic of natural conditions with no suggestion of ecologically significant changes.

There is no indication of adverse impacts from operation of the PLOO on environmental conditions or biological communities that could affect the health and well-being of endangered species or threaten their critical habitat. Future flows and contaminant concentrations from the PLOO would be at or below currently permitted levels. Thus, the continued discharge of treated wastewater from the PLOO is not likely to adversely or discernibly affect endangered species or their critical habitat.

Critical Habitats. No critical habitats are located in the vicinity of the PLOO.

Coordination with Resource Agencies. Upon submittal of the PLOO 301(h) application for modified secondary treatment requirements, the City will coordinate with EPA on requesting consultation by NOAA Fisheries on endangered species under NOAA jurisdiction in accordance with provisions of the ESA.

II.D.4. Are you aware of any State or Federal Laws or regulations (other than the Clean Water Act or the three statutes identified in item 3 above) or an Executive Order which is applicable to your discharge? If yes, provide sufficient information to demonstrate that your modified discharge will comply with such law(s), regulations, or order(s). [40 CFR 125.59(b)(3)]

SUMMARY: No. The PLOO discharge occurs outside of state-regulated marine waters, and the City is not aware of any state or federal laws that are applicable to the renewal of the City's 301(h) waiver application.

State Laws. PLOO discharges 7,154 m (23,472 ft) offshore into federal waters, outside of the three-nautical-mile limit for waters controlled by the State of California. As a result, State

71 SDPUD (2013, 2014, 2015, 2016, 2017, 2018b, 2021b).
72 Minor increases in sediment BOD are seen at near-ZID stations. As documented in Appendix C1, the level of organic enrichment at and immediately near the PLOO ZID boundary is considered moderate and does not significantly and adversely impact species diversity or abundance.

laws apply only to the discharge as it may affect waters within the three nautical miles of the coast.

While the City is not aware state laws applicable within the discharge zone, the State of California ESA is applicable within the three-nautical-mile limit. As described in the response to Questionnaire Section II.D.3, the State of California ESA contains provisions similar to that of the federal ESA and is administered by the CDFW. Appendix I presents information on the State of California ESA.

Federal Laws. The Ocean Pollution Reduction Act (OPRA) of 1994 provided the City of San Diego with the opportunity to re-enter the 301(h) process.[73] The law established four conditions for the City's re-entrance into the 301(h) process:

- Achieve an annual average 58 percent BOD removal,
- Achieve a monthly average 80 percent TSS removal,
- Construct 45 mgd of recycled water treatment capacity, and
- Reduce the mass emissions of solids during the period of modification.

As documented herein and in the City's prior 301(h) applications, the PLWTP discharge achieved compliance with each of these provisions.

The Ocean Pollution Reduction Act II (HR 587, also known as OPRA II) is currently being considered by Congress. OPRA II would allow EPA to issue a conventional NPDES permit for the PLOO discharge, provided that:

- The PLOO discharge is more than 4 nautical miles from shore and at a depth of 93.3 to 95.4 m (306 to 313 ft),
- PLOO TSS mass emissions are initially limited to 12,000 mt/yr, are limited to 11,500 mt/yr after December 31, 2025, and are limited to 9,942 mt/yr after December 31, 2027,
- 30-day average TSS concentrations shall be less than 60 mg/L,
- An annual average system-wide removal of BOD of 58 percent is achieved, and a monthly average system-wide removal of TSS of 80 percent is achieved,
- The discharge achieves compliance with all effluent limitations applicable to secondary treatment except for BOD and TSS,
- The discharge complies with all other applicable requirements governing discharges, including state-imposed water quality standards,
- The City maintains a pretreatment program that meets the requirements of Section 301(h) of the Clean Water Act,
- A minimum of 10 years of ocean monitoring data and analysis are available at the time of application, and

73 House of Representatives Bill 5176 (HR 5176).

- Potable reuse totaling 83 mgd (to the extent consistent with applicable law) is achieved by December 31, 2035.

PLOO discharge has consistently complied with applicable provisions of OPRA II, and the City is on track to comply with the potable reuse requirements of OPRA II.

If passed by Congress and signed into law, OPRA II would allow future PLOO NPDES permit applications to follow application and renewal procedures associated with conventional POTW NPDES permits, but would maintain the pretreatment, treatment, monitoring and compliance provisions implemented in prior PLOO modified secondary treatment NPDES permits issued under Section 301(h) of the CWA.

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III. TECHNICAL EVALUATION

III.A PHYSICAL CHARACTERISTICS OF DISCHARGE

III.A.1 What is the critical initial dilution for your current and modified discharge(s) during 1) the period(s) of maximum stratification and 2) any other critical period(s) of discharge volume/composition, water quality, biological seasons, or oceanographic conditions?

SUMMARY: No modifications have been implemented to the extended PLOO since its construction, and initial dilution characteristics of the PLOO remain as documented in prior 301(h) applications. Appendix Q presents the results of initial dilution modeling conducted in 1995 to assess PLOO initial dilution characteristics. As documented in Appendix Q, critical initial dilution was concluded as occurring during maximum stratification. A median initial dilution of 338:1 was computed for an average PLWTP flow of 240 mgd (10.5 m³/sec). A critical "minimum month" initial dilution of 204:1 was computed for a 205 mgd (8.98 m³/sec) PLOO discharge. Additional modeling conducted by EPA in 2002 confirmed the modeling results presented in Appendix Q. On the basis of the EPA modeling, Order No. R9-2017-0007 retained the PLOO minimum month average initial dilution of 204:1 that had been applied in all prior PLOO NPDES permits. This 204:1 initial dilution is used for determining compliance with water quality criteria and standards for the protection of aquatic life. Receiving water and plume tracking data collected subsequent to the adoption of Order No. R9-2017-0007 confirm the appropriateness of the 204:1 initial dilution for assessing Ocean Plan compliance.

Appendix Q presents the results of initial dilution modeling conducted in 1995 for a PLOO flow of 240 mgd (10.5 m³/sec). No modifications to the PLOO have been implemented since 1995, and the modeling results remain valid. As documented in Appendix Q, two sets of long-term oceanographic data were combined for purposes of developing the PLOO initial dilution estimates. The first data set consisted of CTD (conductivity-temperature-depth) data collected during pre-discharge studies for the extended PLOO, and data from the monthly monitoring hydrocast surveys following commencement of discharge. The second data set consisted of concurrent time-series measurements of the ocean currents (at 20 m depth intervals) and the temperature structure of the water column (at 5 m depth intervals).

As documented within Appendix Q, initial dilutions were computed from the oceanographic data using a modified version of the EPA RSB initial dilution simulation model.[1] Modifications (discussed in detail in Appendix Q) were made to the RSB model to:

- Provide solutions for certain types of density stratification that the original version was not capable of solving,
- Incorporate an input data file structure that was suitable for the large number of observations provided by the time-series measurements,
- Provide an output data file structure appropriate in format and content for subsequent programs that used the initial dilution simulation information as input data, and
- Increase the accuracy of the initial dilution solutions.

1 The RSB ocean outfall dilution model was developed by Roberts, Snyder and Baumgartner (1989a, 1989b, 1989c).

Computed Initial Dilution - Time Series Data. The time-series measurements were based on simultaneous measurements of (1) ocean currents and (2) the density structure of the water column (using temperature and salinity data). The simulations also included the daily as well as monthly variations in the PLOO discharge flow. As a result, initial dilutions calculated from the time series data provide a realistic representation of the initial dilutions associated with the 240 mgd and 205 mgd PLOO discharge flows.

Initial dilutions calculated for an annual average discharge rate of 10.5 m^3/sec (240 mgd) are summarized in Table III.A-1 for (1) time series data that includes ocean currents and (2) time series stratification data with ocean currents set to zero. As shown in Table III.A-1, estimated initial dilutions are higher when dilution effects associated with ocean currents are considered. When dilution effects associated with ocean currents are considered along with a PLOO average annual flow rate of 240 mgd (10.5 m^3/sec):

- A median flux-averaged initial dilution of 338:1 is projected, and
- Initial dilutions are between 223:1 and 544:1 more than 80 percent of the time.

When ocean currents are set to zero and only the time-series stratification data are input, the median flux-averaged initial dilution is:

- 283:1 for a 240 mgd (10.5 m^3/sec) discharge rate
- 300:1 for a 205 mgd (8.98 m^3/sec) discharge rate

With zero ocean currents, initial dilutions are between 214:1 and 409:1 approximately 80 percent of the time for a PLOO discharge flow of a 205 mgd (8.98 m^3/sec).

Table III.A-1:
Distribution of Flux-Averaged Initial Dilutions
Based on Observed Time-Series Density/Ocean Current Data

Probability	Computed Initial Dilution using Time Series Density/Ocean Current Data [A]			
	Observed Time Series Ocean Currents [B,C]		Zero Ocean Currents [C,D]	
	240 mgd PLOO Flow	205 mgd PLOO Flow	240 mgd PLOO Flow	205 mgd PLOO Flow
95-percentile	634:1	686:1	431:1	455:1
90-percentile	544:1	592:1	389:1	409:1
70-percentile	409:1	443:1	319:1	340:1
Median (50-percentile)	338:1	365:1	283:1	300:1
30-percentile	284:1	306:1	248:1	262:1
10-percentile	223:1	239:1	202:1	214
5-percentile	200:1	215:1	183:1	194:1

Table III.A-1 Notes (see next page):

A Based on actual pre-construction ocean stratification conditions and ocean currents in the vicinity of the PLOO, as measured in 13,757 data sets during 1990-1991. Data from 1990-1991 used in the initial dilution simulations are characteristic of present-day ocean currents as measured by static moored ocean current meters. Flux-average initial dilutions are the average initial dilution across the plume upon completion of initial dilution for each discrete stratification and ocean current measurements (e.g., each one of the total 13,757 data sets).

B Initial dilutions based on time-series data that includes both stratification data and ocean current data.

C See Appendix Q for description of initial dilution model and model results. Simulation calculations include daily and monthly flow variations that result in the average annual PLOO flow of 240 mgd (10.5 m^3/sec) and 205 mgd (8.98 m^3/sec). Also see Appendix O of City of San Diego (1995).

D Initial dilutions based on time series stratification data with ocean currents set to zero.

Computed Initial Dilution - CTD Data. Appendix Q also presents regulatory flux-averaged initial dilutions computed using monthly CTD stratification data from 1990-1994 as input and assuming zero ocean currents. Table III.A-2 presents a monthly breakdown of computed initial dilutions using the 1990-1994 CTD data and assuming zero ocean currents. As shown in Table III.A-2, assuming that ocean currents are zero (no flow-induced enhancement of initial dilution), monthly initial dilution rates at a PLOO discharge flow of 205 mgd are computed at values ranging from 204:1 (winter conditions of maximum stratification) to 354:1 (summer conditions). Monthly average initial dilutions are computed to range from 202:1 (winter conditions of maximum stratification) to 324:1 (summer conditions) for a PLOO discharge flow of 240 mgd.

As shown in Table III.A-2, the average initial dilution based on the 1990-1994 CTD data set was 271:1 for a PLOO flow of 240 mgd (10.5 m^3/sec) and 283:1 for a PLOO flow of 205 mgd (8.98 m^3/sec). The average initial dilution for the period January through September for both the 240 mgd and 205 mgd flow rates was nearly 300:1.

As shown in comparing Tables III.A-1 and III.A-2, the median initial dilutions calculated from the time-series measurements are more conservative than the median initial dilutions computed from the CTD data and zero ocean currents. The seasonal variation in the monthly average initial dilutions computed from the time-series data is also comparable with the pattern of the dilutions computed from the CTD data (see Appendix Q). Since the simulations computed from the two different data sets involve different assumptions (e.g., density-temperature relationships, discharge variability, under sampling effects, etc.), this consistency lends support for the validity of the modeling results.

Table III.A-2:
Monthly Regulatory Flux-Averaged Initial Dilutions
Based on CTD Data and Zero Ocean Currents (Ocean Plan-Defined Initial Dilution)

Month	Computed Initial Dilution Using 1990-1994 CTD Data and Assuming Zero Ocean Currents [A,B]	
	240 mgd PLOO Flow	205 mgd PLOO Flow
January	202:1	214:1
February	224:1	204:1 [C]
March	263:1	264:1
April	284:1	313:1
May	295:1	315:1
June	324:1	354:1
July	320:1	325:1
August	294:1	325:1
September	307:1	317:1
October	281:1	287:1
November	249:1	264:1
December	207:1	217:1
Annual Average	271:1	283:1
Jan-Sept Average	294:1	292:1

Table III.A-2 Notes:

A The Ocean Plan (State Board, 2019) requires that minimum average month initial dilution be assessed assuming zero ocean currents.

B See Appendix Q for description of initial dilution model and model results. Simulation calculations include daily and monthly flow variations that result in the average annual PLOO flows of 240 mgd (10.5 m^3/sec) and 205 mgd (8.98 m^3/sec). Also see Appendix O of City of San Diego (1995).

C Order No. R9-2017-0007 assigns an initial dilution of 204:1 for the PLOO, as projected end-of-permit PLOO discharge flows are less than 205 mgd. As documented in Tables II.A-29 and II.A-30 (Section II.A.5.a), average annual PLOO discharge flows are projected to remain below 205 mgd within the upcoming NPDES permit term and beyond.

EPA-Assigned Initial Dilution. As reported in the EPA Final Decision dated August 4, 2017, EPA verified the City's 1995 modeling conclusions using the modified RSB model (set at zero ocean currents) and the EPA UMERGE dilution model in conjunction with updated stratification data developed as part of the PLOO monitoring program.[2] The August 4, 2017 Final Decision concluded that:

- The independent City and EPA modeling efforts produced similar results given the range of uncertainties associated with modeling,
- Each of the modeling efforts provided a conservative estimate of initial dilution as defined within the Ocean Plan,
- Compliance with Ocean Plan receiving water quality objectives should be computed on the basis of an initial dilution of 204:1 and a flow of 205 mgd (8.98 m^3/sec), and [3,4]
- The 204:1 initial dilution represents the lowest average initial dilution within any single month, and instantaneous and short-term initial dilutions at any given specific location can and will occur that are lower than the 204:1 monthly average initial dilution that is assigned for purposes of assessing Ocean Plan compliance.[5]

CDOM-Derived Dilution Estimates. As presented in the City's 2015 301(h) application, Rogowski et al. (2012, 2013) utilized receiving water optical measurements of colored dissolved organic matter (CDOM) to estimate and track the presence of the PLOO plume.[6] CDOM is naturally present in the ocean environment but is present in higher concentrations in the PLOO effluent, allowing CDOM to be a useful parameter for evaluating plume characteristics and tracking plume movement.

Rogowski et al. (2012, 2013) infer PLOO dilutions by comparing CDOM concentrations in the PLOO effluent (derived from a three month-analysis of the CDOM variability in the effluent) with CDOM measurements in the PLOO receiving waters. For assessing CDOM-derived dilution, a calibration curve was developed by diluting PLOO effluent with ocean water derived from Scripps Pier over dilution ratios ranging from 50:1 to 600:1. CDOM measurements obtained by an automated underwater vehicle (AUV) as it passed through and near the PLOO plume were then compared to the calibration curve in order to infer plume dilutions from the CDOM measurements.

In comparing CDOM-derived dilutions with dilutions simulated under similar conditions by a plume computer model (NRFIELD, formerly called RSB), Rogowski et al. concluded that the model simulations predicted plume heights-of-rise and dilutions that were greater than the

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2 See page 20 of the August 4, 2017 EPA Final Decision (EPA, 2017). As noted within the Final Decision, EPA determined that a minimum average month initial dilution of 204:1 (and a flow of 205 mgd) was appropriate for use in characterizing minimum average month conditions, as determined by (1) RSB model results presented in the City's original 1995 301(h) application, (2) subsequent model results obtained by EPA using the RSB model (assuming zero ocean currents) and PLOO stratification data, and (3) model results obtained by EPA using the UMERGE model and available PLOO stratification data.

3 *Ibid*.

4 Effluent concentration limits and performance goal concentrations within Order No. R9-2017-0007 are computed using Equation 1 of the Ocean Plan and receiving water quality objectives established in Table B of the 2015 Ocean Plan (now called Table 3 within the 2019 version of the Ocean Plan). Mass emission limits and performance goals within Order No. R9-2017-0007 are computed using the concentration limits or performance goal concentrations and a flow of 205 mgd, as average annual PLOO discharge flows were projected to be less than 205 mgd throughout the permit term of Order No. R9-2017-0007.

5 The August 4, 2017 EPA Final Decision (see page 20 of the Decision) acknowledges that the 204:1 initial dilution represents a conservative value for characterizing the projected lowest average monthly initial dilution, and that instantaneous or short-term initial dilutions at any given specific time may be lower than the 204:1 monthly average initial dilution.

6 See Appendix F of the City's 2015 301(h) application. Rogowski et al. (2012); City of San Diego (2015).

dilutions derived from the CDOM observations. Using the CDOM measurements, Rogowski et al. (2012) computed "minimum observed dilutions" for 21 automated underwater vehicle missions during April 2011 through April 2012. CDOM-derived "minimum observed dilutions" ranged from 103:1 for the February 28, 2011 mission to 304:1 for the November 30, 2011 mission. The CDOM-derived observations presented by Rogowski et al. (2012) depict significant variation of dilution (patchiness) within the PLOO discharge plume at any given time, in part, as a function of temporal variability and vertical shear of ocean currents.

Similar variations in dilution are depicted in Appendix Q, where initial dilution simulations using the RSB-TSI model and time-series data predicted instantaneous minimum dilutions that were as much as 40 percent lower than the corresponding "minimum month" initial dilutions that were time-averaged over a 30-day period and space-averaged throughout the discharge plume.

It should be noted that the dilution values estimated by Rogowski et al. (which refers to CDOM-derived instantaneous dilution at a particular location) should not be confused with the Ocean Plan monthly average initial dilution[7] regulatory definition that is to be used for purposes of computing compliance with Ocean Plan Table 3 receiving water quality objectives. While CDOM-derived instantaneous dilution values are useful for tracking the PLOO plume and characterizing the patchy nature of dilution at locations within and near the discharge plume, the CDOM-derived dilutions do not represent time- or space-averaged values over the discharge plume. Additionally, the CDOM-inferred dilutions are dependent on the assumption that CDOM characteristics in shore waters at Scripps Pier (which was used in diluting PLOO effluent to develop a CDOM calibration curve) are comparable to CDOM characteristics in offshore waters. Further issues that increase the complexity and limit the practicality for using CDOM measurements to compute Ocean Plan "minimum month initial dilution" include:

- Variability of CDOM in the PLOO effluent that may occur over a 30-day period
- The natural presence and variability of CDOM in the ocean environment
- The non-conservative nature of CDOM
- The practical inability of an underwater vehicle to provide time- and space-averaged measurements throughout the PLOO discharge plume throughout a 30-day period

While computer models suffer from their own set of limitations, the calibrated and verified RSB-TSI model presented in Appendix Q (and the modeling cited in the August 4, 2017 EPA Final Decision) remains the most useful tools for purposes of estimating monthly average initial dilution during any single month of the year, as defined within the Ocean Plan. A minimum month initial dilution of 204:1 (see Appendix Q and pages F-7 and F-25 of the Fact Sheet to Order No. R9-2017-0007) thus remains applicable for (1) characterizing average monthly initial dilution during minimum month conditions and (2) assessing compliance with Ocean Plan receiving water quality objectives[8] to be achieved upon completion of initial dilution.

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7 The term "minimum month initial dilution" is used herein as a synonym for the Ocean Plan definition that states: "lowest average initial dilution within any single month of the year."

8 Table 3 of the 2019 Ocean Plan (formerly Table B of the 2015 version of the Ocean Plan) establishes receiving water quality objectives for the protection of aquatic habitat and for the protection of public health, to be achieved upon completion of initial dilution, defined as the lowest average initial dilution during any month of

III.A.2 What are the dimensions of the zone of initial dilution for your modified discharge(s)?

Guidance regarding the assigned dimensions of the zone of initial dilution (ZID) is presented on page 56 of the *1994 Amended 301(h) Technical Support Document* (ATSD).[9] No modifications to the PLOO have been implemented since its construction that affect the assigned dimensions of ZID, and the PLOO ZID remains unchanged from the City's prior 301(h) applications.

Figure III.A-1 presents the PLOO ZID dimensions. As shown in Figure III.A-1, the ZID (as determined using guidance from the ATSD) extends 93.5 m (307 ft) on either side of the PLOO diffuser legs.

Appendix Q presents estimates of distances associated with completion of initial dilution at a PLOO flow of 240 mgd (10.5 m^3/sec). Table III.A-3 presents a statistical breakdown of computed distances required for completion of initial dilution.

Table III.A-3:
Horizontal Downstream Distance from Outfall Ports to the Completion of Initial Dilution

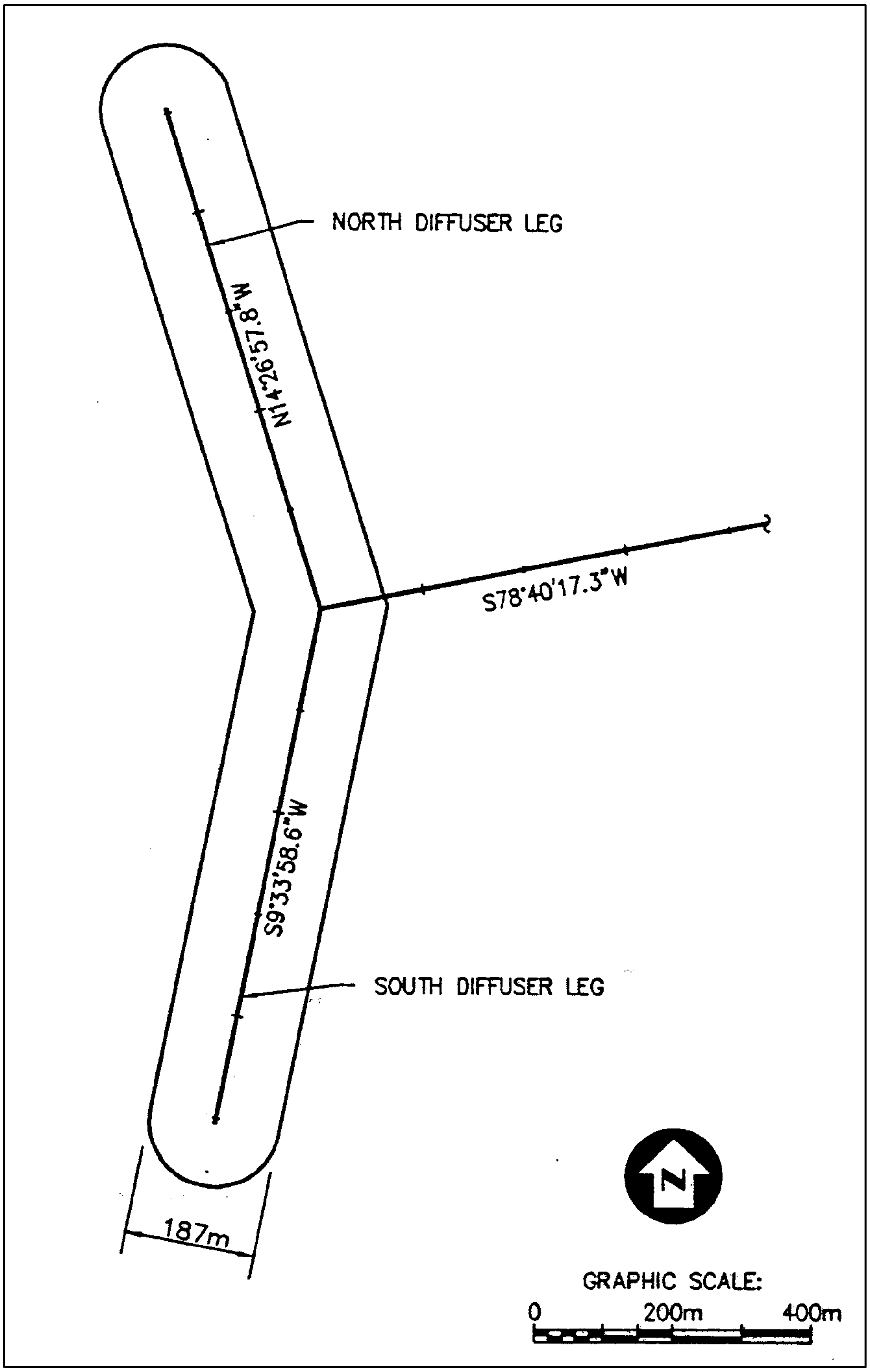
Parameter	Horizontal Downstream Distance [A] from PLOO Ports (240 mgd Flow)	
	Feet	Meters
Minimum Value	34.5	10.5
10th Percentile	82.0	25.0
20th Percentile	99.7	30.4
30th Percentile	152	46.4
40th Percentile	241	73.5
50th Percentile	294	89.7
60th Percentile	349	106.4
70th Percentile	407	123.9
80th Percentile	477	145.5
90th Percentile	582	177.4
99th Percentile	925	281.9
Maximum Value	1,799	548.3

Table III.A-3 Notes:

A Computed horizontal downstream distance from the ports to the completion of initial dilution process. Based on oceanographic data collected during 1990-1991. See Appendix Q and City of San Diego (1995).

9 EPA (1994).

Figure III.A-1:
Point Loma Ocean Outfall ZID Dimensions



III.A.3 What are the effects of ambient currents and stratification on dispersion and transport of the discharge plume/wastefield?

SUMMARY: Stratification effects will keep the wastefield submerged and subject to effects of deeper ocean currents. Ambient deeper ocean currents will help disperse the wastefield upcoast, downcoast, and to deeper waters.

Ocean currents and stratification conditions in the PLOO vicinity remain as documented in the City's prior 301(h) applications and as presented in Section II.B and Appendices D and P. Comprehensive predesign and oceanographic studies (see Section II.B) were conducted in the 1990s to assess ocean currents and oceanographic conditions in the vicinity of the PLOO. Since that time, the City has amassed a lengthy data base of oceanographic conditions through the collection of:

- Ocean stratification data via CTD (conductivity, temperature depth) profiles at 36 offshore stations along the 18, 60, 80 and 98 m contours
- Ocean current data using acoustic Doppler current profilers (ADCPs)
- Ocean current data and depth-density profiles using real-time oceanographic mooring systems (RTOMs)
- Oceanographic data using AUVs or remotely operated towed vehicles (ROTVs), including data for surrogate parameters which can be used to infer the location and transport of the PLOO discharge[10]

The comprehensive data collection efforts over the past quarter century have confirmed the overall ocean current and ocean stratification trends identified in the original PLOO pre-design studies of the 1990s.

Stratification. The stratification of the water column and the currents in the vicinity of the discharge are discussed in Section II.B of this Large Applicant Questionnaire and in Appendices D and P.

CTD data collected to date at the PLOO shows that ocean density profiles closely follow temperature observations.[11] Temperature/salinity data collected at the PLOO shows consistent seasonal trends in ocean density profiles. As surface waters warm in the spring, a thermocline is formed which separates warmer surface waters (epilimnion) from deeper waters (hypolimnion). While temperatures within the hypolimnion remain relatively consistent throughout the year, significant variation in epilimnion temperatures are observed. As the thermocline is established in early spring, it deepens and strengthens (e.g., temperature gradients across the thermocline increase) throughout the spring, summer and fall. The PLOO discharges deep into the hypolimnion (far below the thermocline), and the process of initial dilution typically results in the discharge plume rising toward the thermocline before it is trapped from further upward motion. Weakest stratification typically occurs in winter months (December through February) as epilimnion waters cool.

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10 Oceanographic data collected since the adoption of Order No. R9-2017-0007 are presented in SDPUD (2018, 2019, 2021a).

11 This is consistent with findings by Bowden (1975) and Jackson (1986) that ocean density profiles are primarily influenced by temperature differences.

The Point Loma outfall terminates at a depth of approximately 93.3 to 95.4 m (306 to 313 ft). At this depth, the water column is sufficiently stratified to trap the wastefield below the surface throughout the year. The rise height of the PLOO discharge plume is highly dependent on density structure and stratification of the water column, as well as ambient currents (see Appendices P and Q of this application). Stronger currents may result in greater initial mixing while weaker currents may result in shallower rise heights depending on stratification. Other local ocean dynamics, such as internal waves, can result in further mixing and impact observed plume rise heights.[12]

CTD data and plume tracking using sensors mounted on AUVs and ROTVs demonstrate that the PLOO plume is typically confined to the depth interval between 55 and 87 m (180 to 285 feet). Based on CTD data from 2014-2020, approximately 96 percent of the possible plume detections were at depths of 40 m (131 ft) or more, and no detections were observed above a depth of 24 m (79 ft).[13]

Ambient Net Currents. Ocean current data collected through ACDPs and RTOMs show consistency with ocean current data presented in prior PLOO 301(h) applications. Net currents are longshore, with most observations of current direction show a northwest/southeast axis. Highest mean ocean current speeds typically occur in surface waters and decrease with depth throughout all seasons. Net speeds typically ranged from less than 1 cm/sec to over 6 cm/sec, and instantaneous currents typically range from 6 to 12 cm/sec.[14]

While net currents are predominantly longshore, significant short-term and long-term temporal variation in both current speed and direction occurs, including:

- Tidal variations (variations associated with tides)
- Supertidal variations (short-term variations more frequent than tidal variations)
- Subtidal (long-term variations that vary more slowly than tidal variations)

The transport distances associated with the temporally varying components of the currents depend on their duration (periodicity), as well as their strength. Currents in the vicinity of the PLOO are dominated by subtidal variations in the longshore component of flow. Typical cross-shore tidal excursions are on the order of a kilometer or less. Since the outfall diffuser is approximately 4-5 km offshore from the outer edge of a kelp bed, kelp bed and nearshore waters would not be affected by such cross-shore tidal excursions.

Cross-shore (onshore/offshore) currents within a few miles of the San Diego County coastline show little correlation over distances of less than 1000 m (3280 ft), but high correlation exists with respect to longshore currents at distances of 3 km or more.[15] As a result, while the RTOMs ocean current measurements only provide data on a single point and offer little value in assessing net onshore/offshore movement of the PLOO plume, the RTOMs data are useful in projecting both the direction and speed of the upcoast or downcoast transport of the PLOO discharge.

12 Rogowski (2012, 2013).
13 See CTD section of Appendix P.
14 City of San Diego (1995); SDPUD (2018, 2019, 2021a).
15 Hendricks (1987) deployed multiple ocean current meters at multiple locations in San Diego and Orange County and found little correlation in cross-shore currents between current meters located 1 km (3280 ft) apart but found high correlation in long-shore currents measured at current meters located several km apart.

Plume tracking work completed to date demonstrate that data collected through AUV/ROTV, ACDP and RTOMs deployment are consistent with and complementary to historical and recent CTD and bacteriological data.[16] As a result, this multi-phase tracking effort allows for better understanding of plume trajectory and predications of plume behavior while at the same time confirming the historical trends in ocean currents, stratification and plume movement. The plume tracking efforts also confirm that the combination of horizontal spatial separation and deep confinement (vertical separation) combines to isolate the kelp bed from intrusions of the PLOO wastefield.

III.A.4 Will there be significant sedimentation of suspended solids in the vicinity of the modified discharge?

Question III.A.4 is applicable only to "small dischargers". Dischargers defined under 40 CFR 125, Subpart G as large dischargers (with 5 mgd flows or serving a population of 50,000) are required to provide a more detailed evaluation of sedimentation under Question III.A.5.

III.A.5 Sedimentation of suspended solids.

a. What fraction of the modified discharge's suspended solids will accumulate within the vicinity of the modified discharge?

SUMMARY: For a PLOO discharge flow of 240 mgd (10.5 m^3/sec) and a TSS mass emission rate of 20,000 mt/yr (higher than the currently proposed mass emission rate), conservative computer simulations projected that approximately 8 to 9 percent of the suspended solids discharged from the PLOO would be deposited within an area extending approximately 8 miles (15 km) upcoast and downcoast from the discharge and about 4.3 miles (7 km) offshore from the diffuser. Visual observation of the PLOO diffuser zone indicates that these theoretical 1995 computed solids deposition rates are significantly overestimated, as after more than 25 years of discharge, no visual accumulation of outfall solids is evident in the vicinity of the PLOO. One reason the 1995 solids deposition computations were significantly overestimated is that present-day TSS and settleable solids concentrations are far below levels assumed within the 1995 analysis. For example, the 1995 deposition computations were based on a PLOO TSS concentration of 134 mg/L, a TSS MER of over 16,000 mt/yr, and an effluent settleable solids concentration of 3.4 ml/L. In contrast, the 2020 PLOO discharged averaged a TSS concentration of 34 mg/L, a settleable solids concentrations of less than 0.2 ml/L, and a TSS mass emission of less than 7,000 mt/yr. Further, the 1995 deposition modeling did not take into account that approximately 80 percent of the PLOO TSS is volatile and (because the solids are not settleable) can be consumed within the water column prior to settling to the ocean floor.

The vertical velocity of PLOO wastewater upon discharge is approximately 0.03 ft/sec (10 cm/sec). As a result, the waste plume buoyancy carries almost all particles in the discharge upward into the waste field. The degree to which particles settle out from the waste field is dependent on the solids mass emission rate, the height of waste plume rise, ocean currents, and settling velocities of the particles. As documented herein, the 2020 PLOO discharge contained average annual TSS concentrations of 34 mg/L and settleable solids concentrations of less than 0.2 ml/L (milliliters per liter). Further, volatile solids comprise approximately 80

16 Plume tracking work completed in accordance with the Regional Board-approved Plume Tracking Monitoring Plan (PTMP) developed by the City pursuant to Receiving Water Monitoring Requirement VI.B.2 of Order No. R9-2017-0007.

percent of the TSS. Since the present-day PLOO discharge contains few settleable solids and the majority of suspended solids are organic:

- Virtually no solids deposition occurs in the vicinity of the PLOO, and
- A significant portion of the discharged suspended solids will be consumed within the water column.

1995 Projections of Solids Accumulation. The 1995 ATSD set forth methodology for estimating solids deposition and accumulation. The City's 1995 301(h) application (see Appendix Q of the 1995 301(h) application) estimated solids deposition and accumulation using this ATSD guidance. As documented in the City's 1995 waiver application, solids deposition, accumulation, and transport were assessed using two computer models:

- The EPA ATSD particle simulation model
- The SEDPXY solids transport model

The fraction of solids that would accumulate in the vicinity of the PLOO diffuser was estimated for two scenarios:

- Scenario 1: PLOO TSS mass emission rate of 16,500 mt/yr under average annual ocean conditions
- Scenario 2: PLOO TSS mass emission rate of 18,100 mt/yr under critical (maximum stratification) ocean conditions

Under Scenario 1, the EPA ATSD methodology projected that approximately 8.1 percent of the discharged solids are simulated as settling within a zone extending approximately 7 miles (11.3 km) upcoast and downcoast from the outfall. Under Scenario 2, the model projected that approximately 8.6 percent of the discharged solids would settle within this zone.

The SEDPXY model coupled particle settling with a program that (1) simulated the movement of parcels of wastewater using a progressive vector approach, and (2) computed solids deposition within each 10 m by 10 m (33 ft by 33 ft) model element. For each of the two model scenarios, the SEDPXY model projected that approximately 8 to 9 percent of the PLOO solids would be deposited within a 30 km (17 mile) by 14 km (8 mile) zone surrounding the outfall. (See Appendix Q of the City's 1995 301(h) application.)

Conservative Nature of 1995 Solids Deposition Projections. Both the EPA ATSD and SEDPXY models simulated a great majority of the discharged solids as being carried far from the PLOO discharge point. While only a small fraction is simulated as settling within the general area offshore from San Diego, visual observations in the vicinity of the PLOO demonstrate that the 1995 sedimentation models significantly overestimated the quantity of deposited solids that would actually accumulate on the ocean floor. Key reasons the 1995 models overstated PLOO solids deposition rates include:

- The 1995 deposition models assumed TSS concentrations that are four times higher than present-day PLOO discharge TSS concentrations,
- The 1995 deposition model assumed TSS MERs that are more than twice the present-day MERs,

- Particle settling velocities in the current PLOO discharge are significantly slower than settling velocities that were used in the solids deposition models; present-day settleable solids concentrations in the PLOO discharge are more than an order of magnitude (factor of 10) lower than settleable solids concentrations assumed in the 1995 deposition models,
- Solids loss through organic uptake was neglected, and
- Resuspension effects were neglected.

Overestimated Particle Settling Velocities. Solids deposition rates projected by both the ATSD and SEDPXY models were based on PLWTP effluent settling characteristics measured in 1978 - before chemically enhanced treatment was implemented at the PLWTP. As a result, solids deposition computations presented in the City's 1995 301(h) application were conservative to an extreme degree.

Demonstrating this, Table III.A-4 characterizes the difference in PLOO solids during 1978 and 2020. As shown in Table III.A-4, PLOO suspended solids are significantly less than solids concentrations in the 1978 PLOO discharge. Due to improved treatment at the PLWTP, 2020 settleable solids (solids with higher settling rates) averaged less than 0.2 ml/L - a value that is less than the 1978 value by more than a factor of ten. Settling velocities in the present-day PLOO effluent are considerably slower than those used in the City's 1995 301(h) application. These slower settling rates translate to significantly reduced settling and accumulation of discharged solids in the vicinity of the PLOO than was projected in the City's 1995 301(h) application.

Table III.A-4:
Comparison of 1978 and 2020 PLOO Effluent TSS and Settleable Solids

Year	Means of Treatment	Average Annual TSS (mg/L)	Average Annual Settleable Solids (ml/L)
1978 [A]	Primary Sedimentation	134 mg/L	2.3
2020 [B]	Chemically assisted primary sedimentation	34 mg/L	< 0.2

Table III.A-4 Notes:

A Solids settling computations presented in the City's 1995 301(h) application utilized PLWTP data from 1978. At that time, the PLWTP provided only primary sedimentation. Values from Appendix Q of the City's 1995 301(h) application. (City of San Diego, 1995)

B Average annual PLOO discharge values for calendar year 2020 (SDPUD, 2021b). Average annual 2020 values from Section 5.4 of Appendix M.

Organic Composition/Decay Was Neglected. During 2020, effluent volatile (organic) suspended solids averaged 27 mg/L in the PLOO discharge, while effluent TSS averaged 34 mg/L. Organic solids thus comprised approximately 80 percent of the total solids in the PLOO discharge during 2020. Upon discharge, organic solids are eliminated by consumption (biological uptake) or decay, resulting in reduced deposition of settled solids on the ocean bottom. The 1995 solids deposition model did not account for such organic consumption or losses.

Resuspension Effects Were Neglected. Both models presented in the 1995 301(h) application neglect the effects of resuspension. Conditions at the Point Loma outfall (sediment particle sizes, current speeds, and lack of evidence of sediment accumulation) indicate that particle resuspension is a significant factor limiting the accumulation of sediments near the Point Loma outfall diffuser.

The PLOO outfall diffuser is located near the edge of a shelf that significantly steepens to deep waters immediately west of the diffuser. As demonstrated by ocean current monitoring (see Appendix P), the near-bottom flow has an offshore component toward these deeper waters that is comparable to, or exceeding, the dominant longshore component of flow. Particles resuspended near the edge of the shelf are carried off the shelf into deeper water, promoting the loss of resuspended material from the shelf.

Erosional and resuspension effects are evidenced by (1) the fact that natural soils at the diffuser site generally consist of sands rather than clay or silt particles, and (2) sediment monitoring data and visual observations of the outfall diffuser area indicate no evidence of sediment accumulation.

Outfall ROV Visual Observations. The extended PLOO discharge was initiated in 1994, and the discharge has been continuous since that time. Visual observations of the vicinity of the PLOO by remotely operated vehicle (ROV) confirm that the solids deposition projections presented in the City's 1995 301(h) application are overly conservative. ROV surveys conducted since the outfall was constructed have not indicated evidence of solids accumulation in the vicinity of the PLOO discharge.[17] Actual PLOO solids deposition rates and rates of accumulation are negligible, and significantly below the theoretical calculations presented in the City's prior 301(h) applications.

III.A.5 b. What are the calculated area(s) and rate(s) of sediment accumulation within the vicinity of the modified discharge(s) ($g/m^2/yr$)?

SUMMARY: The City's prior 301(h) applications presented conservative computer simulations of suspended solids deposition and transport in the vicinity of the PLOO diffuser. Results from these models indicate that solids deposition rates will decrease with distance from the outfall. Using the procedures outlined in EPA's Amended Technical Support Document (ATSD), maximum theoretical depositional flux rates in the area of the outfall diffuser were estimated at approximately 33 g/m²/yr for average annual conditions under a PLOO TSS mass emission rate of 16,500 mt/yr. Under critical 90-day conditions (and a TSS MER of 18,100 mt/yr, maximum deposition rates are conservatively computed at 68 g/m²/year. These simulated deposition rates are based on several conservative assumptions, including (1) significantly higher solids concentrations than actually occur (2) higher concentrations of settleable particles than actually occur, (3) faster particle settling velocities than those that actually occur, (4) organic decay/uptake is neglected, (5) resuspension is neglected, and (6) higher TSS mass emission rates than those proposed in this 301(h) application. These compounding conservative assumptions combine to cause significant overestimation of the rates of solids deposition and accumulation. The overly conservative nature of these modeling estimates is confirmed by sediment monitoring and visual observation of the PLOO diffuser zone which shows no evidence of sediment

17 Television video of the PLOO discharge area is collected as part of the biennial ROV surveys assessing the integrity of the PLOO and diffuser. No accumulation of discharged sediments has been reported either by divers or by the ROV television video records collected as part of the PLOO inspections. See Appendix G for the 2020 outfall inspection survey.

accumulation resulting from discharged solids. As a result, the calculated rates and potential zones of sediment accumulation presented herein are presented for theoretical purposes only in conformance with guidance presented in the ATSD.

As noted in the response to Question III.A.5.a, two modeling methods were used to simulate solids deposition for the modified PLOO discharge. The response to Question III.A.5.a presents a brief description of each model.

Method 1 - EPA ATSD. As documented in Appendix Q of the City's 1995 301(h) application, the EPA ATSD model was used to simulate deposition at a PLOO discharge of 240 mgd (10.5 m^3/sec) for the following scenarios:

- Scenario 1: PLOO TSS mass emission rate of 16,500 mt/yr under average annual ocean conditions
- Scenario 2: PLOO TSS mass emission rate of 18,100 mt/yr under critical (maximum stratification) ocean conditions

Table III.A-5 and Table III.A-6 summarizes the results solids deposition modeling for this scenario. As shown in Table III.A-5, a Scenario 1 solids deposition rate of approximately 33 g/m^2/yr is simulated for a zone that extends approximately 2 km (1.1 miles) upcoast and downcoast from the PLOO diffuser.

Table III.A-5:
Summary of Results of EPA ATSD Model
Fraction of Discharged Solids for 240 mgd, 16,500 mt/yr Discharge[A]
Average Annual Conditions

Particle Size Group (Settling velocity range in cm/sec)	Size of Ellipse within which Average Particle in Given Size Group is Deposited			Simulated Cumulative Deposition Rate within Ellipse[C] (g/m^2/yr)
	Area[B] (km^2)	Length (km)	Width (km)	
> 0.1	9.9	3.94	2.87	33
0.1 - 0.01	989	39.4	28.7	0.8
0.01 - 0.006	2746	65.7	47.9	0.13
0.006 - 0.001	98,960	394	287	0.02

Table III.A-5 Notes:

A See Appendix Q of the City's 1995 waiver application for details on the ATSD modeling method and input data. To be conservative, a TSS mass emission rate of 16,500 mt/yr was used - a rate higher than the mass emission rates proposed in this 301(h) application.

B Depositional areas from Table Q-5 of Appendix Q of the City's 1995 301(h) application.

C Cumulative depositional flux. From Table Q-6 of Appendix Q of the City's 1995 301(h) application. (City of San Diego, 1995)

Table III.A-6:
Summary of Results of EPA ATSD Model
Fraction of Discharged Solids for 240 mgd, 18,100 mt/yr Discharge [A]
Critical 90-Day Period

Particle Size Group (Settling velocity range in cm/sec)	Size of Ellipse within which Average Particle in Given Size Group is Deposited			Simulated Cumulative Deposition Rate within Ellipse [C] g/m²/yr
	Area [B] (km^2)	Length (km)	Width (km)	
> 0.1	4.6	2.53	2.45	68
0.1 - 0.01	460	25.3	24.6	2.0
0.01 - 0.006	1279	42.1	41.0	0.3
0.006 - 0.001	46,036	394	287	0.04

Table III.A-6 Notes:

A To be conservative, a TSS MER of 22,000 mt/yr is used for the "critical period", even though the proposed Point Loma discharge (See "Basis of Application" in Volume II) is to discharge no more than 11,999 mt/yr.

B Depositional areas from Table Q-5 of Appendix Q of the City's 1995 301(h) application.

C Cumulative depositional flux. From Table Q-6 of Appendix Q of the City's 1995 301(h) application. (City of San Diego, 1995)

A solids depositional rate of approximately 68 g/m²/yr (see Table III.A-6) is simulated under critical conditions (Scenario 2) within a zone that extends approximately 0.7 miles (1.2 km) upcoast and downcoast from the PLOO diffuser.

Method 2 - SEDPXY. The City's 1995 301(h) application also presented depositional simulations using the 36,000 element SEDPXY model. (The SEDPXY model is described in detail in Appendix Q of the City's 1995 301(h) application.) The SEDPXY model offers several advantages over the EPA ATSD model, but does not account for organic decay and resuspension. Additionally, the SEDPXY model makes use of conservative PLWTP effluent settling characteristics.

Solids deposition rates projected in the SEDPXY model were significantly less than the EPA ATSD model. Under Scenario I (240 mgd, 16,500 mt/yr TSS mass emission, and average annual ocean conditions), a solids deposition rate was computed at 2 g/m²/yr within an area approximately 0.46 mi² (1.3 km²) surrounding the PLOO diffuser.

Solids Accumulation Conclusions. The deposition rate predictions from the two simulation models represent the theoretical maximum flux of effluent particles settling from the water column onto the ocean bottom. Both the EPA ATSD and SEDPXY models significantly overstate the quantity of deposited solids that would be deposited (and accumulate) on the ocean floor, as a result of the following conservative assumptions:

- Particle settling velocities in the current PLOO discharge are significantly slower than settling velocities that were used in the solids deposition models,
- PLOO mass emissions of TSS were significantly overestimated,
- Solids loss through organic uptake was neglected, and

- Resuspension effects were neglected.

As documented in the response to Question III.A.5.a, these assumptions compound to cause significant overestimation in the theoretical solids deposition rates developed using the ATSD and SEDPXY models. Sediment monitoring and visual observations by subsurface ROVs of the vicinity of the PLOO show no evidence of solids accumulation in sediments. Actual outfall solids deposition rates and rates of accumulation are thus significantly less than the theoretical calculations developed using the ATSD and SEDPXY models.

III.A.5. c. What is the fate of settleable solids transported beyond the calculated sediment accumulation area?

SUMMARY: The majority of the PLOO discharge solids are organic and will be eliminated through biological uptake and decay. Small inorganic particles will be carried out of the discharge zone and dispersed to deeper waters where they will be dispersed and eventually aggregate into larger particles and settle.

As discussed in the response to Questions III.A.5.a and III.A.5.b, computer modeling presented in the City's 1995 301(h) application projected that 8 to 9 percent of the discharged solids would settle in a zone located 8 miles (15 km) upcoast and downcoast from the PLOO diffuser and 4.3 miles (7 miles) offshore from the diffuser. Remaining particles were simulated as settling at greater distances from the outfall, with the slowest settling particles being carried the farthest distance.

Figures III.A-2 and III.A-3 respectively present the theoretical distribution of discharged particles as a function of particle settling velocity, based on modeling studies presented in the City's 1995 301(h) application. (See Appendix Q of the City's 1995 301(h) application.)

As noted in the response to Questions III.A.5.a, the models significantly overestimate the quantity of solids deposited in the outfall vicinity, as:

- Current PLOO concentrations of settleable particles are significantly lower than settleable solids concentrations used in the models,
- PLOO particle settling velocities are significantly less than those used in the models,
- The models assume significantly higher TSS concentrations than the present-day PLOO discharge,
- The models assume a higher mass emission rate than is proposed in this 301(h) application,
- The models neglected organic consumption (uptake) and decay, and
- The solids deposition models neglected effects of resuspension.

Particles not deposited in the outfall vicinity will either be eliminated through biological consumption and decay or transported out of the outfall zone to deep ocean waters.

Figure III.A-2:
Annual Average Theoretical Transport Distances for Particles

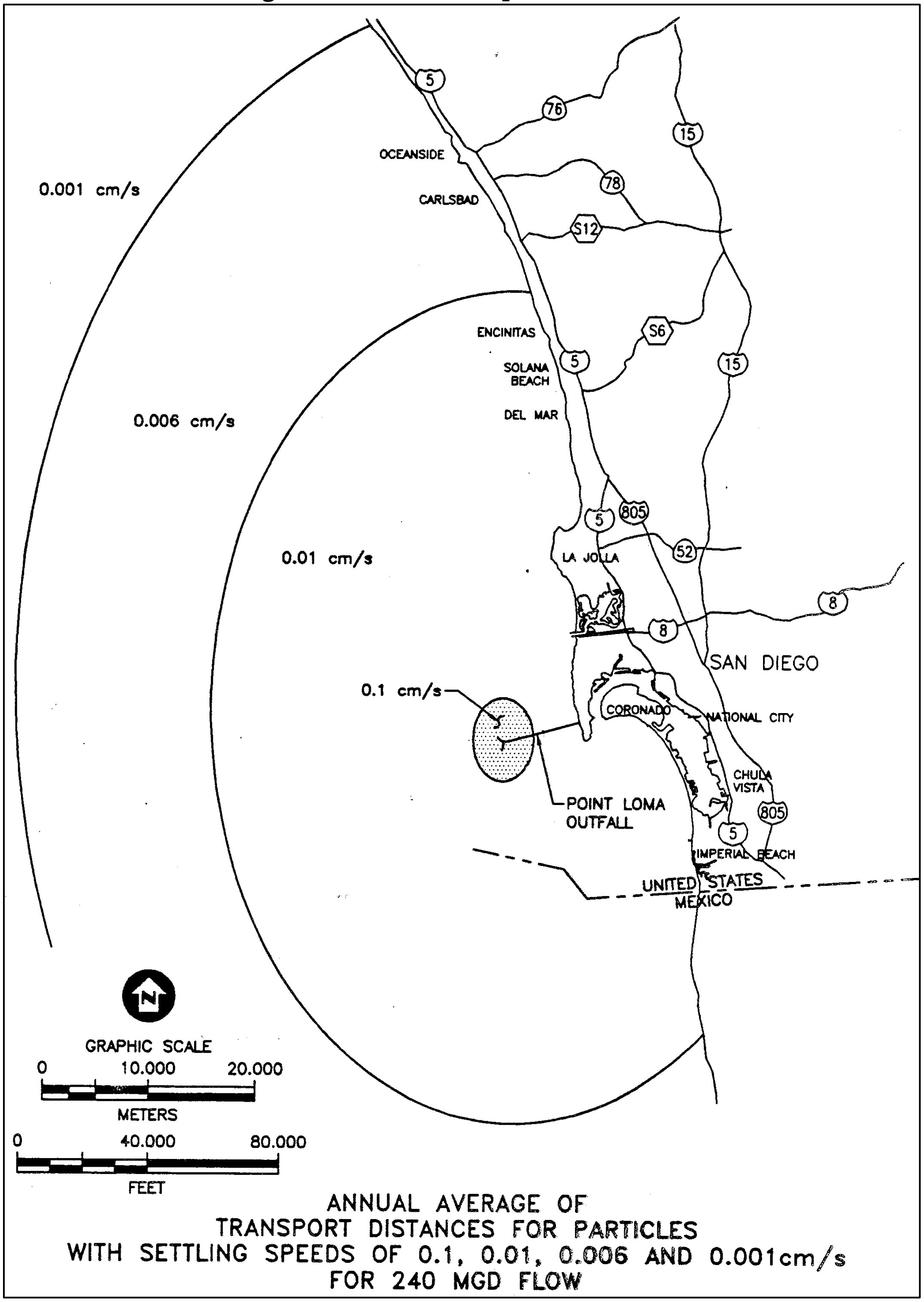
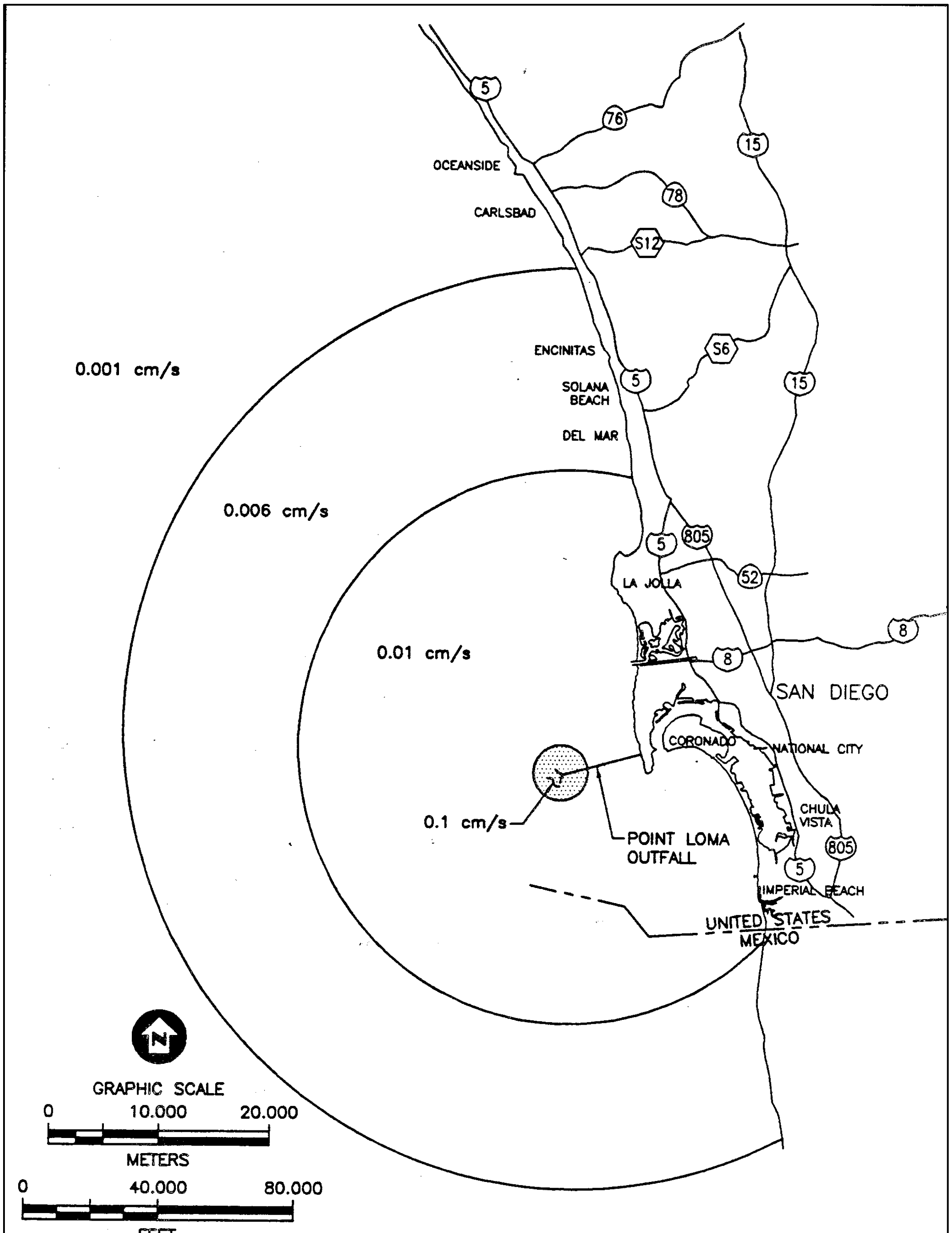


Figure III.A-3:
Critical 90-Day Theoretical Transport Distances for Particles



CRITICAL 90–DAY PERIOD OF
TRANSPORT DISTANCES FOR PARTICLES
WITH SETTLING SPEEDS OF 0.1, 0.01, 0.006 AND 0.001cm/s
FOR 240 MGD FLOW

Particle Settling Overview. As also noted in the City's 1995 301(h) application, the wastefield upon initial dilution typically forms at an elevation of about 26-27 m (85-89 ft) above the ocean bottom. Computer modeling presented in the City's 1995 301(h) application (see Appendix Q of the 1995 application) concluded that discharged particles with settling speeds in excess of 0.002 - 0.007 cm/sec would be deposited on the shelf within several miles of the outfall.

No settling velocity studies have been conducted for the current PLOO discharge. Settling studies conducted in 1978 (before the current PLWTP advanced primary treatment was initiated) concluded that approximately 90 percent of the PLOO particle mass had settling speeds slower than this 0.002 to 0.007 cm/sec threshold.

Since present day PLOO TSS and settleable solids concentrations are significantly lower than in 1978, it is probable that only a small fraction of the PLOO solids would have settling faster than 0.007 cm/sec. As a result, particle settling and accumulation within the vicinity of the PLOO outfall would be negligible. This projected lack of particle accumulation in the PLOO vicinity is consistent with visual observations of sediments using remotely operated submersibles and sediment data.

Particles transported beyond the calculated sediment accumulation area have long residence times in the water column. Approximately 30 days would be required for another 10 percent of the effluent particle mass to be deposited, assuming that the particles remain inert and settling distances do not increase.

Loss of Organic Material. During 2020, volatile (organic) suspended solids comprised 80 percent of the total suspended solids. (Effluent TSS averaged 34 mg/L and volatile suspended solids averaged 27 mg/L). As documented in the City's 1995 301(h) application, the organic portion of the discharged solids will be virtually consumed within 60 days through decay or biological uptake. Table III.A-7 summarizes how this loss of organics affects the overall mass of discharged solids.

As shown in Table III.A-7, one-quarter of the organic mass will be consumed within 3 days of discharge, and half within one week. Within one month, less than one-quarter of the total mass (organic plus inorganic) remains. By the end of two months, only the inorganic fraction of the discharged solids remains. Over this two-month time frame, cross-shore transport will disperse the particles offshore and into deeper and more distant water. (See Figures III.A-2 and III.A-3.)

In addition to reducing the mass of solids, this loss of organic material also may affect the size of remaining particles. Some of the particles will be reduced in size as a result of organic loss. Discharged nutrients biologically consumed in the water column may be returned as waste products in various particle sizes. As a result of these processes, the distribution of particle settling speeds becomes more difficult to estimate as the discharge is transported farther from the outfall vicinity.

**Table III.A-7:
Loss of Organic Material Due to Decay/Consumption**

Elapsed Time	Organic Fraction Remaining [A] (percent of total)	Total Mass Fraction Remaining [B] (percent of total)	Estimated Percent Organic[C]
0	100 %	100 %	71.0 %
12 hours	95.1 %	96.1 %	70.2 %
1 day	90.5 %	92.4 %	69.6 %
3 days	74.1 %	79.3 %	66.4 %
1 week	49.7 %	59.8 %	59.0 %
2 weeks	24.7 %	39.8 %	44.1 %
1 month	4.8 %	23.8 %	14.3 %
2 months	0.2 %	20.2 %	0.8 %

Table III.A-7 Notes:

A Percent of organic material in the PLOO discharge that remains after decay and consumption. From Appendix Q of the City's 1995 301(h) application. (City of San Diego, 1995)

B Total mass fraction remaining after decay/consumption of organic solids. From Table Q-16, Appendix Q of the City's 1995 301(h) application. (City of San Diego, 1995)

C Adapted from Table Q-16, Appendix Q of the City's 1995 301(h) application to reflect the fact that current volatile solids represent approximately 71 percent of total solids. (City of San Diego, 1995)

Resuspension Effects. As documented in the response to Question III.A.5.b, resuspension is a key factor in affecting the rate of accumulated solids in the PLOO vicinity. The PLOO diffuser is located at the edge of a shelf, and the ocean bottom steepens to significant depths immediately beyond the diffuser. The near-bottom flow (see description of oceanography in Appendix P) has a significant offshore component toward these deeper waters. Particles resuspended near the edge of the shelf are carried off into deeper water, promoting the loss of resuspended material from the shelf. These erosional and resuspension effects are evidenced by domination of sand particles (as opposed to more easily resuspended silt or clay particles) in the PLOO diffuser sediments.

Farfield Particle Fate. Inert solids with slow settling velocities will remain suspended in the water column as they are dispersed to greater distances (and depths) from the outfall. Ultimately, the particles will aggregate with other natural particles or will be biologically consumed and discharged as fecal pellets by zooplankton. Quantitative estimates of such particle aggregation and subsequent settling are not possible, however, due to variabilities associated with:

- Alterations of particle size due to organic losses (decay and biological uptake)
- Dependence of settling rates on the type and abundance of zooplankton
- The wide range of settling speeds of the aggregated particles
- The wide range of particle sizes and settling speeds of fecal pellets (less than 0.002 to greater than 3 cm/sec)

In summary, particles transported out of the calculated accumulation area will become increasingly inorganic in content and will be dispersed over an increasingly large area by the ocean currents with correspondingly low deposition rates. Since the remaining particle mass is expected to be mixed with natural particles, their contribution to the accumulation of inorganic material in the sediments outside the calculated accumulation area is expected to be minor compared with the accumulation of natural particles.

The effect of discharged particles on the farfield ocean environment will be negligible, as a result of:

- Low overall discharge TSS concentrations in the PLOO discharge and low quantity of settleable solids
- Reduced (slower) effluent particle settling velocities resulting from PLWTP treatment improvements
- High organic content and associated organic losses through biological uptake and decay, significant increases in ocean bottom depths offshore from the diffuser
- Wide dispersion of discharged solids receiving water monitoring collected by the City at 36 offshore stations and 8 inshore stations confirms the lack of farfield impacts associated with discharged solids. Receiving water light transmittance values at the PLOO monitoring stations are within the range of variability that normally occur within the SCB.

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III.B COMPLIANCE WITH WATER QUALITY STANDARDS

III.B.1 What is the concentration of dissolved oxygen immediately following initial dilution for the period(s) of maximum stratification and any other critical period(s) of discharge volume/composition, water quality, biological seasons, or oceanographic conditions?

SUMMARY: Because of the high dilution achievable by PLOO, the largest projected dissolved oxygen depression in PLOO receiving waters is minimal (0.05 mg/L, or approximately 1 percent). Natural variability of DO in the ocean is significantly greater than this 0.05 mg/L value. This DO theoretical projected depression complies with the Ocean Plan requirement that DO not be depressed more than 10 percent below naturally occurring ambient values. Observed receiving water DO measurements confirm that receiving water DO is not significantly affected by the PLOO discharge.

The City's 1995 301(h) waiver application assessed the farfield DO depression for a PLOO discharge of 240 mgd. Results of this analysis remain applicable and are updated in Appendix R and summarized below.

DO Computation per EPA Methodology. Methodology for computing DO depression is presented on pages B-14 through B-18 of the ATSD (EPA, 1994). The 1994 EPA ATSD presents the following equations for computing receiving water DO concentrations:

$$DO_f = DO_a + \frac{(DO_e - IDOD - DO_a)}{S_a} \qquad Equation\ III.B-1$$

where: DO_f = Final DO concentration (mg/L) of receiving water at the plume trapping level.

DO_a = Affected ambient DO concentration (mg/L) immediately up current of the diffuser averaged over the tidal cycle (12.5 hours) and from the diffuser port depth to the trapping level.

DO_e = Effluent DO (mg/L)

$IDOD$ = Immediate DO demand (mg/L)

S_a = Flux averaged initial dilution

Using the above-defined terms, the depression of DO due to wastewater after completion of initial dilution is given in percent by:

$$DO\% = 100 \cdot \frac{(DO_f - DO_e + IDOD)}{DO_f \cdot S_a} \qquad Equation\ III.B-2$$

IDOD is a difficult value to measure because the chemical test often gives unreliable answers. As a result, *Standard Methods for the Examination of Water and Wastewater* has eliminated the IDOD test since its 14th Edition.[1] In 1994, the PLWTP effluent IDOD was measured at values ranging from 0.45 to 1.74 mg/L in 1994 (nine total samples).

1 APHA/AWWA/WPCF (1971, 1975).

The 1994 EPA ATSD recommends that IDOD values be assigned on the basis of outfall travel time and effluent BOD.[2] Table III.B-1 presents estimated PLOO travel times at the calendar year 2020 PLOO average annual flow of 144.3 mgd (7.45 m^3/sec) flow, the permitted average annual flow 240 mgd (10.5 m^3/sec), and the permitted maximum day flow of 432 mgd (15.61 m^3/sec). As shown in Table III.B-1, average PLOO travel times through the outfall (not counting the diffuser) are projected at approximately 156 minutes for 145 mgd, 94 minutes for 240 mgd, and 52 minutes for 432 mgd.

Table III.B-1:
Estimated PLOO Travel Times

Outfall Segment	Inside Diameter		Length		Estimated PLOO Travel Time (minutes)		
	feet	meters	feet	meters	144.3 mgd [A]	240 mgd [B]	432 mgd [C]
Original outfall	9.0	2.74	11,226	3,422	53.1	32.1	17.8
Extended outfall	12.0	3.66	12,246	3,732	102.9	62.2	34.5
Diffuser Section 1 [D]	7.0	2.13	1,008	307.2	5.8	3.5	1.9
Diffuser Section 2 [D]	5.5	1.68	852	256	3.0	1.8	1.0
Diffuser Section 3 [D]	4.0	1.22	648	197.5	1.2	0.7	0.4
Total Estimated Travel Time - Outfall Only					156.0	94.3	52.3
Total Estimated Travel Time - Outfall & 3 Diffuser Legs					166.0	100.3	55.6

Table III.B-1 Notes:
- A Average annual year 2020 PLOO flow was 144.3 mgd. See Section 5.4 of Appendix M.
- B Maximum average annual PLOO flow permitted by Order No. R9-2017-0007.
- C Maximum day peak wet weather PLOO flow permitted by Order No. R9-2017-0007.
- D Each of the two PLOO diffuser legs is comprised of three sections with successively smaller pipe diameters. Half the PLOO flow is assumed to go through each of the two diffuser legs.

For an outfall travel time of more than 100 minutes and an effluent BOD concentration of 100 mg/L (the 2020 PLWTP BOD averaged 132 mg/L), the EPA guidance document recommends an IDOD value between 3 and 4 mg/L.[3] In accordance with this EPA guidance, receiving water DO_f at the trapping level is conservatively computed based on:

- An effluent IDOD of 4 mg/L
- An assumed PLWTP effluent DO of zero
- Observed pre-discharge receiving water DO within the water column (ambient upcurrent DO, or DO_a), density profile measurements, initial dilution/trapping depth computations for 1990 and 1991 (deemed to represent critical receiving water conditions)

2 Page B-15 of the 1994 ATSD (EPA, 1994).
3 See page B-15 of the ATSD (EPA, 1994).

Using the pre-discharge data, an "upper bound" DOf value of 4.54 mg/L was computed for the critical (minimum initial dilution) period of January through March.[4] As shown in Table III.B-2, DO depression is projected at less than 1 percent throughout a wide range of naturally occurring ambient DO concentrations and oceanographic conditions.

Table III.B-2:
Calculation of Dissolved Oxygen Immediately Following Initial Dilution [A]
Based on Matched Sets of Pre-Discharge Initial Dilution and DO Data –
PLOO Discharge of 240 mgd

Date of Historic DO/CTD Data Set Used in Computations [B]	Initial Dilution (S_a)	Dissolved Oxygen [C] (mg/L)		Change in DO (ΔDO)	
		Mean Upcurrent Ambient (DO_a)	Computed DO at Trapping Level (DO_f)	Difference from Ambient (mg/L)	Percent Difference
Mar. 7, 1990	287:1	4.80	4.77	0.03	0.6 %
Apr. 17, 1990	253:1	4.54	4.50	0.04	0.7 %
May 23, 1990	230:1	4.06	4.03	0.03	0.8 %
Jun. 20, 1990	355:1	5.42	5.39	0.03	0.5 %
Jul. 25, 1990	238:1	4.78	4.79	0.05	0.7 %
Aug. 29, 1990	416:1	5.84	5.81	0.03	0.4 %
Sept. 27, 1990	409:1	4.33	4.31	0.02	0.5 %
Jan. 26, 1991	275:1	6.88	6.84	0.04	0.6 %
Feb. 7, 1991	212:1	5.22	5.17	0.05	0.8 %
Mar. 7, 1991	260:1	4.58	4.54	0.04	0.7 %
Apr. 7, 1991	258:1	4.41	4.37	0.04	0.7 %

Table III.B-2 Notes:

A Calculations conservatively based on IDOD = 4.0 mg/L and DO_e = 0.0 mg/L. Actual PLWTP IDOD is projected to be significantly less than 4.0 mg/L.

B Receiving water DO and thermocline data from 1990 and 1991 are representative of critical receiving water conditions and are representative of present-day DO and thermocline data. See Appendix R.

C DO_a is the affected ambient DO concentration (mg/L) immediately upcurrent of the diffuser averaged over the tidal cycle (12.5 hours) and from the diffuser port depth to the trapping level. DO_f is the final computed DO concentration (mg/L) of receiving water at the plume trapping level.

The conservative DO depression computations presented in Table III.B-2 and Appendix R remain valid (albeit conservative), as:

- Assumptions on PLOO effluent IDOD are conservative
- Actual PLOO DO averaged 1.5 mg/L during 2020[5]
- Receiving water data from 1990-1991 remain representative of critical thermocline trapping conditions

Receiving Water DO Concentrations. Receiving water monitoring conducted off the coast of Point Loma confirm the lack of discernible outfall-related DO depression. The City monitors receiving water DO concentrations at 36 offshore stations and 8 kelp bed stations. While receiving water DO may vary significantly as a result of naturally occurring seasonal and long-

4 See Appendix R for details associated with the DO depression calculations using 1990-1991 pre-discharge data.
5 See Table II.A-9 within Section II.A.4.b of this Large Applicant Questionnaire.

term oceanographic conditions, no discernible outfall-related change in receiving water DO has been observed.

Table III.B-3 summarizes minimum, maximum and average DO measurements at the PLOO outfall monitoring stations for calendar year 2018.[6] As shown in Table III.B-3, DO values in PLOO receiving waters remain high throughout the year, particularly in the epilimnion where DO concentrations are typically in excess of 8 mg/L. Lowest DO values (on the order of 3 mg/L) are seen in spring within the hypolimnion waters as a result of upwelling from deeper waters. DO concentrations at the PLOO stations are consistent with DO concentrations at upcoast and downcoast reference stations along the 100-meter-contour.

Superimposing the 2018 receiving data on projected initial dilutions, Table III.B-4 presents estimated seasonal DO depressions assuming that minimum observed DO values during 2018 represent ambient receiving water dissolved oxygen (DO_a).[7] As shown in Table III.B-4, conservatively estimated seasonal DO depressions using 2018 data are consistent with DO depressions computed using pre-discharge 1990-1991 data. As also shown in Tables III.B-3 and III.B-4, natural variability in receiving water DO concentrations is significantly greater than DO depression values that may be caused by the PLOO discharge.

Table III.B-3:
Receiving Water Dissolved Oxygen in the Vicinity of the PLOO Diffuser, 2018 [A]

Month	Parameter	Receiving Water Dissolved Oxygen [A] (mg/L)				
		1-20 m Depth	21-60 m Depth	61-80 m Depth	81-100 m Depth	1-100 m Depth
February 2018	Minimum value	5.9	5.7	4.8	4.5	4.5
	Maximum Value	8.4	8.2	6.6	5.7	8.4
	Mean Value	8.1	7.3	5.8	5.1	7.1
May 2018	Minimum value	4.1	3.3	3.2	3.0	3.0
	Maximum Value	9.3	5.5	4.3	4.2	9.3
	Mean Value	6.8	4.2	3.7	3.4	4.8
August 2018	Minimum value	7.2	5.4	4.8	4.4	4.4
	Maximum Value	9.0	8.8	6.8	5.7	9.0
	Mean Value	8.3	7.2	5.5	5.0	7.1

6 Ocean data for calendar year 2018 are presented in SDPUD (2019a). The biennial report for calendar years 2019 and 2020 were not available at the time of preparation of this NPDES application.

7 This is a conservative assumption, since the minimum seasonal DO values are unlikely to represent DO conditions that occur in the immediate vicinity of the PLOO discharge for any length of time. Additionally, the observed DO values in the vicinity of the PLOO already reflect any DO depression related to outfall operation. As a result, the computed DO values in Table III.B-4 are conservative in that the values reflect “double counting” of PLOO DO depression effects.

Month	Parameter	Receiving Water Dissolved Oxygen [A] (mg/L)				
		1-20 m Depth	21-60 m Depth	61-80 m Depth	81-100 m Depth	1-100 m Depth
November 2018	Minimum value	7.1	6.3	5.8	5.4	5.4
	Maximum Value	8.4	8.3	7.8	7.0	8.4
	Mean Value	7.8	7.6	6.8	6.2	7.4
Annual Average 2020	Minimum value	4.1	3.3	3.2	3.0	3.0
	Maximum Value	9.3	8.8	7.8	7.0	9.3
	Mean Value	8.8	7.7	6.4	5.7	8.8

Table III.B-3 Notes:

A Annual average of all PLOO ocean stations, as reported within SDPUD (2019a). The biennial report for calendar years 2019 and 2020 were not available at the time of preparation of this NPDES application.

Table III.B-4:
Calculation of Dissolved Oxygen Immediately Following Initial Dilution [A]
Based on Observed Receiving Water DO Values for 2018

Month	Average Monthly Initial Dilution [A] (S_a)	Minimum Observed Seasonal DO at 21-60 m Depth [B] (mg/L)	Change in DO [C] (ΔDO)	
			Difference from Ambient (mg/L)	Percent Difference
February	204:1 [D]	5.7	0.02	0.8 %
May	315:1	3.3	0.01	0.7 %
August	230:1	5.4	0.02	0.8 %
November	355:1	6.3	0.01	0.5 %

Table III.B-4 Notes:

A Monthly initial dilution from Table III.A-2 (See Section III.A.1 of this Large Applicant Questionnaire).

B Observed minimum initial dilution at any PLOO station at depths of 21-60 m (typical range of PLOO plume trapping depths) during 2018. Values from Table III.B-3.

C Calculated DO using Equation III.B-2. Calculations conservatively based on IDOD = 4.0 mg/L and DO_e = 0.0 mg/L. Actual PLWTP IDOD is projected to be significantly less than 4.0 mg/L.

D Represents minimum month PLOO initial dilution assigned within Order No. R9-2017-0007 for purposes of computing compliance with Table 3 Ocean Plan receiving water quality objectives for the protection of aquatic habitat and the protection of human health.

III.B.2. What is the farfield dissolved oxygen depression and resulting concentration due to BOD exertion of the wastefield during the period(s) of maximum stratification and any other critical period(s)?

SUMMARY: Because of the high dilution of the outfall, farfield DO depression is projected to not exceed 0.14 mg/L during the critical period (January through March) for a discharge flow of 240 mgd. The *maximum farfield DO depression under this 240 mgd discharge flow is projected to be 2.4 percent during the critical period. This level of DO depression is well within the Ocean Plan requirement that waste discharges not depress natural ambient DO concentrations more than 10 percent. A reduced level of DO depression would occur for PLOO discharge flows of less than 240 mgd.*

The City's 1995 301(h) waiver application assessed the farfield DO depression for a PLOO discharge of 240 mgd. Results of this analysis remain applicable and are updated in Appendix R and summarized below.

Ocean Plan Requirements. In lieu of establishing a requirement for BOD, the Ocean Plan establishes the following receiving water dissolved requirement:

> *The dissolved oxygen concentration shall not at any time be depressed more than 10 percent from that which occurs naturally, as the result of the discharge of oxygen demanding waste materials.*[8]

This Ocean Plan requirement excludes the effects on DO of the entrainment of deeper and colder ambient water (which has lower natural DO) into the plume during the initial dilution process. Accordingly, the DO depressions presented herein were developed assuming the concentration of DO in the entrained ambient water to be the same as the DO at the trapping level.

Factors Affecting Farfield DO. After the initial dilution, DO in the wastefield is further reduced as a result of nitrogenous and carbonaceous BOD demands. Time-dependent DO changes resulting from BOD demands are computed by:

$$\Delta DO_{BOD}(t) = \Delta CBOD \times (1 - e^{-k_c t}) + \Delta NBOD \times (1 - e^{-k_n t}) \qquad Equation\ III.B - 3$$

where: $\Delta DO_{BOD}(t)$ = the time-dependent depression of DO in the farfield waters

$\Delta CBOD$ = carbon-associated BOD concentration (above ambient) at the completion of initial dilution[9]

$\Delta NBOD$ = nitrogen-associated BOD concentration (above ambient) at the completion of initial dilution[10]

k_c = temperature-dependent decay rate ($days^{-1}$) for carbon-associated BOD[11]

k_n = temperature-dependent decay rate ($days^{-1}$) for nitrogen-associated BOD[12]

8 State Board (2019).

9 Since CBOD concentrations within ambient seawater are near zero, the ΔCBOD is equivalent to the CBOD of the PLWTP effluent, which (see Appendix R) is taken at 336 mg/L (approximately a factor of 2.84 above the effluent $CBOD_5$).

10 Since NBOD concentrations within ambient seawater are near zero, the ΔNBOD is equivalent to the NBOD of the PLWTP effluent. which (see Appendix R) is taken at 6.8 mg/L (approximately a factor of 2.54 above the $NBOD_5$).

11 As determined through Equation B-13 of the ATSD (EPA, 1994), where $k_c = 0.23 \times \theta_C^{(T-20)}$ and θ_C is a coefficient dependent on temperature (T) that ranges from 1.11 for a temperature of 10° C and 1.047 for a temperature of 20° C. As documented in Appendix R, at a temperature of 12.5° C, the k_c value is approximately 0.119 per day.

12 As determined through Equation B-15 of the ATSD (EPA, 1994), where $k_n = 0.1 \times 1.08^{(T-20)}$, where T is temperature. As documented in Appendix R, at a temperature of 12.5 C°, the k_n value is approximately 0.0561 per day.

Farfield DO is also affected by time-dependent subsequent dilution that occurs as a result of ocean mixing beyond the ZID. The time-dependent depression of DO in the farfield waters can be computed as follows:

$$\Delta DO_w(t) = \frac{-\Delta DO_t - \Delta DO_{BOD}(t)}{D_s(t)} \qquad Equation\ III.B-4$$

where:
- $\Delta DO_w(t)$ = the time-dependent depression of DO in the farfield waters
- ΔDO_t = the change in DO due to initial dilution and effluent IDOD, computed per equation III.B-2
- ΔDO_{BOD} = the time-dependent farfield DO depression resulting from nitrogenous and carbonaceous BOD demand (i.e., the reduction in the level of DO in the wastefield resulting from DO and IDOD in the effluent, DO uptake by the BOD exertion, and subsequent oceanic mixing with the surrounding higher DO water)
- $D_s(t)$ = time-dependent subsequent dilution of the wastefield due to oceanic mixing

Estimated Farfield DO Depression. As documented in Appendix R, historic pre-discharge DO, BOD and CTD data (which as are still representative of current PLOO conditions) were used as input to the above equations to estimate subsequent dilution and farfield DO depressions resulting from the PLOO discharge.

Table III.B-5 presents estimated farfield DO depression using pre-discharge data from 1990-1991. As shown in Table III.B-5, it is projected that maximum DO depression due to ultimate CBOD and NBOD demand will occur approximately 32 to 36 hours after discharge, that additional dilution in excess of 2:1 will during this period (over and above initial dilution). Based on estimated values for Equations III.B-3 and III.B-4 per guidance in the ATSD, it is projected that farfield DO depression will remain below 3 percent during the critical period of maximum stratification.

Table III.B-5:
Calculation of Farfield Dissolved Oxygen Depression
Due to Waste Material 240 mgd (10.5 m³/sec) PLOO Discharge

Date of Historic DO/CTD Data Set Used in Computation [A]	Initial Dilution [B] S_a	Dissolved Oxygen (mg/L)		Hours to Minimum Computed Farfield DO	Subsequent Dilution Factor [C] $D_s(t)$	Farfield DO Depression as a Percent of Ambient DO ΔDO_w(%) [D]
		Ambient at Trapping Level DO_t	Difference from Ambient upon Completion of Initial Dilution [B] ΔDOt			
3/07/90	287:1	5.37	0.10	34.5	2.14	1.9
4/17/90	253:1	4.78	0.11	35.5	2.18	2.4
5/23/90	230:1	4.47	0.13	35.5	2.18	2.8
6/20/90	355:1	5.60	0.08	34.5	2.14	1.5
7/25/90	238:1	5.20	0.12	35.0	2.16	2.4

Date of Historic DO/CTD Data Set Used in Computation [A]	Initial Dilution [B] S_a	Dissolved Oxygen (mg/L)		Hours to Minimum Computed Farfield DO	Subsequent Dilution Factor [C] $D_s(t)$	Farfield DO Depression as a Percent of Ambient DO $\Delta DO_w(\%)$ [D]
		Ambient at Trapping Level DO_t	Difference from Ambient upon Completion of Initial Dilution [B] ΔDOt			
8/29/90	416:1	6.08	0.07	34.0	2.11	1.2
9/27/90	409:1	4.68	0.07	35.5	2.18	1.5
1/26/91	275:1	7.15	0.11	32.0	2.02	1.5
2/07/91	212:1	5.83	0.14	34.0	2.11	2.4
3/07/91	260:1	5.00	0.11	35.0	2.16	2.2
4/07/91	258:1	5.18	0.11	35.0	2.16	2.2

Table III.B-5 Notes:

A See Appendix R. Historical data from 1990 and 1991 used in the calculation remain applicable to characterize critical oceanographic conditions in the vicinity of the PLOO discharge.

B Values from Table III.B-2 based on historical pre-discharge data from 1990-1991.

C Computed additional dilution factor $D_s(t)$ subsequent to initial dilution that occurs by the hours estimated to achieve computed minimum farfield DO. As shown above, the PLWTP effluent is further diluted by more than a factor of two within approximately 36 hours of initial dilution. See Appendix R.

D Computed farfield DO depression (as a percent) associated with additional DO depression due to the ultimate CBOD and NBOD within the PLWTP effluent. See Appendix R and Equations III.B-3 and III.B-4 for computation methodology.

Receiving Water Dissolved Oxygen. As discussed in Section II.B.6, observed DO concentrations at the PLOO monitoring stations during the past quarter century demonstrate that the PLOO has minimal effect on receiving water DO. As shown in Figures II.B-11 and II.B-12, receiving water DO concentrations remain high at all monitoring stations and at all depths. While DO concentrations along the 100m depth contour during spring months appear to be marginally lower than DO concentrations at more remote locations, this difference is small. Further, this trend is not evident in summer, fall and winter months.[13]

III.B.3 What are the dissolved oxygen depressions and resulting concentrations near the bottom due to steady sediment demand and resuspension of sediments?

SUMMARY: Based on EPA guidance presented in the 1994 ATSD, the City's original 1995 301(h) application projected that critical 90-day dissolved oxygen depression due to sediment oxygen demand was less than 0.045 mg/L, and maximum oxygen depression due to resuspension of sediments was 0.077 mg/L. Actual PLOO solids emission rates are less than half of the solids MERs used in the original 1995 301(h) application. and PLOO settleable solids concentrations are almost an order of magnitude less than those used in the 1995 computations. As a result, the 1995 DO depression computations performed pursuant to the ATSD guidance thus represent theoretical "upper bound" values. Actual

13 See DO profiles for the 100m contour within Figure II.B-11 and II.B-12.

1800s solids deposition rates (and resulting DO depression due to resuspension of sediments) are likely only a fraction of the theoretical values projected in 1995.

The City's 1995 301(h) waiver application assessed DO depressions due to steady sediment demand and resuspension of sediments for a PLOO discharge of 240 mgd using guidance presented in the ATSD (EPA, 1994). Results of this prior analysis remain valid (albeit highly conservative), and are summarized below and presented in Appendix R.

Steady-State Oxygen Demand. As documented in Appendix R, oxygen depletion due to steady-state oxygen demand was computed using the method outlined in the 1994 ATSD. Page B-35 of this EPA ATSD presents the following equation for computing steady-state oxygen demand:

$$\Delta DO = \frac{a \cdot S_{avg} \cdot k_d \cdot X_m}{86{,}400 \cdot U \cdot H \cdot D} \qquad Equation\ III.B-5$$

where: ΔDO = steady sediment oxygen depletion in (mg/L)
a = oxygen sediment stoichiometric ratio,
k_d = sediment decay constant
S_{avg} = average concentration of deposited organic sediments over the deposition area (g/m^2)
X_m = length of deposition area (m)
U = current speed (m/sec)
D = subsequent dilution associated with horizontal mixing.

Appendix R presents information on each of the above input parameters, and computes or estimates appropriate input values. Table III.B-6 summarizes the input values used in the evaluation of steady-state DO depression for the critical ocean conditions.

Using these input values, Table III.B-7 summarizes the results of DO computations (see Appendix R) for a 240 mgd discharge and TSS mass emission rate of 18,100 mt/yr (a value 50 percent higher than the 11,998 mt/yr TSS MER proposed within this application). As shown in Table III.B-7, the steady-state DO depression is computed at 0.045 mg/L for an outfall discharge TSS MER of 18,100 mt/yr. Resulting DO depressions associated with present-day PLOO flows and TSS MERs would be significantly less.[14]

14 For comparison, the average annual PLOO flow during 2020 was 144.3 mgd and the TSS MER was 6,778 mt/yr. The 18,100 mt/yr TSS MER used in the above DO depression computation is thus greater than the present-day TSS MER by a factor of nearly 2.7, and greater than the permitted 11,999 mt/yr TSS MER by a factor of over 1.5. The DO depressions computed using the 18,100 mt/yr TSS MER thus overstates the probable DO depression associated with the PLOO discharge permitted under Order No. R9 2017-0007.

Table III.B-6:
Parameter Values - Steady Sediment Oxygen Demand Equation [A]

Variable	Description	Estimated Value [B]
a	Stoichiometric ratio	1.07 mg O_2/mg sediment
k_d	Sediment decay constant	0.01/day
S_{avg}	Average concentration of deposited organic sediments over the deposition area	17.14 g/m^2
X_m	Length of deposition area	2700 m
D	Dilution	1.6:1
U	Ocean current speed	0.029 m/sec
H	Layer thickness	2.7 m

Table III.B-6 Notes:

A Parameters for the steady-state sediment oxygen demand equation (Equation III.B-5) developed in accordance with guidance and information presented in the ATSD (EPA, 1994).

B Parameters computed in accordance with the ATSD (EPA, 1994). See Appendix R for details on each parameter. Based on a 240 mgd discharge flow and TSS MER of 18,000 mt/yr.

Table III.B-7:
Computed Steady Sediment Oxygen Depression [A]

Parameter	Value
Computed steady sediment oxygen depression	0.045 mg/L
Minimum observed DO at depth during 2018 at PLOO diffuser stations [B]	3.0 mg/L
Percent depression	1.5 %

Table III.B-7 Notes:

A Computed in accordance with instructions presented the ATSD (EPA, 1994). Input values for the steady sediment DO depression equation (Equation III.B-5) are presented in Table III.B-6.

B Minimum receiving water DO during 2019 at 100 m depth (per SDPUD, 2019a) at the ocean monitoring stations nearest the PLOO diffuser (F29, F30, and F31). 2019 is the most recent calendar year addressed in published PLOO biennial receiving water monitoring reports. Based on a 240 mgd discharge flow and TSS MER of 18,100 mt/yr.

Comparison to Minimum Ambient DO at Depth. The City monitors receiving water DO at 36 offshore stations and 8 kelp stations. The minimum DO at monitoring stations near the PLOO ZID (Stations F29, F30, and F31) during 2018 was 3.0 mg/L.[15] The computed steady-state 0.045

15 See Table III.B-3.

mg/L DO depression (again, a value computed assuming a 18,100 mt/yr discharge) corresponds to a depression of approximately 1.5 percent of the lowest observed year 2018 ambient DO.

Resuspension Oxygen Demand. For determining oxygen demand due to sediment resuspension, the ATSD (EPA, 1994) requires a "worst case" analysis based on all accumulated sediments being resuspended. In accordance with this technical support document, oxygen depletion due to sediment resuspension can be computed by:

$$\Delta DO = \frac{S_r}{D \cdot H} \cdot \left[1 - exp\left(\frac{-k_r t}{24}\right)\right] \qquad Equation\ III.B-6$$

where: ΔDO = oxygen depletion due to sediment resuspension in (mg/L)

S_r = average organic accumulation of resuspended sediments (g/m^2)

D = horizontal (subsequent) dilution

H = depth of water volume containing resuspended materials (m)

k_r = decay rate of resuspended sediments

t = elapsed time since resuspension (hr)

Appendix R applies this equation to the City's 240 mgd PLOO discharge (at an assumed TSS mass emission rate of 18,100 mt/yr). Table III.B-8 summarizes the input values used in Appendix R for the computation of DO depression due to sediment resuspension.

Table III.B-9 summarizes the results of the sediment resuspension DO computations using these input values. As shown in Table III.B-9, the DO depression due to sediment resuspension is computed at 0.077 mg/L. This DO depression translates to less than a 2.6 percent DO depression if receiving water DO concentration at depth are at the minimum observed value of 3.0 mg/L.

The computed DO depression due to sediment resuspension is likely a significant overestimate. The present-day PLOO discharge contains significantly lower concentrations of settleable solids and TSS and significantly lower TSS MERs than those used in the 1995 DO demand computations. As a result, the actual accumulated sediments will be far less than the 20.9 g/m^2 value assumed in the above DO depression computation.[16]

16 Confirming this, no visible sedimentation is evident near the PLOO after more than a quarter century of operation.

Table III.B-8:
Estimated Parameter Values - Oxygen Demand Due to Sediment Resuspension

Variable	Description	Estimated Value [A]
S_r	Average organic accumulation of resuspended sediments	20.9 g/m^2
D	Horizontal (subsequent) dilution	0.01/day
H	Depth of water volume containing resuspended materials	Computed as function of elapsed time and vertical diffusion coefficient [B]
k	Decay rate of resuspended sediments	0.1/sec

Table III.B-8 Notes:

A Parameters estimated or computed in accordance with information provided in the ATSD (EPA, 1994). See Appendix R for details on each parameter.

B Depth of water volume containing resuspended materials "H" is computed as a function of elapsed time and vertical diffusion coefficient (5 cm/sec^2), as follows:

$$H = \frac{\pi^{0.5}}{100}\sqrt{3600 \times t \times \varepsilon_z}$$

Where: ε = vertical diffusion coefficient during resuspension (5 cm^2/sec), and
T = elapsed time following resuspension (hours).

Table III.B-9:
Computed Oxygen Depression Due to Sediment Resuspension [A]

Parameter	Value
Computed oxygen depression due to sediment resuspension [B]	0.077 mg/L
Minimum observed DO at 93 m depth for the January through March critical period [C]	3.0 mg/L
Percent depression	2.6 %

Table III.B-9 Notes:

A Computed in accordance with instructions presented in the ATSD (EPA, 1994). Input values for the steady sediment DO depression equation are presented in Table III.B-8. Based on a 240 mgd discharge and TSS MER of 18,100 mt/yr.

B Computed DO depression due to resuspension is time dependent. The maximum oxygen depression is computed as occurring approximately eight hours after resuspension. See Appendix R.

C Minimum receiving water DO during 2018 at depths ranging from 80 – 100 m at the PLOO offshore monitoring stations. Value from Table III.B-3. (City of San Diego, 2019a)

III.B.4 What is the increase in receiving water suspended solids concentration following initial dilution of the modified discharge?

SUMMARY: The average increase in receiving water TSS concentration resulting from the 240 mgd PLOO discharge is approximately 1 to 2 percent of the natural background concentration.

The concentration of TSS at the completion of initial dilution is calculated using the following equation presented on page B-40 in ATSD (EPA, 1994):

$$SS_f = SS_a + \frac{SS_e - SS_a}{S_a} \qquad Equation\ III.B-7$$

where SS_f = Suspended solids concentration at completion of initial dilution, mg/L.

SS_a = Affected ambient suspended solids concentration immediately upcurrent of the diffuser averaged over one-tidal period (12.5 hours) and from the diffuser port depth to the trapping level, mg/L.

SS_e = Effluent suspended solids concentration, mg/L.

S_a = Flux-averaged initial dilution (California regulatory monthly averages based on CTD data).

As noted in the response to Questionnaire Section II.A.4, the average effluent TSS concentration for the PLWTP discharge during 2020 was 34 mg/L. During 2020, Metro System facilities achieved an average system wide TSS removal of 89.9 percent.

As documented in the City's prior 301(h) applications, receiving water TSS concentrations vary significantly with season and natural conditions. Monitoring conducted as part of a special 1994 receiving water study showed ambient receiving water TSS concentrations ranging from 2.2 mg/L near the PLOO ZID to 11.2 mg/L at reference stations, with a depth-averaged value over a complete tidal cycle of 7 mg/L. While significant variation in receiving water TSS can occur, these 1994 values remain valid for purposes of computing TSS impacts on receiving waters.

Table III.B-10 presents the effects of a PLOO discharge of 240 mgd (10.5 m^3/sec) on receiving water TSS concentrations. Values presented in Table III.B-10 are based on an ambient ocean water TSS concentration of 7 mg/L and monthly flux-averaged regulatory initial dilution values presented within Appendix Q. As shown in Table III.B-10, the PLOO discharge is projected to increase receiving water TSS concentrations by approximately 1 to 2 percent.

Table III.B-10: Suspended Solids Concentration at the Completion of Initial Dilution Assuming an Ambient Receiving Water TSS Concentration of 7 mg/L

Month	Calendar Year 2020 Average Monthly PLWTP TSS Concentration [A] SS_e (mg/L)	Average Ambient TSS Concentration Upcurrent from Outfall Diffuser [B] SS_a (mg/L)	Initial Dilution [C] S_a	Computed Receiving Water TSS Concentration after Initial Dilution [D] SS_f (mg/L)	Increase in Receiving Water TSS concentration (mg/L)	Percent Change in Receiving Water TSS Concentration ΔSS(%)
January	34	7.0	206:1	7.13	0.13	1.9%
February	40	7.0	202:1	7.16	0.16	1.7%
March	34	7.0	224:1	7.12	0.12	1.4%
April	33	7.0	263:1	7.10	0.10	1.4%
May	32	7.0	284:1	7.09	0.09	1.3%
June	33	7.0	295:1	7.09	0.09	1.3%
July	33	7.0	324:1	7.08	0.08	1.1%
August	34	7.0	320:1	7.08	0.08	1.1%

Month	Calendar Year 2020 Average Monthly PLWTP TSS Concentration [A] SS_e (mg/L)	Average Ambient TSS Concentration Upcurrent from Outfall Diffuser [B] SS_a (mg/L)	Initial Dilution [C] S_a	Computed Receiving Water TSS Concentration after Initial Dilution [D] SS_f (mg/L)	Increase in Receiving Water TSS concentration (mg/L)	Percent Change in Receiving Water TSS Concentration ΔSS(%)
September	32	7.0	294:1	7.09	0.09	1.3%
October	31	7.0	307:1	7.08	0.08	1.1%
November	36	7.0	281:1	7.10	0.10	1.4%
December	36	7.0	249:1	7.12	0.12	1.7%
Average	34	7.0	271:1	7.10	0.10	1.4%

Table III.B-10 Notes:
- A Average of daily PLWTP daily effluent TSS concentrations during the listed month. See Table II.A-5 in Section II.A.3.a.
- B Assumed average annual receiving water TSS concentration. From monitoring work conducted in 1994 (which remains valid) presented in the City's 1995 301(h) application. (City of San Diego, 1995) See Table III.B-11 for computed receiving water TSS concentrations over a range of potential receiving water concentrations.
- C Computed mean monthly regulatory initial dilutions. (From Appendix Q).
- D Computed suspended solids concentrations after initial dilution (SS_f) per Equation III.B-7.

Recognizing that natural ambient receiving water TSS concentrations may vary significantly over both short-term and long-term time periods, Table III.B-11 presents estimated PLOO effects on receiving waters for a range of assumed receiving water TSS concentrations. Under this wide range of conditions, the PLOO discharge is projected to increase receiving water TSS concentrations at the edge of the ZID by no more than one half of one percent.

Table III.B-11:
Suspended Solids Concentration at the Completion of Initial Dilution
At a Range of Assumed Potential Receiving Water TSS Concentrations

Potential Receiving Water TSS Concentration [A]	Maximum Monthly Conditions [B] 204:1 Minimum Month Initial Dilution		Median Conditions [C] 338:1 Median Initial Dilution	
	Computed Increase in Receiving Water TSS (mg/L)	Percent Change	Computed Increase in Receiving Water TSS (mg/L)	Percent Change
2.2	0.01	0.5 %	0.01	0.3 %
7.0	0.03	0.4 %	0.02	0.3 %
11.2	0.05	0.4 %	0.03	0.3 %

Table III.B-11 Notes:
- A Ambient receiving water TSS concentrations upgradient from the PLOO diffuser ranged from 2.2 to 11.2 mg/L during monitoring conducted in 1994. (City of San Diego, 1995)
- B Computed as above in Table III.B-10 for the maximum month (February) conditions at the 204:1 initial dilution assigned within Order No. R9-2017-0007.
- C Computed as above in Table III.B-10 for the listed annual average conditions, assuming a median initial dilution of 338:1.

III.B.5 What is the change in receiving water pH immediately following initial dilution of the modified discharge?

SUMMARY: The maximum change in receiving water pH (Δ pH) immediately following initial dilution is 0.02 units, which is well below the Ocean Plan water quality objective of less than 0.2 pH units of change.

The City's 1995 waiver application computed projected effects of a 10.5 m^3/sec (240 mgd) discharge on the pH of receiving waters. These 1995 computations were based on methodology presented in ATSD (EPA, 1994).

As documented in the 1995 waiver application, the PLOO discharge is projected to result in a maximum pH change of 0.02 pH units in receiving waters. Present-day PLOO pH values remain consistent with PLOO pH concentrations that occurred in the 1990s, and no significant changes in wastewater pH are projected for the future PLOO discharge. PLOO discharge flows, however, are significantly below the 240 mgd flowrate used in the 1995 analysis on receiving water pH. As a result, the computations from the 1995 waiver application for a 240 mgd discharge likely overestimates the actual effect of the PLOO discharge on pH. Nonetheless, the 1995 pH computations remain valid as expressing an upper bound effect of the PLOO on receiving water pH.

Receiving water data collected by the City of San Diego over the past 27 years confirm the minimal impact of the PLOO discharge on receiving water pH. The City of San Diego (2018) compared pH values at individual PLO monitoring stations during 2016 and 2017 during two conditions: (1) reference conditions when ocean current and stratification data indicated no potential presence of the PLOO discharge plume and (2) conditions in which ocean current, stratification and water quality data indicates the potential presence of the PLOO plume. Typically, no differences in pH between these two conditions was observed, and maximum differences observed was 0.1 pH unit – a value well within the Ocean Plan requirement that receiving water pH not be changed by more than 0.2 pH units.[17]

While pH effects of the PLOO discharge are minimal, significantly larger pH variation occurs as a result of natural conditions. Lowest pH values typically occur during the spring at depth, likely due to upwelling events of oxygen-poor water. Higher pH values occurred in conjunction with higher concentrations of chlorophyll α and higher DO values.[18]

III.B.6 Does (will) the modified discharge comply with applicable water quality standards for dissolved oxygen, suspended solids, and pH?

SUMMARY: Yes. The PLOO discharge complies with all applicable water quality standards for dissolved oxygen, suspended solids, and pH.

Dissolved Oxygen. The Ocean Plan requires that DO concentrations not be depressed more than 10 percent as the result of oxygen demanding wastes.[19] The response to Questionnaire Section III.B.1 assesses the DO concentration of receiving waters following initial dilution during maximum stratification. As detailed in Section III.B.1 (and in Appendix R), DO after initial dilution at maximum stratification is projected to be depressed less than 0.05 mg/L.

17 See Appendix C.4 of City of San Diego (2018a).

18 See Chapter 2 of City of San Diego (2018a).

19 Water Quality Objective II.B.2 of the 2019 Ocean Plan.

This maximum DO depression complies by a wide margin with the Ocean Plan water quality objective that receiving water DO not be depressed more than 10 percent.

The response to Questionnaire Section III.B.2 addresses farfield DO depression. As discussed in the response to Questionnaire Section III.B.2 (and in Appendix R), farfield DO is conservatively projected to be reduced by less than 3 percent - a value well within the Ocean Plan limit of 10 percent.

The response to Questionnaire Section III.B.3 addresses DO depression near the ocean bottom due to sediment DO demand. As presented in Section III.B.3, DO depression at the bottom as a result of steady sediment DO demand is projected at less than 2 percent. DO depression at the ocean bottom due to sediment resuspension is projected at less than three percent. Both values are within the allowable Ocean Plan DO limit by a significant margin.

Suspended Solids. The Ocean Plan requires that dischargers achieve a 30-day average of 75 percent removal of suspended solids from the effluent stream.[20] The City's existing NPDES permit requires 80 percent TSS removal.

As documented within Table II.A-5, average annual system-wide Metro System TSS percent removal during 2020 was 90.3 percent.[21] Monthly percent removals during 2020 ranged from 88.9 percent to 91.2 percent. During 2017-2020, the City achieved 100 percent compliance with 75 percent TSS removal requirement established in the Ocean Plan and the 80 percent TSS removal effluent limitation established within Order No. R9-2017-0007.[22]

In addition to establishing a 75 percent TSS removal requirement, the Ocean Plan allows Regional Boards to establish TSS effluent concentration limits at values not less than 60 mg/L. Order No. R9-2017-0007 establishes a monthly average effluent TSS concentration limit of 75 mg/L. As shown in Table II.A-5 (see Section II.A.3), monthly average PLWTP effluent TSS concentrations ranged from 31 to 40 mg/L, and monthly average TSS concentrations were 36 mg/L or less during 11 of the 12 months of 2020. Annual average PLWTP TSS effluent concentrations during 2017-2020 ranged from 34 mg/L to 40 mg/L. All PLWTP monthly average effluent TSS concentrations during 2017-2020 were well within the 75 mg/L effluent limitation established within Order No. R9-2017-0007.[23]

Receiving Water pH. The Ocean Plan requires that receiving water pH not be changed at any time more than 0.2 units from that which occurs naturally.[24] As shown in the response to Questionnaire Section III.B.5, the PLOO discharge is computed (using methodology specified in the ATSD) to affect receiving water pH by less than 0.02 units. Further, more than a quarter century of PLOO receiving water data indicate that the PLOO discharge is not having a noticeable effect on receiving water pH, and pH concentrations near the PLOO discharge point remain consistent with values seen at monitoring stations remote from the PLOO.

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20 Table 4 of the 2019 Ocean Plan establishes technology-based effluent limitations for TSS, which are based on percent removal, provided that the effluent limitation should not be less than 60 mg/L.
21 See Section II.A.3.a of this Large Applicant Questionnaire.
22 See Table II.A-5 (Section II.A.3.a) for a monthly breakdown of PLWTP effluent TSS and system-wide TSS removal during 2017-2020.
23 *Ibid.*
24 Water quality objective II.B.2 of the 2019 Ocean Plan.

Effluent pH. The Ocean Plan establishes pH effluent limits of 6 to 9 pH units, to be achieved at all times.[25] Table III.B-12 presents PLWTP effluent pH concentrations during 2017-2020. During 2017-2020, average annual pH concentrations ranged from 7.07 to 7.27 pH units.

The daily maximum PLWTP effluent pH concentration during 2020 was 7.38 pH units, while the minimum daily value for 2020 was 7.01 pH units.[26] During 2020, 80 percent of the daily pH values were between 7.16 and 7.30 pH units, and 90 percent of the daily pH values were between 7.14 and 7.32 pH units.[27]

During 2017-2020, all daily pH values complied with the Ocean Plan requirement that effluent pH not be below exceed 6.0 units nor above 9.0 units.

Table III.B-12:
PLWTP Effluent pH, 2017-2020

Period	PLWTP Effluent pH [A,B] (pH Units)			
	2017[2]	2018	2019	2020
January	7.27	7.09	7.27	7.19
February	7.24	7.13	7.30	7.21
March	7.23	7.18	7.24	7.19
April	7.18	7.18	7.20	7.21
May	7.15	7.19	7.20	7.21
June	7.14	7.12	7.19	7.22
July	7.11	7.19	7.19	7.24
August	7.07	7.22	7.15	7.25
September	7.18	7.23	7.12	7.26
October	7.18	7.27	7.11	7.23
November	7.14	7.24	7.12	7.23
December	7.12	7.25	7.19	7.24
Annual Average	7.17	7.19	7.19	7.22

Table III.B-12 Notes:

A Data from SDPUD (2018b, 2019b, 2020, 2021) for calendar years 2017-2020. See Section 5.4 of Appendix M for 2020 data. 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators at a later date.

B Order No. R9-2017-0007 became effective on October 1, 2017. The PLOO discharge was regulated by Order No. R9-2009-0001 for the first nine months of year 2017.

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25 Table 4 of the 2019 Ocean Plan establishes effluent limitations for pH, requiring that pH be between 6.0 and 9.0 pH units at all times.

26 The minimum daily pH during 2020 of 7.01 pH units occurred on July 6, 2020, while the maximum daily pH of 7.38 pH units occurred on February 5, 2020.

27 Based on daily PLWTP effluent monitoring data, as reported in monthly PLOO monitoring reports submitted to the Regional Board via CIWQS.

III.B.7. Provide data to demonstrate that all applicable State water quality standards, and all applicable water quality criteria established under Section 304(a)(1) of the Clean Water Act for which there is no directly corresponding numerical applicable water quality standards approved by EPA, are met at and beyond the boundary of the ZID under critical environmental and treatment plant conditions in the waters surrounding or adjacent to the point at which your effluent is discharged. [40 CFR 125.62(a)(1)]

SUMMARY: The PLOO discharge complies with water quality objectives and criteria established by the State of California. The PLOO discharge also conforms with water quality criteria established by EPA for the protection of aquatic habitat and the protection of human health.

Ocean Plan Effluent Limitations

Ocean Plan establishes effluent limitations for wastewater discharges and receiving water quality objectives that apply within the three-nautical-mile limit off the California coast. State of California effluent limitations for wastewater discharges to the ocean are established in Table 4 of the Ocean Plan.[28] Effluent limitations are established for grease and oil, TSS, settleable solids, turbidity, and pH. Table III.B-13 presents Ocean Plan effluent limitations for municipal wastewater discharges.

Table III.B-13:
Ocean Plan Table 4 Effluent Limitations for Physical/Chemical Constituents

Constituent	Units	Ocean Plan Table 4 Effluent Limitation [A]		
		30-day Average	7-Day Average	Maximum Value
grease & oil	mg/L	25	40	75
settleable solids	ml/L	1.0	1.5	3.0
suspended solids	% removal	75%	NS [B]	NS [B]
TSS	mg/L	1.0	1.5	3.0
turbidity	NTU	75	100	225
pH	pH units	6 - 9 at all times		

Table III.B-13 Notes:
A From Table 4 of the 2019 Ocean Plan (State Board, 2019).
B NS indicates that the Ocean Plan does not establish a numerical TSS percent removal requirement for the listed time period.

TSS Concentration and Percent Removal Requirements. Order No. R9-2017-0007 implements Ocean Plan effluent limitations for TSS and TSS percent removal. The PLOO discharge has achieved 100 percent compliance with the TSS percent removal requirements established in Order No. R9-2017-0007 and in the Ocean Plan.

Table III.B-14 summarizes PLWTP effluent data for calendar year 2020. As shown in Table III.B-14, the lowest daily percent TSS removal achieved during 2022 was higher than the monthly average 75 percent removal requirement established in the Ocean Plan and in Order

28 Table 4 of the 2019 Ocean Plan was formerly known as Table A in prior Ocean Plan versions.

No. R9-2017-0007.[29] Daily system-wide TSS removals of 90 percent or higher were achieved on more than 69 percent of the days during 2020.[30] Additionally, as shown in Table II.A-5 (see Section II.A.3.a), the PLWTP achieved a monthly average TSS removal of at least 85 percent during all calendar months in 2017-2020.

Table III.B-14:
Summary of Daily PLWTP Effluent Concentrations, 2020

Daily Value	PLWTP Effluent Concentration, 2020 [A]					
	TSS (mg/L)	System-Wide TSS Removal (%)	Settleable Solids (ml/L)	pH (pH units)	Grease and Oil (mg/L)	Turbidity (NTU)
Maximum Daily Value [B]	59	94.2	2.2	7.38	50.6	88
Maximum 7-Day Average [C]	NS [D]	NS [D]	0.5	NS [D]	29.4	58
Maximum Monthly Value [E]	NS [D]	NS [D]	0.3	NS [D]	17.5	52.0
95th Percentile Daily Value [B]	44	92.9	0.5	7.32	22.5	60
90th Percentile Daily Value [B]	41	92.5	0.3	7.30	17.5	56
80th Percentile Daily Value [B]	38	91.9	0.2	7.27	15.1	51
50th Percentile Daily Value [B]	33	90.8	0.1	7.23	11.0	43
Minimum Daily Value [B]	22	82.0	< 0.1	7.01	3.4	11.4
Average Daily Value [F]	34	90.5 [F]	0.2	7.23 [F]	12.4	41

Table III.B-14 Notes:

A Data from monthly monitoring reports submitted to the Regional Board via the CIWQS during calendar year 2020. 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators at a later date per requirements established in Order No. R9-2017-0007.

B Maximum, minimum and percentile values, as determined from the 365 daily average values for the listed constituents during calendar year 2020. Daily average values may be based on the results from multiple samples during a given day.

C Maximum values among computed rolling 7-day averages during 2020.

D NS indicates that the Ocean Plan does not establish a 7-day or 30-day average effluent limitation for the constituent.

E Maximum monthly value during the 12 calendar months of 2020. See Section 5.4 of Appendix M for data. Also see Table II.A-5 (section II.A.3.a of this Large Applicant Questionnaire) for a summary of monthly TSS percent removals during 2017-2020. As shown in Table II.A-5, the PLOO discharge has achieved 100 percent compliance with Ocean Plan TSS percent removal requirements.

F Value computed as the arithmetic average of year 2020 daily values. The average of daily values may differ slightly from annual averages computed as the arithmetic average of monthly values (e.g., values shown in Section 5.4 of Appendix M).

29 The lowest computed daily system wide TSS percent removal during 2020 (82 percent) occurred on April 11, 2020.

30 Daily system wide TSS removal rates of 90 percent or more were achieved during 253 of 365 days (69.3%) during 2020.

pH Requirements. Order No. R9-2017-0007 requires that the PLOO pH be maintained between 6.0 and 9.0 pH units at all times. The PLOO discharge has achieved 100 percent compliance with this pH requirement. As shown in Table III.B-14, daily average pH concentrations in the PLOO discharge during 2020 were always below 7.4 and always above 7.0 pH units. Additionally, as shown in Table III.B-12, little variation in monthly average pH values has occurred during 2017-2020.

Grease and Oil. The PLOO discharge has achieved 100 percent compliance with grease and oil effluent limitations established in the Ocean Plan and within Order No. R9-2017-0007. Grease and oil concentrations in the PLWTP effluent during 2020 (see Table III.B-14) averaged 12.4 mg/L and ranged from 3.4 mg/L to 50.6 mg/L- values well below the 75 mg/L maximum limit.[31] As shown in Table III.B-15, monthly average PLOO grease and oil concentrations during 2017-2020 ranged from 9.5 to 18.6 mg/L – values well below the 25 mg/L monthly average effluent limitation established in the Ocean Plan and Order No. R9-2017-0007.

Table III.B-15:
PLWTP Grease & Oil, 2017-2020

Period	Monthly Average PLWTP Effluent Grease & Oil [A] (mg/L)			
	2017 [B]	2018	2019	2020
January	9.5	12.2	12.3	13.6
February	10.1	15.3	11.2	17.5
March	10.6	14.7	14.5	15.0
April	12.0	13.9	14.1	15.4
May	13.1	13.5	13.0	11.2
June	14.1	18.0	15.1	11.0
July	15.1	14.2	16.5	10.1
August	16.0	14.4	15.4	11.8
September	10.9	13.3	16.8	9.1
October	12.5	14.9	18.6	11.2
November	13.1	11.5	15.7	10.1
December	13.4	10.6	12.2	12.3
Annual Average	12.5	13.9	14.6	12.4

Table III.B-15 Notes:

A Data from SDPUD (2018b, 2019b, 2020, 2021) for calendar years 2017-2020. See Section 5.4 of Appendix M for 2020 data. 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators at a later date per requirements established in Order No. R9-2017-0007.

B Order No. R9-2017-0007 became effective on October 1, 2017. The PLOO discharge was regulated by Order No. R9-2009-0001 for the first nine months of year 2017. Both Orders established a monthly average grease and oil effluent limit of 25 mg/L.

31 The highest PLWTP effluent daily grease and oil concentration reported during 2020 was 50.6 mg/L, which occurred on February 18, 2020. All other daily grease and oil concentrations during 2020 were less than 42 mg/L.

Settleable Solids. The PLOO discharge achieves 100 percent compliance with settleable solids requirements established in the Ocean Plan and Order No. R9-2017-0007:

- The maximum PLOO settleable solids concentration during 2020 was 2.2 ml/L, compared to the corresponding effluent concentration limit of 3.0 ml/L,
- The maximum 7-day average value during 2020 was 0.5 ml/L, a value significantly below the 1.5 ml/L 7-day average settleable solids effluent limit, and
- The maximum monthly PLOO settleable solids concentration during 2020 was 0.3 ml/L, a value significantly below the 1.0 ml/L 30-day average effluent limitation of Order No. R9-2017-0007.

For comparison, Table III.B-16 presents PLWTP monthly average effluent settleable solids during 2017-2020. As shown in the table, the PLWTP achieved consistent removal of settleable solids during 2017-2020. During this four-year period, only two months occurred where monthly average settleable solids concentrations exceeded 0.4 ml/L.

Table III.B-16:
PLWTP Settleable Solids, 2017-2020

Period	PLWTP Effluent Settleable Solids [A] (ml/L)			
	2017 [B]	2018	2019	2020
January	0.2	0.2	0.3	0.3
February	0.1	0.2	0.4	0.2
March	0.1	0.3	0.4	0.2
April	0.2	0.3	0.3	0.2
May	0.2	0.2	0.4	0.1
June	0.2	0.6	0.2	0.1
July	0.2	0.4	0.3	0.2
August	0.5	0.3	0.2	0.1
September	0.1	0.3	0.4	0.2
October	0.2	0.3	0.4	0.2
November	0.3	0.3	0.4	0.2
December	0.2	0.2	0.3	0.2
Annual Average	0.2	0.3	0.3	0.2

Table III.B-16 Notes:

A Data from SDPUD (2018b, 2019b, 2020, 2021) for calendar years 2017-2020. See Section 5.4 of Appendix M for 2020 data. 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators per reporting requirements of Order No. R9-2017-0007.

B Order No. R9-2017-0007 became effective on October 1, 2017. The PLOO discharge was regulated by Order No. R9-2009-0001 for the first nine months of year 2017. Both Orders established a monthly average settleable solids effluent limitation of 1.0 ml/L.

Turbidity. The Ocean Plan and Order No. R9-2017-0007 establish weekly average and instantaneous maximum effluent limits of 100 and 225 Nephelometric Turbidity Units (NTU).

As shown in Table III.B-17, the PLOO discharge complied with these turbidity limits by a significant margin. The maximum 7-day average PLOO effluent turbidity during 2020 was 58 NTU, while the maximum daily value was 88 NTU.

The Ocean Plan and Order No. R9-2017-0007 also establish a 30-day average effluent turbidity limitation of 75 NTU for wastewater discharges to the ocean. Table III.B-17 presents monthly average PLWTP effluent turbidity during 2017-2020. As shown in Table III.B-17, the maximum monthly PLWTP effluent turbidity during 2020 was 52 NTU. During 2017-2020, the maximum monthly turbidity during 2017-2020 was 68 NTU, and all but four months during this period had a turbidity of less than 60 NTU.

Table III.B-17:
PLWTP Effluent Turbidity, 2017-2020

Period	PLWTP Effluent Turbidity [A,B] (NTU)			
	2017[2]	2018	2019	2020
January	27	38	32	31
February	27	37	25	35
March	30	37	33	30
April	41	43	40	24
May	44	53	44	37
June	45	67	47	45
July	56	61	51	50
August	63	68	53	52
September	50	57	53	52
October	46	52	48	51
November	47	43	40	41
December	42	36	29	44
Annual Average	43	49	41	41

Table III.B-17 Notes:

A Data from SDPUD (2018b, 2019b, 2020, 2021) for calendar years 2017-2020. See Section 5.4 of Appendix M for 2020 data. 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators per requirements established in Order No. R9-2017-0007.

B Order No. R9-2017-0007 became effective on October 1, 2017. The PLOO discharge was regulated by Order No. R9-2009-0001 for the first nine months of year 2017. Both Orders establish a 30-day average turbidity effluent limitation of 75 NTU.

Light Transmittance. In addition to establishing effluent turbidity limits, the Ocean Plan establishes the following narrative objective for light transmittance:

Natural light shall not be significantly reduced at any point outside the initial dilution zone as the result of the discharge of waste.[32]

As discussed in Appendices F and Q, the top of the PLOO wastefield is typically contained below depths of 40 to 60 m (131 to 197 ft), which is well below the primary portion of the euphotic zone. Within this deeper zone of the PLOO waste field, natural light levels are less than one percent of incident light at sea surface.

As discussed in the response to II.B.6.a, receiving water light transmittance is assessed at 36 designated offshore stations and 8 designated kelp stations.[33] Figures II.B-13 and II.B-14 graphically presents a summary of light transmittance data at these stations during calendar years 2018-2019.[34] As shown in Figures II.B-13 and II.B.14, no outfall-related differences in water clarity are in evidence.

Effluent Toxicity. Table 3 of the 2019 Ocean Plan establishes a daily maximum receiving water chronic toxicity objective of 1.0 TUc, which applies to receiving waters outside the designated ZID. The Ocean Plan requires that compliance with this receiving water toxicity limit be determined on the basis of the following equation:

$$C_a = \frac{C_e}{1 + D_m} \qquad Equation\ III.B - 8$$

where: C_a = Receiving water chronic toxicity at the edge of the ZID.

C_e = Effluent chronic toxicity in TUc.

D_m = Minimum month initial dilution.

The Ocean Plan also establishes a daily maximum receiving water acute toxicity limit of 0.3 TUa, which applies at a distance of one-tenth the dimension of the ZID.

Provision III.C.4.c of the Ocean Plan establishes effluent toxicity monitoring requirements for acute toxicity and/or chronic toxicity the basis of initial dilution:

- Acute toxicity monitoring is required if D_m is greater than 1000:1,
- Either acute or chronic toxicity monitoring is required if D_m is between 350:1 and 1000:1,
- Chronic toxicity testing is required if *Dm* is between 100:1 and 350:1, but discretion is provided to the Regional Board to require both chronic and acute toxicity monitoring if warranted for protecting beneficial uses, and
- Chronic toxicity texting is required if the D_m is less than 100:1.

Since the PLOO minimum monthly average initial dilution is assigned at 204:1, Order No. R9-2017-0007 establishes chronic toxicity effluent limits and chronic toxicity monitoring requirements and finds that these chronic toxicity limits are protective of both Ocean Plan acute and chronic toxicity objectives.[35]

32 Receiving Water Objective II.C.3 of the 2019 Ocean Plan.

33 See Order No. R9-2017-0007 for a description of the offshore stations and kelp stations.

34 See Section II.B.6 of this Large Applicant Questionnaire.

35 In accordance with these Ocean Plan requirements, Order No. R9-2017-0007 finds that the chronic toxicity limitation established within the Order is projective of both the numerical acute and chronic toxicity objectives that are established in the Ocean Plan. Order No. R9-2017-0007 therefore does not establish effluent limits for acute toxicity and does not establish PLOO monitoring requirements for acute toxicity.

In lieu of establishing the Ocean Plan chronic toxicity limit (numerically expressed in units of TUc), Order No. R9-2017-0007 establishes requirements on the basis of the Test of Significant Toxicity (TST) statistical t-test approach (EPA, 2010). Under this protocol, a null hypothesis of "fail" is assigned unless the test result rejects this null hypothesis, in which test results are reported as "pass". Order No. R9-2017-0007 establishes a requirement of "pass" for PLOO chronic toxicity tests and establishes that the "pass" chronic toxicity effluent limitation is protective of both the numeric acute and chronic toxicity objectives in the Ocean Plan.

In accordance with the monitoring requirements of Order No. R9-2017-0007, chronic toxicity monitoring during 2017-2020 included testing of three different species using six different types of tests:

- *Atherinops affinis* (topsmelt) for survival and growth
- *Haliotis rufescens* (red abalone) for larval development
- *Macrocystis pyrifera* (giant kelp) for germination and germ-tube length (development)

Order No. R9-2017-0007 requires that biennial tests be conducted using the TST testing protocols on each of these species to determine which is most sensitive. In accordance with this requirement, biennial tests of the PLWTP effluent were performed in 2018 and 2020. Table III.B-18 summarizes the results of the 2018 and 2020 biennial chronic toxicity sensitivity testing on the three test species. As shown in Table III.B-18, all test results during 2017-2020 (using the TSD protocols) registered as "pass." As also shown by the NOEC[36] values in Table III.B-18, *Macrocystis pyrifera* (giant kelp) was determined to be the most sensitive species in both the 2018 and 2020 biennial chronic toxicity tests.

Order No. R9-2017-0007 requires monthly chronic toxicity monitoring for the species determined within the biennial testing to be most sensitive. Table III.B-19 presents the results of monthly chronic toxicity tests for *Macrocystis pyrifera* during 2017-2020. As shown in Tables III.B-18 and III.B-19, 100 percent of the PLOO chronic toxicity samples have complied with the "pass" effluent limit established Table 5 of Order No. R9-2017-0007.

36 No observed effects concentration (NOEC).

Table III.B-18:
Point Loma Ocean Outfall Discharge
Biannual Sensitive Species Chronic Toxicity Testing, 2018 and 2020 [A]

Species	Test Endpoint	Date of Sample	TST Result [B]	No Observed Effects Concentration [C] (NOEC)	EC25 [D]	EC50 [E]	Percent Effect [F]
Red Abalone	Development	1/23/2018	Pass	18	39.3	52.2	-0.2
		1/21/2020	Pass	18	36	48.6	-0.9
Topsmelt	Larval Survival	1/23/2018	Pass	32	60.9	100	-7.4
		1/21/2020	Pass	56	86.5	121	-3.5
	Growth	1/23/2018	Pass	56	67.2	109	-28.4
		1/21/2020	Pass	56	64.6	88.4	-14.8
Macrocystis pyrifera (Giant Kelp)	Germination	1/23/2018	Pass	32	75.2	140	4.0
		1/21/2020	Pass	10	51	110	1.4
	Growth Germ Tube Length	1/23/2018	Pass	< 10	52.7	273	6.8
		1/21/2020	Pass	10	102	206	7.8

Table III.B-18 Notes:

A From monthly toxicity monitoring reports submitted to the Regional Board via CIWQS pursuant to Order No. R9-2017-0007. Order No. R9-2017-0007 requires the City to conduct chronic toxicity monitoring of the PLOO effluent using the TST statistical t-test approach described in EPA (2010). Biannual sensitive species screening tests are conducted to identify the most sensitive species which are to be subjected to TST chronic toxicity during the ensuring 24-month period.

B Under the TST approach, the null hypothesis (Ho) is that the mean discharge "in-stream" waste concentration (IWC) response is less than 75 percent of the response in a control sample. A test result that rejects this null hypothesis is reported as "Pass", and a test result that does not reject this null hypothesis is reported as "Fail".

C NOEC (No Observed Effects Concentration) is the maximum percent of effluent that causes no observable effects on the test species.

D EC25 is the dilution at which 25 percent of test organisms display an observable effect.

E EC50 is the dilution at which 50 percent of test organisms display an observable effect.

F Percent effect of the effluent sample compared to a control sample.

Table III.B-19:
Point Loma Ocean Outfall Discharge - Chronic Toxicity Testing, 2017-2020
Giant Kelp (*Macrocystis pyrifera*) Germ Tube Length (Growth) [A]

Date of Sample Giant Kelp Growth	TST Result [B]	No Observed Effects Concentration [C] (NOEC)	EC25 [D]	EC50 [E]	Percent Effect [F]
10/16/2017	Pass	32	145	254	-6.4
11/6/2017	Pass	23	74.1	312	-0.9
12/4/2017	Pass	< 10	48.5	228	0.8
1/23/2018	Pass	< 10	52.7	273	6.8

Date of Sample Giant Kelp Growth	TST Result [B]	No Observed Effects Concentration [C] (NOEC)	EC25 [D]	EC50 [E]	Percent Effect [F]
2/26/2018	Pass	10	61.5	454	7.0
3/5/2018	Pass	32	152	441	2.2
4/16/2018	Pass	32	77.1	441	-9.6
5/22/2018	Pass	32	114	371	-4.3
6/18/2018	Pass	10	76.7	307	7.3
7/23/2018	Pass	32	87.2	245	0.4
8/6/2018	Pass	23	67.9	364	0.8
9/10/2018	Pass	10	62.1	244	7.2
10/2/2018	Pass	10	47.7	204	-5.9
11/5/2018	Pass	10	58.4	201	-6.1
12/3/2018	Pass	< 10	64.4	256	-2.8
1/17/2019	Pass	10	102	281	-4.8
2/19/2019	Pass	< 10	74.3	366	-7.7
3/4/2019	Pass	32	69.4	203	2.6
4/19/2019	Pass	32	65.3	174	-0.4
5/13/2019	Pass	32	100	236	-2.3
6/3/2019	Pass	10	54.5	226	1.5
7/15/2019	Pass	32	79	245	2.4
8/5/2019	Pass	10	52.2	227	2.7
9/2/2019	Pass	< 10	94.5	189	-5.4
10/7/2019	Pass	10	69.4	198	-0.4
11/4/2019	Pass	10	70.3	162.5	1.1
12/2/2019	Pass	10	59.1	184	-3.1
1/7/2020	Pass	32	55.7	158	-2.3
1/21/2020	Pass	10	102	206	7.8
2/3/2020	Pass	10	85	312	-0.8
3/9/2020	Pass	32	112	266	-3.1
4/5/2020	Pass	10	55.9	236	-2.5
5/5/2020	Pass	10	66	197	-0.8
6/1/2020	Pass	32	70	262	3.7
7/6/2020	Pass	< 10	58.9	193	-3.3
8/3/2020	Pass	32	67.2	238.6	0
9/1/2020	Pass	10	70.5	292	-0.4
11/2/2020	Pass	32	61.3	208	-5.3
12/7/2020	Pass	10	60.9	218	-2.4

Table III.B-19 Notes:

A From monthly toxicity monitoring reports submitted to the Regional Board via CIWQS pursuant to Order No. R9-2017-0007. Order No. R9-2017-0007 requires the City to conduct chronic toxicity monitoring of the PLOO effluent using the TST statistical t-test approach described in EPA (2010). Biannual sensitive species screening tests are conducted to identify the most sensitive species which are to be subjected to TST chronic toxicity during the ensuring 24-month period. As shown in Table III.B-18, this biannual screening determined that giant kelp (*Macrocystis pyrifera*) was the most sensitive of the tested species.

B Under the TST approach, the null hypothesis (Ho) is that the mean discharge "in-stream" waste concentration (IWC) response is less than 75 percent of the response in a control sample. A test result that rejects this null hypothesis is reported as "Pass", and a test result that does not reject this null hypothesis is reported as "Fail".

C NOEC (No Observed Effects Concentration) is the maximum percent of effluent that causes no observable effects on the test species.

D EC25 is the dilution at which 25 percent of test organisms display an observable effect.

E EC50 is the dilution at which 50 percent of test organisms display an observable effect.

F Percent effect of the effluent sample compared to a control sample.

Ocean Plan Receiving Water Standards - Protection of Aquatic Life. Table 3 of the Ocean Plan establishes receiving water quality objectives to be achieved after completion of initial dilution (at the edge of the ZID). Table III.B-20 summarizes the general categories of Ocean Plan Table 3 water quality objectives.

Table III.B-20:
Categories of Regulated Parameters within Table 3 of the Ocean Plan [A]

Category	Targeted Compounds	Regulated Parameters	
		To Protect Against Chronic Impacts	To Protect Against Acute Impacts
Protection of marine aquatic life	Toxic organic and inorganic compounds	• 6-month median	• Daily maximum • Instantaneous maximum
Protection of human health	Toxic noncarcinogens	• 30-day average	Not applicable
	Toxic carcinogens	• 30-day average	Not applicable

Table III.B-20 Notes:

A Table 3 of the 2019 Ocean Plan was formerly known as Table B in prior versions of the Ocean Plan.

The Ocean Plan establishes the following equation to determine effluent concentration limits required to implement Table 3 receiving water quality objectives:

$$C_e = C_o + D_m(C_o - C_s) \qquad Equation\ III.B-9$$

where: C_e = Effluent concentration limit to be established in the NPDES permit to achieve the Ocean Plan Table 3 receiving water quality objective

C_o = Ocean Plan water quality objective to be met upon completion of initial dilution

C_s = The background seawater concentration, to be assigned as zero except for arsenic (background concentration of 3 µg/L), copper (2 µg/L), mercury (0.0005 µg/L), silver (0.16 µg/L), and zinc (8 µg/L)

D_m = Minimum month initial dilution

Based on this equation, Order No. R9-2017-0007 implements the Ocean Plan Table 3 water quality objectives through the establishing PLOO effluent concentration limits and effluent performance goals. Performance goals are established in lieu of effluent concentration limits where the Regional Board and EPA determine that a reasonable potential does not exist for the Ocean Plan Table 3 receiving water quality objectives to be exceeded.

Tables III.B-21 and III.B-22 presents PLOO effluent concentration limits and performance goals established within Order No. R9-2017-0007 for the protection of marine aquatic life. Table III.B-23 compares maximum sample values observed during 2017-2020 with daily maximum and instantaneous maximum effluent limitations and performance goals established in Order No. R9-2017-0007. As shown in Table III.B-21, the PLOO discharge achieved 100 percent compliance with the instantaneous maximum and daily maximum limits for the protection of aquatic habitat established in Order No. R9-2017-0007.[37]

Table III.B-22 presents maximum monthly average values for the PLOO discharge during 2017-2020 and compares the maximum monthly values with 6-month median effluent limitations and performance goals established in Order No. R9-2017-0007. As shown in Table III.B-22, the PLOO discharge achieved 100 percent compliance with Ocean Plan 6-month median objectives for the protection of aquatic habitat.

Receiving Water Standards - Protection of Human Health. Ocean Plan Table 3 receiving water quality objectives for the protection of human health are established on the basis of 30-day average values. Order No. R9-2017-0007 implements these Ocean Plan Table 3 water quality objectives for the protection of human health by establishing effluent concentration limitations for Aldrin and effluent performance goals for all other Ocean Plan constituents.[38]

Table III.B-23 presents PLOO performance goals based on the Ocean Plan receiving water quality objectives for the protection of human health for non-carcinogens. For comparison, the table also presents maximum monthly average PLWTP effluent concentrations during 2017-2020. As shown in Table III.B-23, the PLOO discharge complied with all of the human health (non-carcinogen) performance goals by significant margins.

Table III.B-24 presents PLOO effluent limitations and effluent performance goals for human health (carcinogen) compounds. The only Ocean Plan Table 3 carcinogenic compounds detected in the PLWTP with regularity (e.g., more than half of the samples) are (1) toluene, and (2) the halogenated compounds chloroform, chloromethane (methyl chloride) and dichloromethane (methylene chloride).

Table III.B-21:
Compliance with Ocean Plan Water Quality Objectives for the Protection of Marine Aquatic Life Maximum Daily and Instantaneous Maximum Objectives

Constituent	Concentration (µg/L)					
	Highest Daily Average PLOO Concentration [A]				Limitation or Performance Goal [B]	
	2017	2018	2019	2020	Maximum Daily	Instantaneous Maximum
Effluent Limitation for the Protection of Aquatic Habitat Established in Table 5 of Order No. R9-2017-0007 [C]						
Chlorine residual	970 [D]	110	1,430 [E]	1,400 [F]	1,600 [C]	12,000 [C]

37 As shown in Table III.B-21, the PLOO discharge achieved 100 percent compliance with the 12 mg/L instantaneous maximum chlorine residual effluent limitations established in Order No. R9-2017-0007. While instantaneous chlorine residual values during 2017-2020 exceeded 1.6 mg/L on a few rare and isolated occasions, operators were notified whenever an anomalous chlorine residual value occurred, and subsequent samples collected on that date resulted in compliance with the 1.6 mg/L daily maximum chlorine residual effluent limitation established in Table 5 of Order No. R9-2017-0007.

38 Effluent limitations are established for aldrin, as the Regional Board and EPA determined within Order No. R9-2017-0007 that a reasonable potential existed to cause or contribute to an exceedance of the Ocean Plan water quality objective for aldrin. Effluent performance goals are established in lieu of enforceable effluent limitations for constituents deemed by EPA and the Regional Board to not represent a reasonable potential for non-compliance.

Constituent	Concentration (µg/L)					
	Highest Daily Average PLOO Concentration [A]				Limitation or Performance Goal [B]	
	2017	2018	2019	2020	Maximum Daily	Instantaneous Maximum
Performance Goals for the Protection of Aquatic Habitat Established in Table 6 of Order No. R9-2017-0007 [G]						
Arsenic	1.98	1.87	2.14	1.86	5,900	16,000
Cadmium	0.37	5.05	0.044	3.39	820	2,100
Chromium (VI)	2.14 [H]	5.88 [H]	1.64 [H]	1.86 [H]	1,600	4,100
Copper	23.9	28.5	30.6	22.7	2,100	5,700
Lead	13.6	4.01	2.46	8.59	1,600	4,100
Mercury	0.100	0.033	0.019	0.034	33	82
Nickel	7.01	5.34	4.88	5.64	4,100	10,000
Selenium	2.41	2.12	2.04	1.79	12,000	31,000
Silver	6.12	0.038	0.109	0.123	540	1,400
Zinc	54.6	32.9	39.7	48.1	15,000	39,000
Cyanide	4	ND [I]	ND [I]	ND [I]	820	2,100
Ammonia	44,500	48,100	46,400	46,900	490,000	1,200,000
Non-chlorinated phenolics	128	141	130	113	25,000	64,000
Chlorinated phenolics	ND [I]	ND [I]	ND [I]	ND [I]	820	2,100
Endosulfan	ND [I]	ND [I]	ND [I]	ND [I]	3.7	5.5
Endrin	ND [I]	ND [I]	ND [I]	ND [I]	0.82	1.2
HCH [J]	ND [I]	ND [I]	ND [I]	0.103 [J]	1.6	2.5

Table III.B-21 Notes:

A Highest daily average PLWTP effluent concentration during the listed year. Data from monthly reports submitted to the Regional Board via CIWQS during 2017-2020. 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators at a later date per requirements of Order No. R9-2017-0007.

B Effluent concentration limitation or performance goal established in Order No. R9-2017-0007 to implement the Ocean Plan water quality objective for the protection of aquatic life to be achieved upon completion of initial dilution. A PLOO minimum average month dilution of 204:1 is assigned within Order No. R9-2017-0007 for purposes of translating Ocean Plan receiving water quality objectives to effluent limitations or performance goals. See Equation III.B-9.

C Effluent concentration limitation established in Table 5 of Order No. R9-2017-0007 to implement the Ocean Plan Table 3 receiving water quality objectives for chlorine residual for the protection of aquatic life.

D Anomalous instantaneous chlorine residual value of 2.12 mg/L occurred on 6:00 am January 21, 2017, resulting in a daily average chlorine residual on that date of 0.97 mg/L. The PLOO discharge complied with the instantaneous maximum and daily average chlorine residual limit established in Order No. R9-2017-0007 during all days of 2017.

E Anomalous chlorine residual value of 8.3 mg/L occurred at 8:12 am on December 28, 2019, resulting in a daily average chlorine residual on that date of 1.43 mg/L. The PLOO discharge complied with the instantaneous maximum and daily average chlorine residual limit established in Order No. R9-2017-0007 during all days of 2019.

F Anomalous chlorine residual value of 8.4 mg/L occurred at 6:04 am on April 13, 2020, resulting in a daily average chlorine residual on that date of 1.4 mg/L. The PLOO discharge complied with the instantaneous maximum and daily average chlorine residual limit established in Order No. R9-2017-0007 during all days of 2020.

G Effluent performance goal establishes in Table 6 of Order No. R9-2017-0007 to implement Ocean Plan Table 3 receiving water objectives for the protection of aquatic habitat. Constituents listed in order of appearance in Table 5 of Order No. R9-2017-0007.

H Total chromium concentrations are shown. Order No. R9-2017-0007 allows total chromium values to be used in lieu of Chromium VI for assessing compliance with the chromium VI performance goals.

I ND indicates the constituent was not detected in any sample during the listed year.

J HCH (hexachlorocyclohexane) is also known as BHC. Gamma HCH was the only HCH isomer detected during 2017-2020 and was detected on only one sample (October 21, 2020).

Table III.B-22: Compliance with Ocean Plan Water Quality Objectives for the Protection of Marine Aquatic Life 6-Month Median Objectives

Constituent	Concentration (µg/L)				
	Highest Monthly Average PLOO Concentration [A]				6-Month Median Effluent Limitation or Performance Goal [B]
	2017	2018	2019	2020	
Effluent Limitation for the Protection of Aquatic Habitat Established in Table 5 of Order No. R9-2017-0007					
Chlorine residual	< 37 [C]	< 30 [C]	49 [C]	< 97 [C]	410 [D]
Performance Goals for the Protection of Aquatic Habitat Established in Table 6 of Order No. R9-2017-0007 [E]					
Arsenic	1.30	2.65	1.66	1.63	1,000
Cadmium	< 0.26 [F]	1.26	< 0.04 [F]	0.85	210
Chromium (VI)	2.14 [G]	5.88 [G]	1.64 [G]	1.86 [G]	410
Copper	20.1	13.7	16.6	18.0	210
Lead	6.46	1.26	0.98	2.59	410
Mercury	0.0137	0.0116	0.0115	0.0115	8.1
Nickel	5.16	4.34	4.48	4.78	1,000
Selenium	1.64	1.85	1.81	1.55	3,100
Silver	1.53	< 0.104 [F]	< 0.010 [F]	0.07	110
Zinc	42.0	22.6	30.8	40.0	2,500
Cyanide	< 5 [f]	< 5 [F]	ND [H]	< 4 [F]	210
Ammonia	42,600	43,900	45,800	45,000	120,000
Non-chlorinated phenolics	94	106	108	89	6,200
Chlorinated phenolics	ND [H]	ND [H]	ND [H]	ND [H]	210
Endosulfan	ND [H]	ND [H]	ND [H]	ND [H]	1.8
Endrin	ND [H]	ND [H]	ND [H]	ND [H]	0.41
HCH [I]	ND [H]	ND [H]	ND [H]	0.026 [J]	0.82

Table III.B-22 Notes:

A Highest monthly PLWTP effluent concentration during the listed year. Data from SDPUD (2018, 2019, 2020, 2021). 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators at a later date per requirements of Order No. R9-2017-0007.

B Effluent concentration limitation or performance goal established in Order No. R9-2017-0007 to implement the Ocean Plan water quality objective for the protection of aquatic life to be achieved upon completion of initial dilution. A PLOO minimum average month dilution of 204:1 is assigned within Order No. R9-2017-0007 for purposes of translating Ocean Plan receiving water quality objectives to effluent limitations or performance goals. See Equation III.B-9.

C Highest monthly average values as reported in SDPUD (2018, 2019, 2020, 2021). Chlorine residual was not detected in more than 99 percent of the PLWTP effluent samples during each year.

D 6-month median effluent concentration limitation established in Table 5 of Order No. R9-2017-0007 to implement the Ocean Plan Table 3 receiving water quality objectives for chlorine residual for the protection of aquatic life.

E Effluent performance goal establishes in Table 6 of Order No. R9-2017-0007 to implement Ocean Plan Table 3 receiving water objectives for the protection of aquatic habitat. Constituents listed in order of appearance in Table 5 of Order No. R9-2017-0007.

F Highest monthly average is expressed as a "<x", as the majority of the values were ND during the month.

G Total chromium concentrations are shown. Order No. R9-2017-0007 allows total chromium values to be used in lieu of chromium VI for assessing compliance with the chromium VI performance goals.

H ND indicates the constituent was not detected in any sample during the listed year.

I HCH (hexachlorocyclohexane) is also known as BHC. Gamma HCH was the only HCH isomer detected in the PLOO effluent and was detected only in one sample during 2017-2020 (October 21, 2020).

Table III.B-23: Compliance with Ocean Plan Objectives for the Protection of Human Health Non-Carcinogens

Constituent	Concentration (µg/L)				
	Maximum Observed PLOO Concentration [A]				30-Day Average Performance Goal
	2017	2018	2019	2020	
Effluent Performance Goal for the Protection of Human Health (Non-Carcinogens) in Table 6 of Order No. R9-2017-0007 [B]					
Acrolein	ND [C]	ND [C]	ND [C]	ND [C]	45,000
Antimony	2.76	0.79	1.06	2.52	250,000
Bis (2-chloroethoxy) methane	ND [C]	ND [C]	ND [C]	ND [C]	900
Bis (2-chloroisopropyl) ether	ND [C]	ND [C]	ND [C]	ND [C]	250,000
Chlorobenzene	ND [C]	ND [C]	ND [C]	ND [C]	120,000
Chromium (III)	2.14 [D]	5.88 [D]	1.64 [D]	1.86 [D]	3.9 E+07
di-n-butyl phthalate	ND [C]	ND [C]	ND [C]	ND [C]	720,000
1,2-dichlorobenzene	ND [C]	ND [C]	ND [C]	ND [C]	1,000,000 [E]
1,3-dichlorobenzene	ND [C]	ND [C]	ND [C]	ND [C]	
Diethyl phthalate	47.4	5.2	5.9 [F]	3.8	6.8 E+06
Dimethyl phthalate	ND [C]	ND [C]	ND [C]	ND [C]	1.7 E+08
4,6-dinitro-2-methylphenol	ND [C]	ND [C]	ND [C]	ND [C]	45,000
2,4-dinitrophenol	3.0 [G]	ND [C]	ND [C]	ND [C]	820
Ethylbenzene	ND [C]	ND [C]	0.6 DNQ [H]	0.9 DNQ [H]	840,000
Fluoranthene	ND [C]	ND [C]	ND [C]	ND [C]	3,100
Hexachlorocyclopentadiene	ND [C]	ND [C]	ND [C]	ND [C]	12,000
Nitrobenzene	ND [C]	ND [C]	ND [C]	ND [C]	1,000
Thallium	ND [C]	ND [C]	ND [C]	ND [C]	410
Toluene	18.0	11.2	3.8	3.8	1.7 E+07
Tributyltin	ND [C]	ND [C]	ND [C]	ND [C]	0.29
1,1,1-trichloroethane	ND [C]	ND [C]	ND [C]	ND [C]	1.1 E+08

Table III.B-23 Notes:

A Maximum observed PLWTP effluent concentration during the listed year. Data from SDPUD (2018b, 2019b, 2020, 2021) for calendar years 2017-2020. Also see Tables II.A-15 through II.A-24 of Section II.A.4.b. 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators at a later date per reporting requirements of Order No. R9-2017-0007.

B Effluent performance goal established in Table 6 of Order No. R9-2017-0007 to implement the Ocean Plan water quality objective for the protection of human health (non-carcinogens) to be achieved upon completion of initial dilution. A PLOO minimum average month dilution of 204:1 is assigned within Order No. R9-2017-0007 for purposes of translating Ocean Plan receiving water quality objectives to effluent limitations or performance goals.

C ND indicates the constituent was not detected in any sample during the listed year.

D Total chromium concentrations are shown. Order No. R9-2017-0007 allows total chromium values to be used in lieu of chromium III for assessing compliance with the chromium III performance goals.

E Performance goal is for total dichlorobenzenes.

F Method blank was outside of acceptable limits. Highest diethyl phthalate value during 2018 that met quality control criteria was 3.9 µg/L.

G Listed value occurred on June 8, 2017. All other samples during 2017-2020 were ND.

H The listed value was detected not quantifiable (DNQ); the concentration was greater than the MDL but below the reporting limit.

Table III.B-24:
Compliance with Ocean Plan Objectives for the Protection of Human Health - Carcinogens

Constituent		Concentration (µg/L)				
		Maximum Observed PLOO Concentration [A]				30-Day Average Effluent Limitation or Performance Goal
		2017	2018	2019	2020	
Effluent Limitation for the Protection of Human Health (Carcinogens) Established in Table 5 of Order No. R9-2017-0007 [B]						
Aldrin		ND [C]	ND [C]	ND [C]	ND [C]	35
Effluent Performance Goal for the Protection of Human Health (Carcinogens) Established in Table 6 of Order No. R9-2017-0007 [D]						
Acrylonitrile		ND [C]	ND [C]	ND [C]	ND [C]	21
Benzene		ND [C]	ND [C]	0.5 DNQ [E]	0.5 DNQ [E]	1200
Benzidene		ND [C]	ND [C]	ND [C]	ND [C]	0.014
Beryllium		0.06	ND [C]	ND [C]	ND [C]	6.8
Bis (2-chloroethyl) ether		ND [C]	ND [C]	ND [C]	ND [C]	9.2
Bis (2-ethylhexyl) phthalate		ND [C]	ND [C]	ND [C]	9.95	720
Carbon tetrachloride		ND [C]	ND [C]	ND [C]	ND [C]	180
Alpha (cis) chlordane		ND [C]	ND [C]	ND [C]	ND [C]	0.0047 [F]
Chlordane	Gamma chlordane	ND [C]	ND [C]	ND [C]	ND [C]	
	Oxychlordane	ND [C]	ND [C]	ND [C]	ND [C]	
	Chlorodibromomethane	1.2	0.4 DNQ [E]	0.5 DNQ [E]	0.5 DNQ [E]	1,800
Chloroform		7.2	4.4	6.9	4.1	27,000
Dichloro diphenyl-trichloroethane (DDT)	o,p-DDD (2,4'-DDD)	ND [C]	ND [C]	ND [C]	ND [C]	0.035 [G]
	o,p-DDE (2,4'-DDE)	ND [C]	ND [C]	ND [C]	ND [C]	
	o,p-DDT (2,4'-DDT)	ND [C]	ND [C]	ND [C]	ND [C]	
	p,p-DDD (4,4'-DDD)	ND [C]	ND [C]	ND [C]	ND [C]	
	p,p-DDE (4,4'-DDE)	ND [C]	ND [C]	ND [C]	ND [C]	
	p,p-DDT (4,4'-DDT)	ND [C]	ND [C]	ND [C]	ND [C]	
1,4-dichlorobenzene		ND [C]	ND [C]	ND [C]	ND [C]	3,700
3,3-dichlorobenzidene		ND [C]	ND [C]	ND [C]	ND [C]	1.7
1,2-dichloroethane		ND [C]	ND [C]	ND [C]	ND [C]	5,700
1,1-dichloroethylene		ND [C]	ND [C]	ND [C]	ND [C]	180
Dichlorobromomethane		1.6	0.4 DNQ [E]	0.6 DNQ [E]	0.5 DNQ [E]	1,300
Dichloromethane (methylene chloride)		1.9 DNQ [E]	5.69	3.3	0.9 DNQ [E]	92,000
cis 1,3-dichloropropene		ND [C]	ND [C]	ND [C]	ND [C]	1,800
Trans-1,3-dichloropropene		ND [C]	ND [C]	ND [C]	ND [C]	
Dieldrin		ND [C]	ND [C]	ND [C]	ND [C]	0.0082
2,4-dinitrotoluene		ND [C]	ND [C]	ND [C]	ND [C]	530
1,2-diphenylhydrazine		ND [C]	ND [C]	ND [C]	ND [C]	33

Constituent		Concentration (µg/L)				
		Maximum Observed PLOO Concentration [A]				30-Day Average Effluent Limitation or Performance Goal
		2017	2018	2019	2020	
Halomethanes	Bromoform	ND [C]	ND [C]	ND [C]	ND [C]	27,000 [H]
	Bromomethane	1.2 DNQ[E]	0.7 DNQ[E]	0.4 DNQ[E]	ND [C]	
	Chloromethane	16.2	4.3	3.3	6.5	
Heptachlor		ND [C]	ND [C]	ND [C]	ND [C]	0.010
Heptachlor epoxide		ND [C]	ND [C]	ND [C]	ND [C]	0.0041
Hexachlorobenzene		ND [C]	ND [C]	ND [C]	ND [C]	0.043
Hexachlorobutadiene		ND [C]	ND [C]	ND [C]	ND [C]	2,900
Hexachloroethane		ND [C]	ND [C]	ND [C]	ND [C]	510
Isophorone		ND [C]	ND [C]	ND [C]	ND [C]	150,000
N-nitrosodimethylamine		ND [C]	ND [C]	ND [C]	ND [C]	1,500
N-nitrosodi-n-propylamine		ND [C]	ND [C]	ND [C]	ND [C]	78
N-nitrosodiphenylamine		ND [C]	ND [C]	ND [C]	ND [C]	510
Polynuclear aromatic hydrocarbons (PAHs)	Acenaphthylene	ND [C]	ND [C]	ND [C]	ND [C]	1.8 [I]
	Anthracene	ND [C]	ND [C]	ND [C]	ND [C]	
	benzo (a) anthracene	ND [C]	ND [C]	ND [C]	ND [C]	
	3,4-benzo fluoranthene	ND [C]	ND [C]	ND [C]	ND [C]	
	benzo (k) fluoranthene	ND [C]	ND [C]	ND [C]	ND [C]	
	benzo (g,h,i) perylene	ND [C]	ND [C]	ND [C]	ND [C]	
	benzo (a) pyrene	ND [C]	ND [C]	ND [C]	ND [C]	
	Chrysene	ND [C]	ND [C]	ND [C]	ND [C]	
	dibenzo (a,h) anthracene	ND [C]	ND [C]	ND [C]	ND [C]	
	Fluorene	ND [C]	ND [C]	ND [C]	ND [C]	
	ideno (1,2,3-cd) pyrene	ND [C]	ND [C]	ND [C]	ND [C]	
	Phenanthrene	ND [C]	ND [C]	ND [C]	ND [C]	
	Pyrene	ND [C]	ND [C]	ND [C]	ND [C]	
Poly-chlorinated biphenyls (PCBs)	PCB 1016	ND [C]	ND [C]	ND [C]	ND [C]	0.0039 [J]
	PCB 1221	ND [C]	ND [C]	ND [C]	ND [C]	
	PCB 1232	ND [C]	ND [C]	ND [C]	ND [C]	
	PCB 1242	ND [C]	ND [C]	ND [C]	ND [C]	
	PCB 1248	ND [C]	ND [C]	ND [C]	ND [C]	
	PCB 1254	ND [C]	ND [C]	ND [C]	ND [C]	
	PCB 1260	ND [C]	ND [C]	ND [C]	ND [C]	
	PCB 1262	ND [C]	ND [C]	ND [C]	ND [C]	
TCDD Equivalents		ND [C]	ND [C]	ND [C]	ND [C]	8.0 E-7
1,1,2,2-tetrachloroethane		ND [C]	ND [C]	ND [C]	ND [C]	470
Tetrachloroethylene		ND [C]	0.6 DNQ[E]	ND [C]	ND [C]	410
Toxaphene		ND [C]	ND [C]	ND [C]	ND [C]	0.043
Trichloroethylene		ND [C]	ND [C]	ND [C]	ND [C]	5,500
1,1,2-trichloroethane		ND [C]	ND [C]	ND [C]	ND [C]	1,900

Constituent	Concentration (µg/L)				
	Maximum Observed PLOO Concentration [A]				30-Day Average Effluent Limitation or Performance Goal
	2017	2018	2019	2020	
2,4,6-trichlorophenol	ND [C]	ND [C]	ND [C]	2.2 DNQ [E]	59
Vinyl chloride	ND [C]	ND [C]	ND [C]	ND [C]	7,400

Table III.B-24 Notes:

- A Maximum observed PLWTP effluent concentration during the listed year. Data from SDPUD (2018b, 2019b, 2020, 2021) for calendar years 2017-2020. Also see Tables II.A-15 through II.A-24 of Section II.A.4.b. 2020 is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators at a later date per reporting requirements of Order No. R9-2017-0007.
- B Effluent concentration limitation established in Table 5 of Order No. R9-2017-0007 to implement the Ocean Plan water quality objective for the protection of human health (non-carcinogens) to be achieved upon completion of initial dilution. A PLOO minimum average month dilution of 204:1 is assigned within Order No. R9-2017-0007 for purposes of translating Ocean Plan receiving water quality objectives to effluent limitations or performance goals.
- C ND indicates the constituent was not detected in any sample during the listed year.
- D Effluent performance goals established in Table 6 of Order No. R9-2017-0007 to implement the Ocean Plan water quality objective for the protection of human health (non-carcinogens) to be achieved upon completion of initial dilution.
- E The constituent was detected but not quantifiable (DNQ).
- F Effluent performance goal applies to the sum of chlordane compounds.
- G Effluent performance goal applies to the sum of DDD, DDE, and DDT isomers.
- H Effluent performance goal applies to the sum of halomethane compounds (bromoform, bromomethane, and chloromethane).
- I Effluent performance goal applies to the sum of the listed polynuclear aromatic hydrocarbons (PAHs).
- J Effluent performance goal applies to the sum of PCB isomers.

As shown in Table III.B-24, the PLOO discharge achieved 100 percent compliance with the 30-day average effluent limitations and performance goals established in Order No. R9-2017-00076 to implement Ocean Plan Table 3 water quality objectives for the protection of human health (carcinogens).

Method Detection Limits and Compliance. As shown above, during 2017-2020 the PLWTP achieved 100 percent compliance with NPDES effluent limitations and performance goals that implement Ocean Plan receiving water quality objectives for the protection of aquatic habitat and the protection of public health. It should be noted that Ocean Plan receiving water quality objectives are established at concentrations less than achievable MDLs for several constituents. Appendix II of the 2019 Ocean Plan requires attainment of "Minimum Levels" that represent the lowest quantifiable concentration based on proper application of method specific analytical procedures. The City's wastewater chemistry laboratory achieves MDLs that are consistent with the required Minimum Levels established in the Ocean Plan.

Implementation Provision III.C.8(a) of the 2019 Ocean Plan states:

> *III.C.8(a) Dischargers are out of compliance with the effluent limitation if the concentration of the pollutant in the monitoring sample is greater than the effluent limitation and greater than or equal to the reported Minimum Level.*

All PLWTP effluent samples for Ocean Plan constituents during 2017-2020 were either below the corresponding Ocean Plan-based effluent limit/performance goal or below the reported Minimum Level.

Additional Ocean Plan Receiving Water Objectives. In addition to establishing receiving water quality objectives for toxic constituents, the Ocean Plan establishes numerical receiving water quality objectives for total and fecal coliform, DO, and pH. The Ocean Plan also established narrative objectives for physical, chemical, and biological characteristics.

Compliance of the PLOO discharge with Ocean Plan water quality objectives for DO, suspended solids, and pH are addressed in the response to Questionnaire Section III.B.6. The responses to Questionnaire Section III.E.2 and Appendix H documents compliance of the PLOO discharge with Ocean Plan recreational body contact bacteriological requirements.

Discharge to Federal Waters. While the PLOO discharges outside the three-nautical-mile limit of state-regulated waters, the effluent limitations and performance goals of Order No. R9-2017-0007 are established on the basis of achieving compliance with Ocean Plan Table 3 receiving water quality objectives at the edge of the PLOO ZID. As a result, even though the discharge is outside state-regulated waters, the PLOO discharge is required to comply with effluent limitations and performance goals that are based on Ocean Plan Table 3 receiving water objectives. Thus, state-adopted receiving water quality objectives[39] for the protection of aquatic habitat and the protection of human health (consumption of organisms) are in effect throughout the PLOO discharge zone, even though the PLOO discharge occurs outside the three-nautical-mile limit.

Federal Water Quality Criteria. EPA establishes federal water quality criteria to protect marine life and human health.[40] Federal criteria applicable to the PLOO discharge include:

- Acute criteria for the protection of saltwater aquatic habitat
- Chronic criteria for the protection of saltwater aquatic habitat
- Chronic criteria for the protection of human health (consumption of organisms)

The federal criteria do not represent standards but provide guidance to states and tribes for establishing water quality standards. The criteria also are useful in assessing potential impacts from wastewater discharges. Table III.B-25 presents current EPA water quality criteria for the protection of saltwater habitat and human health (consumption of organisms). For comparison, the table also presents Ocean Plan water quality objectives for these constituents. The Ocean Plan establishes water quality objectives for each of the constituents addressed by EPA water quality criteria for which a reasonable potential exists for the constituents to be

39 Ocean Plan water quality objectives have been approved by EPA as representing water quality standards as defined within and enforceable under the CWA.

40 EPA (2021a) presents current (year 2022) water quality criteria for the protection of public health. EPA (2021b) presents water quality criteria for the protection of aquatic habitat.

present in wastewater in concentrations that could potentially impact beneficial uses. As shown in Table III.B-25, almost all of the EPA constituents are addressed by comparable Ocean Plan water quality objectives.

The Ocean Plan does not establish water quality objectives for some constituents for which EPA has established criteria. These compounds, in part, include:

- Organophosphorus pesticides such as chlorpyrifos, demeton, diazinon, guthion, and malathion
- Chlorinated pesticides such as mirex and methoxychlor
- Volatile organic compounds unlikely to appear in municipal wastewater such as 2-chloronaphthalene, 1,2-trans-dichloroethylene, 1,2-dichloropropane, 1,2,4-trichlorobenzene, and 1,1,1- trichloroethylene
- Base neutral compounds unlikely to appear in municipal wastewater such as butyl benzyl phthalate, bis chromomethyl ether, n-nitrosodibutylamine, n-nitrosodipyrrolidine and n-nitrosodiethylamine.

Table III.B-25:
Comparison of EPA Water Quality Criteria and Ocean Plan Water Quality Objectives

CAS [A] Number	Compound	EPA Water Quality Criteria (µg/L) [B]			Ocean Plan Receiving Water Quality Objective (µg/L) [C]		
		Saltwater Aquatic Habitat		Human Health[D]	Saltwater Aquatic Habitat		Human Health[D]
		CMC [E] (acute)	CCC [E] (chronic)	Chronic	6-Month Median	Daily Maximum	30-Day Average
83329	Acenaphthylene	NA[F]	NA[F]	90	NA[G]	NA[G]	0.0088
107028	Acrolein	NA[F]	NA[F]	400	NA[G]	NA[G]	220
107131	Acrylonitrile	NA[F]	NA[F]	7.0	NA[G]	NA[G]	0.1
107028	Aldrin	1.3	NA[F]	7.7 E-07	NA[G]	NA[G]	2.2 E-05
120127	Anthracene	NA[F]	NA[F]	400	NA[G]	NA[G]	0.0088 [H]
7440360	Antimony	NA[F]	NA[F]	640	NA[G]	NA[G]	1200
7440382	Arsenic	69	36	0.14	3.0	12	NA[G]
71432	Benzene	NA[F]	NA[F]	16 - 58	NA[G]	NA[G]	5.9
92875	Benzidene	NA[F]	NA[F]	0.011	NA[G]	NA[G]	6.9 E-05
56553	Benzo (a) anthracene	NA[F]	NA[F]	0.013	NA[G]	NA[G]	0.0088 [H]
50328	Benzo (a) pyrene	NA[F]	NA[F]	0.0013	NA[G]	NA[G]	0.0088 [H]
205992	Benzo (b) fluoranthene	NA[F]	NA[F]	0.0013	NA[G]	NA[G]	0.0088 [H]
207089	benzo (k) fluoranthene	NA[F]	NA[F]	0.013	NA[G]	NA[G]	0.0088 [H]
319846	BHC alpha (HCH)	NA[F]	NA[F]	0.00039	0.004	0.008	NA[G]
319857	BHC beta (HCH)	NA[F]	NA[F]	0.014	0.004	0.008	NA[G]
58899	BHC gamma (Lindane)	0.16	NA[F]	4.4	0.004	0.008	NA[G]
108601	bis(1-chloroisopropyl) ether	NA[F]	NA[F]	4000	NA[G]	NA[G]	0.045
111444	bis (2-chloroethyl) ether	NA[F]	NA[F]	2.2	NA[G]	NA[G]	4.4
542881	bis (chloromethyl) ether	NA[F]	NA[F]	0.017	NA[G]	NA[G]	NA[G]
117817	bis (2-ethylhexyl) phthalate	NA[F]	NA[F]	0.37	NA[G]	NA[G]	3.5
75252	Bromoform	NA[F]	NA[F]	120	NA[G]	NA[G]	130 [J]
85687	Butyl benzyl phthalate	NA[F]	NA[F]	0.1	NA[G]	NA[G]	NA[G]
7440439	Cadmium	40	0.53	NA	1.0	4.0	NA[G]
56235	Carbon tetrachloride	NA[F]	NA[F]	5	NA[G]	NA[G]	0.9
57749	Chlordane	0.09	0.004	0.00032	NA[G]	NA[G]	2.3 E-05
108907	Chlorobenzene	NA[F]	NA[F]	800	NA[G]	NA[G]	570

CAS [A] Number	Compound	EPA Water Quality Criteria (µg/L) [B]			Ocean Plan Receiving Water Quality Objective (µg/L) [C]		
		Saltwater Aquatic Habitat		Human Health[D]	Saltwater Aquatic Habitat		Human Health[D]
		CMC [E] (acute)	CCC [E] (chronic)	Chronic	6-Month Median	Daily Maximum	30-Day Average
124481	Chlorodibromomethane	NA[F]	NA[F]	21	NA[G]	NA[G]	8.6
67663	Chloroform	NA[F]	NA[F]	2,000	NA[G]	NA[G]	130 [J]
91587	2-chloronaphthalene	NA[F]	NA[F]	1,000	NA[G]	NA[G]	NA[G]
95578	2-chlorophenol	NA[F]	NA[F]	800	1.0 [K]	4.0 [K]	NA[G]
2921992	Chlorpyrifos	0.011	0.0056	NA	NA[G]	NA[G]	NA[G]
18540299	Chromium VI	1100	50	NA	2.0	8.0	NA[G]
208019	Chrysene	NA[F]	NA[F]	0.13	NA[G]	NA[G]	0.0088 [H]
7440508	Copper	4.8	3.1	NA	3.0	12	NA[G]
57125	Cyanide	1.0	1.0	400	1.0	4.0	NA[G]
72548	4,4'-DDD	NA[F]	NA[F]	0.00012	NA[G]	NA[G]	0.00017 [I]
72559	4,4'-DDE	NA[F]	NA[F]	1.8 E-05	NA[G]	NA[G]	0.00017 [I]
50293	4,4'-DDT	0.13	0.001	3.0 E-05	NA[G]	NA[G]	0.00017 [I]
8065483	Demeton	NA[F]	0.1	NA	NA[G]	NA[G]	NA[G]
33415	Diazinon	0.82	0.82	NA	NA[G]	NA[G]	NA[G]
53703	Dibenzo (a,h) anthracene	NA[F]	NA[F]	0.0013	NA[G]	NA[G]	0.0088 [H]
95501	1,2-dichlorobenzene	NA[F]	NA[F]	3,000	NA[G]	NA[G]	570 [M]
541371	1,3-dichlorobenzene	NA[F]	NA[F]	10	NA[G]	NA[G]	570 [M]
106467	1,4-dichlorobenzene	NA[F]	NA[F]	900	NA[G]	NA[G]	570 [M]
91941	3,3-dichlorobenzidene	NA[F]	NA[F]	0.15	NA[G]	NA[G]	0.0081
75274	Dichlorobromomethane	NA[F]	NA[F]	27	NA[G]	NA[G]	6.2
107062	1,2-dichloroethane	NA[F]	NA[F]	650	NA[G]	NA[G]	28
75354	1,1-dichloroethylene	NA[F]	NA[F]	20,000	NA[G]	NA[G]	0.9
156605	1,2-trans-dichloroethylene	NA[F]	NA[F]	4,000	NA[G]	NA[G]	NA[G]
88062	2,4-dichlorophenol	NA[F]	NA[F]	60	30 [K]	120 [K]	NA[G]
78875	1,2-dichloropropane	NA[F]	NA[F]	31	NA[G]	NA[G]	NA[G]
542756	1,3-dichloropropene	NA[F]	NA[F]	12	NA[G]	NA[G]	8.9
60571	Dieldrin	0.71	0.0019	1.2 E-06	NA[G]	NA[G]	4.0 E-05
105679	2,4-dimethylphenol	NA[F]	NA[F]	3,000	30 [L]	120 [L]	NA[G]
84662	Diethyl phthalate	NA[F]	NA[F]	600	NA[G]	NA[G]	33000
131113	Dimethyl phthalate	NA[F]	NA[F]	2,000	NA[G]	NA[G]	820000
84742	Di-n-butyl phthalate	NA[F]	NA[F]	30	NA[G]	NA [G]	3500
25550587	Dinitrophenols	NA[F]	NA[F]	1,000	30 [L]	120 [L]	NA[G]
534521	4,6-dinitro-2-methylphenol	NA[F]	NA[F]	30	30 [L]	120 [L]	220
120832	2,4-dinitrophenol	NA[F]	NA[F]	300	30 [L]	120 [L]	4.0
121142	2,4-dinitrotoluene	NA[F]	NA[F]	1.7	NA[G]	NA[G]	2.6
122667	1,2-diphenylhydrazine	NA[F]	NA[F]	0.2	NA[G]	NA[G]	0.16
959988	Endosulfan (alpha)	0.034	0.087	30	0.009 [N]	0.018 [N]	NA[G]
33213659	Endosulfan (beta)	0.034	0.0087	40	0.009 [N]	0.018 [N]	NA[G]
1031078	Endosulfan sulfate	NA[F]	NA[F]	40	0.009 [N]	0.018 [N]	NA[G]
72208	Endrin	0.37	NA[F]	0.03	0.002	0.004	NA[G]
7421934	Endrin aldehyde	NA[F]	NA[F]	1.0	0.002	0.004	NA[G]
100414	Ethylbenzene	NA[F]	NA[F]	130	NA[G]	NA[G]	4100
206440	Fluoranthene	NA[F]	NA[F]	20	NA[G]	NA[G]	15
86737	Fluorene	NA[F]	NA[F]	70	NA[G]	NA[G]	0.0088 [H]
86500	Guthion	NA[F]	0.01	NA[6]	NA[G]	NA[G]	NA[G]
76448	Heptachlor	0.053	0.0036	5.9 E-06	NA[G]	NA[G]	5.0 E-05
1024573	Heptachlor epoxide	0.053	0.0036	3.2 E-05	NA[G]	NA[G]	3.0 E-05
118741	Hexachlorobenzene	NA[F]	NA[F]	7.9 E-05	NA[G]	NA[G]	0.00021
87683	Hexachlorobutadiene	NA[F]	NA[F]	0.01	NA[G]	NA[G]	14

CAS [A] Number	Compound	EPA Water Quality Criteria (µg/L) [B]			Ocean Plan Receiving Water Quality Objective (µg/L) [C]		
		Saltwater Aquatic Habitat		Human Health[D]	Saltwater Aquatic Habitat		Human Health[D]
		CMC [E] (acute)	CCC [E] (chronic)	Chronic	6-Month Median	Daily Maximum	30-Day Average
608731	Hexachlorocyclohexane	NA[F]	NA[F]	0.010	0.004	0.008	NA[G]
77474	Hexachlorocyclopentadiene	NA[F]	NA[F]	4	NA[G]	NA[G]	58
67721	Hexachloroethane	NA[F]	NA[F]	0.1	NA[G]	NA[G]	2.5
193395	Ideno (1,2,3-cd) pyrene	NA[F]	NA[F]	0.0013	NA[G]	NA[G]	0.0088 [H]
78591	Isophorone	NA[F]	NA[F]	1,800	NA[G]	NA[G]	730
7439921	Lead	210	8.1	NA[6]	2.0	8.0	NA[G]
121755	Malathion	NA[F]	0.1	NA[6]	NA[G]	NA[G]	NA[G]
7439976	Mercury	1.8	0.94	NA[6]	0.04	0.16	NA[G]
59507	3-Methyl-4-chlorophenol	NA[F]	NA[F]	2,000	1.0 [K]	4.0 [K]	NA[G]
75092	Methylene chloride	NA[F]	NA[F]	1,000	NA[G]	NA[G]	450
72435	Methoxychlor	NA[F]	0.03	0.02	NA[G]	NA[G]	NA[G]
2385855	Mirex	NA[F]	0.001	NA[6]	NA[G]	NA[G]	NA[G]
7440020	Nickel	74	8.2	4600	5.0	20	NA[G]
98953	Nitrobenzene	NA[F]	NA[F]	600	NA[G]	NA[G]	4.9
924163	Nitrosodibutylamine	NA[F]	NA[F]	0.22	NA[G]	NA[G]	NA[G]
55185	Nitrosodiethylamine	NA[F]	NA[F]	1.24	NA[7]	NA[7]	NA[G]
930552	Nitrosodipyrrolidine	NA[F]	NA[F]	34	NA[G]	NA[G]	NA[G]
62759	N-nitrosodi-n-propylamine	NA[F]	NA[F]	0.51	NA[G]	NA[G]	0.38
621647	N-nitrosodimethylamine	NA[F]	NA[F]	3.0	NA[G]	NA[G]	7.3
86306	N-nitrosodiphenylamine	NA[F]	NA[F]	6.0	NA[G]	NA[G]	2.5
---	PCBs	NA[F]	NA[F]	6.4 E-05	NA[G]	NA[G]	1.9 E-05
608935	Pentachlorobenzene	NA[F]	NA[F]	0.1	NA[G]	NA[G]	NA[G]
87865	Pentachlorophenol	13	7.9	0.04	1.0 [K]	4.0 [K]	NA[G]
108952	Phenol	NA[F]	NA[F]	300,000	30 [L]	120 [L]	NA[G]
129000	Pyrene	NA[F]	NA[F]	30	NA[G]	NA[G]	0.0088 [H]
7782492	Selenium	290	71	4,200	15	60	NA[G]
7440224	Silver	1.9	NA[F]	NA[6]	0.7	2.8	NA[G]
79345	1,1,2,2-tetrachloroethane	NA[F]	NA[F]	3.0	NA[G]	NA[G]	4.3
95943	1,2,4,5-tetrachlorobenzene	NA[F]	NA[F]	0.03	NA[G]	NA[G]	NA[G]
128184	Tetrachloroethylene	NA[F]	NA[F]	29	NA[G]	NA[G]	2.0
120821	1,2,4-trichlorobenzene	NA[F]	NA[F]	0.076	NA[G]	NA[G]	NA[G]
71556	1,1,1-trichloroethane	NA[F]	NA[F]	200,000	NA[G]	NA[G]	NA[G]
79005	1,1,2-trichloroethane	NA[F]	NA[F]	8.9	NA[G]	NA[G]	9.4
7440280	Thallium	NA[F]	NA[F]	0.47	NA[G]	NA[G]	2.0
108883	Toluene	NA[F]	NA[F]	520	NA[G]	NA[G]	85,000
8001352	Toxaphene	0.21	0.0002	0.00071	NA[G]	NA[G]	0.00032
---	Tributyltin	0.42	0.0074	NA	NA[G]	NA[G]	0.0014
79016	Trichloroethylene	NA[F]	NA[F]	7.0	NA[G]	NA[G]	2.0
120821	1,2,4-trichlorobenzene	NA[F]	NA[F]	0.076	NA[G]	NA[G]	NA[G]
95954	2,4,5-trichlorophenol	NA[F]	NA[F]	600	1.0 [K]	4.0 [K]	NA[G]
88062	2,4,6-trichlorophenol	NA[F]	NA[F]	2.8	1.0 [K]	4.0 [K]	0.29
75014	Vinyl chloride	NA[F]	NA[F]	1.6	NA[G]	NA[G]	36
7440666	Zinc	90	81	26,000	20	80	NA[G]
1746016	2,3,7,8-TCDD (dioxin)	NA[F]	NA[F]	5.1 E-09	NA[G]	NA[G]	3.9 E-09

Table III.B-25 Notes:

A Chemical Abstracts Service number.

B National EPA recommended water quality criteria for the protection of aquatic life and human health is published by EPA (2021a, 2021b) pursuant to Section 304(a) of the Clean Water Act to provide guidance to states and tribes for use in adopting water quality standards.

CAS [A] Number	Compound	EPA Water Quality Criteria (µg/L) [B]			Ocean Plan Receiving Water Quality Objective (µg/L) [C]		
		Saltwater Aquatic Habitat		Human Health[D]	Saltwater Aquatic Habitat		Human Health[D]
		CMC [E] (acute)	CCC [E] (chronic)	Chronic	6-Month Median	Daily Maximum	30-Day Average

C Ocean Plan receiving water quality objective to be achieved upon completion of initial dilution (State Board, 2019).
D Criteria or water quality objective addresses the protection of human health for the consumption of organisms.
E Criteria Maximum Concentration (CMC) is the estimate of the highest concentration an aquatic habitat can briefly be exposed without an unacceptable effect. Criteria Continuous Concentration (CCC) is the estimate of the highest concentration an aquatic habitat can be indefinitely exposed without resulting in unacceptable effect.
F Not applicable. No EPA water quality criterion is established for the constituent.
G Not applicable. No Ocean Plan receiving water quality objective is established for the constituent.
H Ocean Plan water quality objective applies to sum of polynuclear aromatic hydrocarbons (PAHs).
I Ocean Plan water quality objective applies to sum of DDD, DDE, and DDT isomers.
J Ocean Plan water quality objective applies to sum of halomethanes (e.g., bromoform, bromomethane, and chloromethane).
K Ocean Plan water quality objective applies to sum of chlorinated phenols.
L Ocean Plan water quality objective applies to sum of non-chlorinated phenols.
M Ocean Plan water quality objective applies to sum of dichlorobenzenes (e.g., 1,2-dichlorobenzene, 1,2-dichlorobenzene).
N Ocean Plan water quality objective applies to endosulfan alpha, endosulfan beta, and endosulfan sulfate.

Table III.B-26 summarizes constituents addressed by EPA water quality criteria, but for which the Ocean Plan has not established numerical water quality objectives. While several of the EPA-listed constituents are not specifically analyzed, compliance with the EPA criteria is virtually assured (see rationale presented in Table III.B-26) by the facts that:

- The compounds are not routinely present in municipal wastewater,
- Similar (and surrogate) compounds are not present in the PLWTP effluent, and
- Unreasonably high concentrations of the constituents would be required in the PLWTP effluent in order to approach the EPA water quality criteria concentrations upon completion of initial dilution.

Table III.B-26:
Constituents Not Regulated in the Ocean Plan but Addressed within EPA Water Quality Criteria [A]

Category	Constituents [A]	Rationale for PLOO Compliance
Organophosphorus pesticides	• Chlorpyrifos • Demeton • Diazinon • Guthion • Malathion	These constituents are monitored monthly in the PLWTP effluent. Malathion and chlorpyrifos were occasionally detected during 2017-2020. The highest observed malathion concentration during 2017-2020 was 0.495 µg/L. Chloropyrifos was not detected above the quantification limit during 2017-2020, and highest observed chloropyrifos concentration was 7.8 DNQ µg/L. After initial dilution, the PLOO discharge would comply with the EPA water quality criteria for these organophosphorus pesticides by a significant margin.

Category	Constituents[A]	Rationale for PLOO Compliance
Chlorinated pesticides	• Mirex • Methoxychlor	Mirex and Methoxychlor are monitored monthly in the PLWTP effluent and were not detected during 2017-2020.
Base Neutrals	• Butyl benzyl phthalate • 2-chloronaphthalene • 1,2-trans-dichloroethene • 1,2-dichloropropane • 1,2,4-trichlorobenzene	The PLWTP effluent is analyzed monthly for these compounds. None of the compounds were detected in the PLWTP effluent during 2017-2020.
	• N-nitrosodibutylamine • N-nitrosodipyrrolidine • N-nitrosodiethylamine • bis (chloromethyl) ether	The compounds are not specifically analyzed in the PLWTP effluent but are screened as part of base/neutral analyses. The compounds are unlikely to be present in the PLWTP effluent. Similar more common compounds were not detected in the PLWTP effluent during 2017-2020, including: n-nitrosodimethylamine, n-nitrosodiphenylamine, and bis(2-chloroisopropyl).
Purgeable Compounds	• Pentachlorobenzene	Pentachlorobenzene is not specifically analyzed but is screened as part of priority pollutant analyses. The compound is unlikely to be present in the PLWTP effluent, as more common chlorinated benzene compounds (e.g., dichlorobenzene) are rarely detected, and then at low concentrations that ensure compliance with water quality objectives and criteria.

Table III.B-26 Notes:

A Constituents for which EPA has established water quality criteria but for which no corresponding Ocean Plan water quality objective has been established.

NPDES Permit Requirements and Performance Benchmarks. In addition to establishing effluent performance goals that implement Ocean Plan receiving water quality objectives, Order No. R9-2017-0007 (NPDES CA0107409) establishes effluent benchmarks for use in determining which parameters require antidegradation analysis at the end of the current NPDES permit period.[41]

An analysis of compliance with the benchmarks is presented in the Antidegradation Study portion of this 301(h) application. (See Part 3 of Volume II.) As shown in the Antidegradation Study, the City achieved compliance with all NPDES mass emission benchmarks during 2017-2020 except for non-chlorinated phenolic compounds and ammonia-nitrogen. Analyses presented in Part 3 of Volume II demonstrates that the mass emissions of non-chlorinated phenol and ammonia-nitrogen from the PLOO are in compliance with Tier I antidegradation regulations and that no Tier II analysis is required.

Violations of Effluent Limits During 2017-2020. The comprehensive City of San Diego monitoring program annually conducts in excess of 10,000 analyses of the PLWTP effluent

41 Mass emission benchmarks for antidegradation assessment are established within Table 7 of Order No. R9-2017-007.

discharge on hundreds of effluent samples. The City achieved 100 percent compliance during 2017-2020 with the:

- Effluent concentration and mass emission limitations established in Table 5 of Order No. R9-2017-0007 that implement the provisions of CWA Sections 301(h) and 301(j)(5)
- Effluent concentrations and mass emission limitations established in Table 5 of Order No. R9-2017-0007 that implement Ocean Plan Table 4 technology-based effluent limitations
- Effluent concentration and mass emission limitations established in Table 5 of Order No. R9-2017-0007 that implement Ocean Plan Table 3 receiving water quality objectives
- Effluent concentration and mass emission performance goals established in Table 6 of Order No. R9-2017-0007 that implement Ocean Plan Table 3 receiving water quality objectives for constituents for which enforceable effluent limitations were not established

TSS mass emissions were reduced during the effective period of Order No. R9-2017-0007, and continued implementation of the system-wide chemical addition program (PRI-SC) has allowed the PLWTP to achieve TSS concentrations that consistently approach 30 mg/L.

III.B.8. Provide the determination required by 40 CFR 125.60(b)(2) or, if the determination has not yet been received, a copy of a letter to the appropriate agency(s) requesting the required determination.

The City has requested (see correspondence in Appendix U) that the Regional Board provide an updated determination of compliance for the PLOO discharge. A copy of this determination will be forwarded to EPA when it is received by the City.

REFERENCES

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III.C IMPACT ON PUBLIC WATER SUPPLIES

III.C.1. Is there a planned or existing public water supply (desalinization facility) intake in the vicinity of the current or modified discharge?

SUMMARY: No existing or planned water supply facilities are located in the vicinity of the PLOO discharge.

The only existing seawater desalination facility in San Diego County is a 50 mgd facility located in Carlsbad, California. The Claude "Bud" Lewis Carlsbad Desalination Plant (CDP) is located 30 miles north of the PLOO. The CDP diverts up to 100 mgd of saline water from Agua Hedionda Lagoon. Waste brine from the CDP is discharged to the Pacific Ocean (surf zone discharge south of the mouth of Agua Hedionda Lagoon) via an effluent channel formerly used by the Encina Power Station. CDP intake and discharge operations are regulated under Regional Board Order No. R9-2019-0003, as amended by Order No. R9-2020-0004.

As part of oceanographic studies submitted to the Regional Board in application for the CDP NPDES permit, computer modeling performed by Jenkins and Waysl (2001, 2004) concluded that only a small portion of the Poseidon seawater desalination brine discharge (less than 1 percent) would be re-entrained in the Agua Hedionda Lagoon intake. The mouth of Agua Hedionda Lagoon mouth is located north of the brine discharge point, and the PLOO is a further 30 miles south. As a result, the PLOO discharge (30 miles to the south) will not have any discernible effect on the proposed Agua Hedionda Lagoon seawater intake.[1]

Long-term water plans issued by the San Diego County Water Authority do not envision any other seawater desalination facilities in San Diego County.[2]

An additional seawater desalination facility is proposed in South Orange County, approximately 60 miles north of the PLOO discharge. The proposed South Coast Water District Doheny Ocean Desalination Project would produce up to five mgd of potable supply and would feature subsurface slant wells beneath the ocean floor for its source supply.[3]

As with the CDP in Carlsbad, the PLOO discharge (or other regional municipal ocean outfall discharges north of the PLOO) will not have any discernible effect on the Doheny Desalination Project.[4]

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1 The Encina Ocean Outfall discharge is located approximately 3.2 km (2 miles) south of the CDP intake, and the Oceanside and San Elijo Ocean Outfalls respectively discharge approximately 5.6 km (3.5 miles) north and 18 km (11.2 miles) south of the CDP intake. Studies conducted as part of the CDP NPDES permit application indicate that the CDP intake is not influenced by any of these outfall discharges. Jenkins and Waysl (2001, 2004); Poseidon Resources (2005).

2 San Diego County Water Authority (2020).

3 South Orange County Wastewater Authority (2020).

4 Intakes for the Doheny Desalination Facility are onshore from the South Orange County Wastewater Authority (SOCWA) San Juan Creek Ocean Outfall discharge. SOCWA (2020) determined that the outfall discharge has no discernible effect on the desalination supply.

III.C.2. If yes,

a. What is the location of the intake(s) (latitude and longitude)?

b. Will the modified discharge(s) prevent use of the intake(s) for public water supply?

c. Will the modified discharge(s) cause increased treatment requirements for the public water supply(s) to meet local, State, and EPA drinking water standards?

The question is not applicable, since no existing or planned public drinking water supply intake facilities exist or are proposed in the vicinity of the PLOO discharge.

REFERENCES

Jenkins, Scott, and Joseph Wasyl. *Hydrodynamic Modeling of Dispersion and Dilution of Concentrated Seawater Produced by the Ocean Desalination Project at the Encina Power Plant, Carlsbad, CA, Part II: Saline Anomalies Due to Theoretical Extreme Case Hydraulic Scenarios* (prepared for Poseidon Resources Corporation). 2004.

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III.D BIOLOGICAL IMPACT OF DISCHARGE

III.D.1 Does (will) a balanced indigenous population of shellfish, fish, and wildlife exist:

a. Immediately beyond the ZID of the current and modified discharge(s)?

b. In all other areas beyond the ZID where marine life is actually or potentially affected by the current and modified discharge?

SUMMARY: Yes. A balanced indigenous population (BIP) exists immediately beyond the ZID of the current PLOO discharge. Additionally, it is projected that a BIP will continue to be maintained, as planned Metro System improvements will result in future reductions in PLOO wastewater flows and mass emissions.

This question is addressed using two approaches. First, the City's comprehensive monitoring database on sediment quality, benthic invertebrate and trawl-caught fish communities is reviewed to compare pre-discharge (1991-1993) and post-discharge (1994-2020) conditions.[1] Second, available data and evidence are reviewed to assess potential effects that the PLOO discharge may have on the health, population and diversity of plankton, mammals, birds, fish, or endangered species.

Detailed assessments of existing sediment conditions, benthic infauna communities, and demersal fish and megabenthic invertebrate communities are presented in Appendices C1, C2, C3 and C4. Details of the City's bioaccumulation assessment program for fish tissue are presented in Appendix C5. In accordance with direction received from EPA, data are presented within Appendices C1 through C5 in a similar format to that used to assess populations of shellfish, fish and wildlife presented in prior PLOO 301(h) applications.[2]

Evaluation of Existing Conditions: More than 40 years of environmental monitoring data at PLOO and reference monitoring stations are available for assessing trends in sediment chemistry, benthic infauna communities and demersal fish and megabenthic communities. This extensive data base includes pre-discharge (pre-construction and construction from July 1991 to October 1993) and post-discharge periods (1994 to present).

The City’s prior NPDES application compared post-discharge data for the period 1994-2013 against pre-discharge data. As part of this 301(h) application, data for the 1991-1993 pre-discharge period are evaluated against the following post-discharge data sets:

- The post-discharge period not covered in the prior 301(h) application (e.g., 2014-2020)[3]
- The entire post-discharge period through 2020 (e.g., 1994-2020)

1 2020 represents the last full calendar year for which receiving water and benthic metrics were available at the time this report was prepared. Data for calendar year 2021 will be assessed within the Biennial Receiving Water Monitoring Report for years 2020-2021 that is required per Receiving Water Monitoring Requirements IV.E.1-3 of Order No. R9-2017-0007.

2 Includes City of San Diego (1995, 2001, 2007 and 2015).

3 Data for calendar year 2021 were not yet fully available at the time of preparation of this NPDES application. Data for 2021 will be submitted to regulators according to requirements established within Order No. R9-2017-0007.

Post-discharge monitoring data for these two time periods are examined to explore the relationships(s) between the PLOO discharge and measured environmental changes. Table III.D-1 summarizes the number of benthic grab samples and community trawls collected to date. Table III.D-1 also summarizes the database used within Appendices C1 through C4 for comparing data sets over this 1991-2020 period.[4]

Table III.D-1:
Summary of Available Sediment, Infauna and Community Trawl Samples [A]

Category	Pre-Discharge 1991-1993	Complete Post-Discharge Period 1994-2020 [B]	Recent Conditions 2014-2020 [C]
Total Number of Samples			
Sediment Grabs	230	1,542	299
Infauna Grabs	420	2,697	343
Community Trawls	160	545	59
Winter & Summer Samples Assessed at 12 Primary PLOO Core Stations [D]			
Sediment Grabs	60	648	168
Infauna Grabs	60	647	168
Community Trawls	30	291	59

Table III.D-1 Notes:

A From Table C1-1 of Appendix C1.

B Year 2021 data were not available for assessment at the time of preparation of this NPDES application. As a result, the post-discharge period addressed herein is 1994-2020.

C The City's prior 301(h) application (City of San Diego, 2015) assessed sediment, benthic infauna grabs and community trawl data through 2013. The right-hand column indicates the number of samples (for the period during 2014-2020) addressed herein but not addressed part of prior PLOO 301(h) assessments.

D To ensure continuity in evaluating data among multiple years and to ensure consistency with data bases evaluated as part of prior 301(h) applications, Appendix C focuses on samples collected only during winter (typically January) and summer (typically July). Further, as with prior PLOO 301(h) applications, the Appendix C analyses exclude data from Stations SD9 and SD11 (where sampling was discontinued in 2003), exclude data from replicate trawls that were collected during and prior to 1995, exclude analyses of invertebrate biomass (which was no longer recorded after July 2003), and exclude short trawls that contained large red crab hauls.

Overview and Summary of Findings. The City's discharge of municipal wastewater into offshore marine waters is not affecting the maintenance of natural conditions in sediments and biota (benthic invertebrates and fishes) beyond the designated PLOO ZID. After more than 38 years of wastewater discharge from the extended PLOO, monitoring results show that a BIP is maintained beyond the ZID off Point Loma, and that natural conditions in sediments and biota (benthic invertebrates and fishes) are maintained. Benthic habitats beyond the ZID boundary are populated by natural communities of indigenous benthic invertebrates that are characteristic of the SCB. Key parameters useful for assessing these benthic communities include infaunal abundance, species diversity, BRI and populations of key indicator species.[5] Based on post-discharge data collected to date, all indicator parameters demonstrate

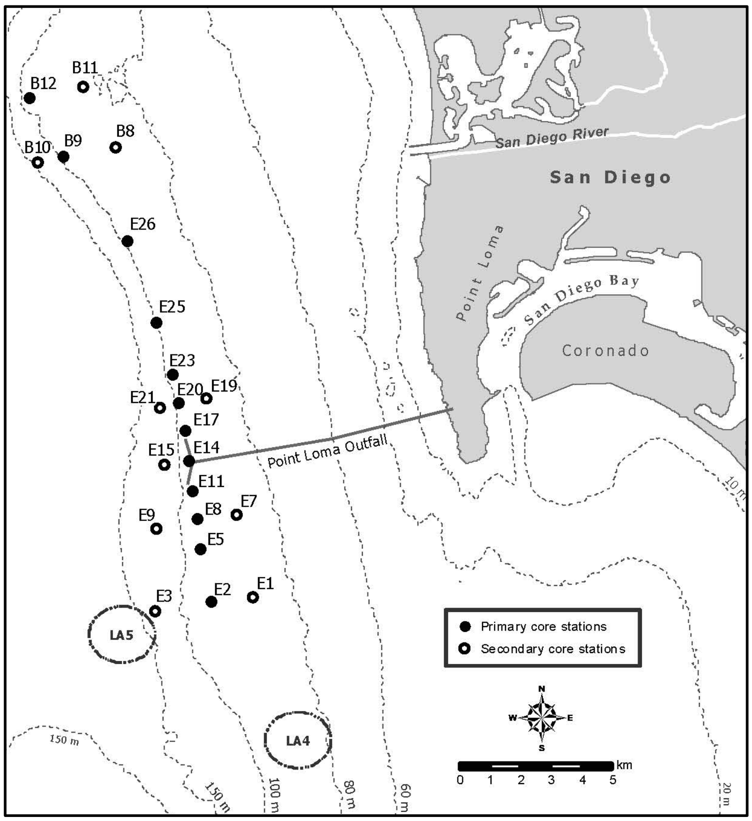
4 As discussed in Footnote C to Table III.D-1, the analyses presented in Appendix C are based on assessment of summer and winter surveys that exclude data collected in only portions of the overall data period.

5 Key indicator species include species that are sensitive to degraded water quality or sediment conditions, and species that are tolerated to degraded sediments or waters.

conditions in the vicinity of the PLOO that are within the limits of variability that characterize natural benthic communities of the SCB continental shelf. Further, no adverse outfall-related effects are in evidence from analyses of trawl-caught fish and invertebrates, including measurements of toxins in fish tissue.

Sediment Conditions. Characteristics of ocean sediments (e.g., grain size, organic content, contaminant levels) are important factors influencing benthic communities. Figure III.D-1 presents the location of core and secondary benthic and sediment chemistry monitoring stations.

Figure III.D.1:
Location of PLOO Benthic and Sediment Chemistry Monitoring Stations[6]



As shown in Figure III.D-1, benthic and sediment chemistry monitoring sites include:

- 12 primary core benthic monitoring stations along the 98 m depth contours[7]
- 5 secondary benthic monitoring stations along the 88 m depth contour
- 5 sites along the 116 m depth contour

6 See Appendix C1. Figure III.D-1 also shows the location of PLOO monitoring stations with respect to the locations of the PLOO and dredge disposal sites LA4 and LA5.

7 The PLOO discharge ports are between 306 and 313 feet (93.3 and 94.5 m) below Mean Lower Low Water. Due to the height of the diffuser and outfall ballast, the depth to the ocean bottom at the end of the PLOO diffuser is approximately 320 feet (98 m). Since the PLOO discharge predominantly moves upcoast or downcoast, the 98 m depth contour (sometimes also referred to in City monitoring reports as the 100 m depth contour) is thus important in assessing potential impacts associated with the outfall discharge.

Table III.D-2 summarizes sediment chemistry results from the PLOO monitoring stations during pre-discharge (1991-1993) and post-discharge (1994-2020) conditions. Full results from the pre- and post-discharge sediment monitoring are presented in Appendix C1. A summary of the key conclusions and trends are presented below.

Particle Size Distribution. Differences in the composition of sediments (e.g., fine vs. coarse particles) and associated levels of organic loading can affect the burrowing, tube building and feeding abilities of infaunal invertebrates, which in turn may lead to changes in benthic community structure. Sediment grain size and the proportion of silt and clay combined (i.e., percent fines), sand and coarser particles (e.g., pebbles, gravel, shell hash) are also indicative of the local hydrodynamic regime, while other physical properties (size, shape, density, and mineralogy) interact with deposited organic particles to create new conditions in sediment carbon coupling at the boundary layer.

As detailed in Appendix C1, sediment composition in the vicinity of the PLOO has changed little in the past 40 years, and no consistent changes over time have occurred that might correspond to effects caused by the PLOO discharge.[8] Temporal variability in sediment compositions at sites near the PLOO occurs primary within the sand and coarse fractions, which is likely related to the movement of ballast materials used to support the outfall pipe as opposed to the PLOO discharge itself. Relatively coarse material has also increased at stations near the LA-5 dredge disposal sites, likely due to "short dumps."[9]

Organic Load Indicators. Organic load parameters such as TOC (total organic carbon), BOD, total volatile solids (TVS), total nitrogen and sulfides can be used to assess the amount of carbon imported into sediments as file particulate matter. Operation of the PLOO has not significantly affected TOC, TVS, or total nitrogen in PLOO sediments. Values for these parameters remain similar to (or less) than pre-discharge values observed during 1991-1993. and remain within typical background values observed in the SCB.[10]

Table III.D-2:
Comparison of Pre- and Post-Discharge PLOO Sediment Data with San Diego Regional Surveys [A]

Category	Parameter	Units	San Diego Regional Surveys [B]	PLOO Surveys [C]	
				Pre-Discharge 1991-1993	Post-Discharge 1994-2020
Grain Size	Fine particles	% of total particles	39	40	41
	Fine sands		46	57	55
	Medium-coarse sands		14	3	3
	Coarse particles		2	0	1

8 As an example of the lack of change over time, the percent of fine particles at the 12 primary core stations averaged 40 percent during pre-discharge conditions and averaged 41 percent during post-discharge conditions. See Appendix C1.

9 Refers to the dumping of dredge spoils closer to the shore than the designated LA-5 disposal site. See Section C1-3 of Appendix C1.

10 See Section C1-3 of Appendix C1.

Category	Parameter	Units	San Diego Regional Surveys [B]	PLOO Surveys [C]	
				Pre-Discharge 1991-1993	Post-Discharge 1994-2020
Organic Loading	Total organic carbon (TOC)	% of total	0.6	0.5	0.7
	Total volatile solids (TVS)		2.37	2.15	2.31
	Total nitrogen		0.05	0.04	0.05
	BOD	ppm [D]	319	270	303
	Sulfides		5.8	1.2	6.0
Toxic inorganic compounds	Arsenic	ppm [D]	3.5	2.4	3.1
	Beryllium		0.1	0.4	0.2
	Cadmium		0.1	1.3	0.2
	Chromium		18	17	17
	Copper		8	7	7
	Lead		5	2	3
	Mercury		0.02	0.01	0.02
	Nickel		7	7	7
	Selenium		0.1	0.2	0.1
	Silver		0.2	0.1	0.3
	Zinc		31	28	28
Toxic organic compounds	DDT [E]	ppm [D]	1.069	1.247	0.579
	PCBs congeners[F]		1.195 [F]	NA [F]	0.147 [F]
	PAHs [G]		0.0275	ND	0.020

Table III.D-2 Notes:

A From Table C1-2 of Appendix C1.

B Data for the SCB, as reported by SCCWRP for SCB regional surveys conducted in 1994, 1998, 2003, 2008, 2013 and 2018.

C PLOO data from 98 m outfall stations during winter (typically January) and summer (typically July) surveys.

D Parts per million.

E Dichloro-diphenyl-trichloroethane (DDT) compounds. Family of compounds includes isomers of DDT along with isomers of related compounds DDD (dichloro-diphenyl-dichloroethane) and DDE (dichloro-diphenyl-dichloroethylene).

F PCBs (polychlorinated biphenyls) were measured as arochlors (the most common commercial mixtures of PCB compounds) through April 1998. After this time, PCBs were measured as congeners (which includes all individual PCB compounds, of which arochlors are a subset).

G Polycyclic aromatic hydrocarbons (PAHs), which are the sum of acenaphthylene, anthracene, 1,2-benzanthracene, 3,4-benzo fluoranthene, benzo [k] fluoranthene, 1,12-benzo perylene, benzo [a] pyrene, chrysene, dibenzo [ah] anthracene, fluorene, indeno [1,2,3-cd] pyrene, phenanthrene and pyrene.

The only sustained effects for organic load indicators were mostly restricted to a few sites located within about 100 to 300 m (328 to 984 ft) of the outfall (i.e., within 100 to 200 m of the ZID). These three near-ZID sites include station E14 located immediately west of the center of the PLOO wye, and stations E11 and E17 located off the ends of the southern and northern diffuser legs, respectively.[11] The effects observed at these sites include an increase in coarser sediments through time, measurable increases in sulfide concentrations, and small increases in BOD levels.

A slight increase in sediment BOD has been observed at Station E14 since the PLOO discharge began, but BOD values remain similar to values reported at other SCB regional stations. Further, 97 percent of the samples from near-ZID stations show post-discharge BOD values that are less than the upper tolerance interval of 440 ppm for the San Diego mainland shelf.[12,13]

Concentrations of sulfides have shown a distinct outfall-related pattern with higher values near the PLOO that lessen with distance from the PLOO. However, sulfide concentrations at the near-ZID stations remain consistent with values reported at regional stations sampled at mid-shelf depths off the coast of San Diego. Further, no evidence exists that the relatively small increase in sulfide concentrations near the PLOO discharge site is affecting sediment quality to the point that marine biota are degraded.[14]

Toxic Compounds. Table III.D-3 summarizes findings from Appendices C1 through C4 relative to the presence of toxic compounds in sediments at PLOO stations, reference stations, and typical values found in regional surveys within the SCB. As shown in Table III.D-3 (and as detailed in Appendices C1 through C4), no spatial trends are in evidence that indicate adverse sediment effects associated with the PLOO discharge. Additionally, concentrations at virtually all PLOO and reference sites are within upper tolerance intervals for the San Diego mainland shelf.[15]

Table III.D-3: Summary of Sediment Chemistry Monitoring at PLOO and Reference Stations [A]

Parameter	Summary of Findings within Appendix C1
Toxic Inorganic Parameter	
Arsenic	• Significant natural sources exist in submarine hot springs. • No spatial patterns occur that are indicative of effects associated with the PLOO. • All concentrations are below typical SCB background concentrations of 10 ppm. • 97% of samples below the upper tolerance interval of 5.7 ppm.
Beryllium	• No clear patterns occur that are indicative of effects associated with the PLOO. • 99% of near-ZID stations and 94% of farfield stations had concentrations below the upper tolerance interval of 1.54 ppm.

11 Station E11 is located about 149 m from the southern ZID boundary, while E17 is located about 197 m from the northern ZID boundary.
12 *Ibid.*
13 Multivariate analyses were performed (see Appendix C2 to identify benthic sites or communities likely to provide the most appropriate reference values for environmental indicators in the PLOO region. Tolerance intervals were calculated for 27 sediment parameters and 15 biological indicators.
14 See Section C1-3 of Appendix C1.
15 *Ibid.*

Parameter	Summary of Findings within Appendix C1
Cadmium	• Sediment concentrations have decreased since operation of the PLOO began, but the cause of this is unknown. • Post-discharge levels at PLOO stations remain consistent with reference data from SCB regional surveys. • 96% of near-ZID stations and 89% of farfield stations had concentrations below the upper tolerance interval of 0.9 ppm.
Chromium	• Concentrations at PLOO stations are generally lower than reference data from SCB regional surveys. • Concentrations at the core PLOO stations are generally lower than at northern reference stations B9 an B12. • 99% of near-ZID stations and 99% of farfield stations had concentrations below the upper tolerance interval of 31.6 ppm
Copper	• No spatial patterns occur that are indicative of effects associated with the PLOO, but concentrations are highest near the LA-5 dredge disposal site where dredged sediments from San Diego Bay are deposited. • 100% of near-ZID D stations and 99% of farfield stations had concentrations below the upper tolerance interval of 25.8 ppm.
Lead	• No spatial patterns occur that are indicative of effects associated with the PLOO, but concentrations are highest near the LA-5 dredge disposal site where dredged sediments from San Diego Bay are deposited. • Concentrations at PLOO stations are generally lower than reference data from SCB regional surveys. • 99% of near-ZID stations and 99% of farfield stations had concentrations below the upper tolerance interval of 13.2 ppm.
Mercury	• Improvement in detection limits over time has resulted in increased number of detected concentrations. • No spatial patterns occur that are indicative of effects associated with the PLOO. • Detected values at all sites were less than 0.089 ppm. • 100% of near-ZID stations and 100% of farfield stations had concentrations below the upper tolerance interval of 0.107 ppm.
Nickel	• Concentrations at PLOO stations are generally lower than reference data from SCB regional surveys. • 99% of near-ZID stations and 99% of farfield stations had concentrations below the upper tolerance interval of 12.3 ppm.
Selenium	• No spatial patterns occur that are indicative of effects associated with the PLOO. • 99% of near-ZID stations and 99% of farfield stations had concentrations below the upper tolerance interval of 0.7 ppm.
Silver	• Detected in only 3% of samples in the PLOO area; concentrations are consistent with data from SCB regional surveys. • 99% of near-ZID stations and 99% of farfield stations had concentrations below the upper tolerance interval of 6.07 ppm.
Zinc	• Concentrations at PLOO stations are generally lower than reference data from SCB regional surveys. • 99% of near-ZID stations and 99% of farfield stations had concentrations below the upper tolerance interval of 74.1 ppm.

Parameter	Summary of Findings within Appendix C1
Toxic Organic Parameter	
DDT	• Detected only sporadically, and no spatial patterns occur that are indicative of effects associated with the PLOO. • Concentrations at PLOO stations are generally lower than reference data from SCB regional surveys. • 100% of near-ZID stations and 99% of farfield stations had concentrations below the upper tolerance interval of 17,000 ppt.[B]
PCBs	• Detected most frequently near the LA-5 dredge disposal site. • Concentrations at PLOO stations are generally lower than at reference areas within the SCB. • 100% of near-ZID stations and 99% of farfield stations had concentrations below the upper tolerance interval of 12.43 ppt.[B]
PAHs	• Detected only sporadically, and concentrations at core PLOO stations are less than at reference stations.
Table III.D-3 Notes are on the following page: A Summary of sediment chemistry findings from Appendix C1. See Section C1-3 of Appendix C1. B Parts per thousand (ppt).	

Summary. Overall, the PLOO discharge is not affecting sediment quality in the vicinity of the PLOO. The only sustained effects are a slight increase in coarse sediments and sulfide concentrations and a small increase in BOD concentrations at stations E11, E14 and E17 which are located within 200 m of the ZID. Particle size, sulfide and BOD values, however, remain within the range of variability for PLOO reference stations and throughout the SCB. No evidence exists that the PLOO discharge is affecting benthic sediments to the point that marine biota are degraded or adversely affected. These findings are supported by sediment toxicity testing and benthic community monitoring results, as discussed in the following sections.

Benthic Infauna. Benthic infaunal organisms represent excellent indicators of changes that occur in the marine environment due to the effects of wastewater discharges or other anthropogenic or natural sources. As with sediments, benthic infauna (macrofauna) data are currently collected at 22 monitoring stations off the coast of Point Loma (see Figure III.D-1).

As shown in Table III.D-1, benthic communities off Point Loma (see Appendix C1) were analyzed based on a total of 707 separate 0.1 m^2 grab samples collected at the 12 primary core (outfall depth) stations during January and July from 1991 through 2020. Of the 707 samples collected at these sites, 60 were collected prior to discharge (1991-1993) and 647 were collected during the post-discharge period (1994-2020). The latter includes 168 samples for the period 2014-2020 that were not addressed in the City's previous 2015 waiver application.[16]

Patterns and trends for key benthic community parameters are discussed in detail within Appendix C1 of this application. Benthic community parameters include:

- Number of species (species richness or species diversity)
- Infaunal abundance (populations)

16 The City's prior 301(h) application (City of San Diego, 2015) evaluated a 20-year post-discharge database for the period 1994-2013.

- Swartz dominance
- Benthic Response Index
- Abundances of major taxa (e.g., polychaetes, echinoderms, crustaceans, mollusks)
- Abundances of pollution sensitive, pollution tolerant or opportunistic species (i.e., bioindicators)
- Abundances of numerically dominant taxa (i.e., top 10 species by abundance)

Table III.D-4 summarizes data for these categories for pre- and post-discharge conditions at all stations, at Station E14 at the PLOO diffuser "wye" and the reference Station B9. Appendix C1 presents a detailed analysis of each of these measured parameters. Key findings and conclusions for the benthic infauna parameters are summarized below.

Table III.D-4:
Summary of Pre- and Post-Discharge Benthic Infauna

Parameter		Pre-Discharge, 1991-1993			Post-Discharge, 1994-2020		
		All Sites[B] Mean (min-max)	Station E14[C] (Outfall)	Station B9[D] (Reference)	All Sites[B] Mean (min-max)	Station E14[C] (Outfall)	Station B9[D] (Reference)
Species Richness		66 (44 - 100)	63	68	86 (41 - 140)	92	85
Species Abundance	All species	269 (124 - 498)	279	254	346 (94 - 788)	422	310
	Annelids [E]	151 (50 - 375)	170	143	205 (40 - 670)	179	194
	Arthropods [F]	44 (10 - 102)	44	52	57 (2 - 178)	64	47
	Mollusks	19 (4 - 102)	14	13	36 (2 - 283)	58	24
	Echinoderms	51 (9 - 84)	47	43	42 (0 -175)	12	41
	All other taxa)	3 (0 - 11)	4	4	6 (0 - 51)	10	5
Benthic Response Index (BRI)		4.6 (-4 - 12)	4.8	7.0	10.2 (-4 - 37)	20.5	6.4
Swartz Dominance		18 (9 - 30)	18	20	28 (4 - 50)	26	29
Diversity (H)		3.3 (2.7 - 3.9)	3.3	3.4	3.7 (2.0 - 4.4)	3.7	3.8

Table III.D-4 Notes:

A From Table C1-5 of Appendix C1.
B Data from 12 primary core stations along the 98 m depth contour. Mean values shown above, with the range of minimum and maximum values shown in parentheses.
C Station E14 is closest to the PLOO diffuser (see Figure III.D-1).
D Station B9 is far from the PLOO and is used to indicate reference conditions.
E Annelids are predominantly comprised of polychaetes.
F Arthropods are predominantly comprised of crustaceans.

Species Richness. One potential indicator of environmental degradation would be a reduction in benthic species diversity or number of species at near-ZID stations compared to reference stations. Species richness (see Table III.D-4) was highly variable both in pre- and post-discharge conditions, but average species richness values during post-discharge conditions were generally higher than during the pre-discharge period, particularly at the near-ZID stations E14 and E11 and Station E2. As documented in Appendix C1, no conclusions can be drawn regarding whether this increase is related to the PLOO, as:

- A general increase in species richness has occurred within the SCB, regardless of proximity to the PLOO,
- The number of infaunal species near the outfall are within the range of natural variability within the SCB,
- In general, the increased number of species at the near-ZID station E14 may be related to the presence of outfall ballast which provides excellent habitat for some species, and
- The number of species at Station E2 is likely influenced by proximity to the LA-5 dredged materials disposal site.

An increase in species richness is generally not considered adverse unless it is accompanied by a reduction in the number of species present of a significant change in the dynamics of the infaunal community. A decrease in species richness when combined with high organic enrichment and increased populations of pollutant-tolerant organisms can be indicative of degraded conditions. This is not occurring at the PLOO, however, since species richness is somewhat higher at the near-ZID PLOO stations and populations of pollutant-sensitive species at the near-ZID stations continue to be robust. Further species diversity and abundance near the PLOO continue to be within the range of natural variability seen through the mainland shelf benthic habitats of the SCB.[17]

Infaunal Abundance. As shown in Table III.D-4, the population of infaunal organisms along the 98 m depth contour were highly variable, but generally higher during post-discharge conditions than during pre-discharge conditions. Despite this increase, however, there were no spatial patterns in the region, and increases in infaunal abundances also during this time period also increased at stations beyond the influence of the PLOO discharge. Further, 96 percent of the infaunal abundances at all stations were within the tolerance interval bounds of 144-644 organisms per sample.

While differences in infaunal abundance exists between pre- and post-discharge conditions, these differences are concluded as minor, as infaunal abundances at all sites off Point Loma were similar to and within the range of values seen at:

- PLOO reference stations far removed from the PLOO
- Regional surveys conducted within the San Diego Region
- Regional surveys conducted throughout the SCB[18]

17 See Section C1-4 of Appendix C1.
18 *Ibid.*

Benthic Response Index (BRI). The BRI is an important tool for gating anthropogenic impacts to benthic habitats throughout the SCB.[19] BRI values below 25 are indicative of reference conditions, while BRI values between 34 and 44 represent increasing, albeit minor, levels of environmental degradation.

Overall, BRI values in the PLOO area reflect reference conditions, as BRI values were below 25 at all of the PLOO stations, except for Station E14 which is located near the ZID boundary immediately west of the PLOO wye. While BRI values at Station E14 have been higher during the post-discharge period compared to pre-discharge conditions, 95 percent of the E14 samples showed BRI values less than 34, indicating only minor effect. Highest BRI values at Station E14 were limited to three surveys (winter 2017, summer 2017 and winter 2018). BRI values at all other stations, including Stations E11 and E17 immediately upcoast and downcoast from the PLOO diffuser, showed little increase and never exceeded the reference condition thresholds. Thus, changes in BRI values have been highly localized, temporary in nature and, along with other community metrics, not considered indicative of degraded benthic habitats.[20]

Dominance and Diversity. Dominance reflects shifts in the benthic community structure with respect to abundance of species. One measure of dominance is the Swartz Dominance Index, which is a measure of the number of species that account for 75 percent of the organism population within a given sample. Low Swartz dominance values indicate communities dominated by a few species. Another useful metric is the Shannon diversity index (H'). Within this scale, H' values range from zero (indicative of a population comprised of a single species) to a value of five (very high diversity).[21]

Despite their proximity to the outfall, benthic infaunal communities in the PLOO vicinity have not become dominated by pollution-tolerant species. Instead, dominance (as measured by the Swartz Dominance Index) has decreased region-wide off the Point Loma coast. Post-discharge benthic communities in the region as a whole are characteristic of a more even distribution of species than prior to discharge. Additionally, 100 percent of nearfield and 99 percent of farfield samples during the post-discharge period were within the Swartz tolerance interval bounds of 7 to 48 taxa. Further, more than 99 percent of the nearfield and farfield samples during the post-discharge period were within the H' interval bounds of 2.5 to 4.3.

Indicator Species. Polychaete worms represented the most abundant benthic invertebrates off the Point Loma coast. As documented in Appendix C1, a comparison of data collected during summer surveys showed little evidence of temporal or spatial trends. Alternating periods of population growth and decline have occurred throughout the region during the post-discharge period, regardless of station proximity to the PLOO, indicating that species populations are largely influenced by natural variations in oceanographic conditions.

Several species of polychaetes that occur within the SCB are useful indicators of organic loading, including *Capitella telata*. *Capitella telata* occur rarely in the vicinity of the PLOO, and when present occur in low abundance.

19 Since the BRI was developed from data collected within the SCB over several decades, the index is largely driven by the abundance of species common off the coast of Point Loma. (See Appendix C1-4.)

20 See Section C1-4 of Appendix C1.

21 While the Shannon diversity index (H') ranges from 0 to 5, values in excess of four are rarely encountered.

While populations of *Capitella telata* show a minor outfall-related pattern at Station E14 (near the PLOO ZID boundary), populations of *Capitella telata* remain at levels characteristic of undisturbed habitat. Overall, the low abundance of *Capitalla telata* and other indicator species[22] suggest no substantial organic loading or habitat degradation near the PLOO.

The ophiuroid (brittle star) *Amphiodia urtica* is a key bioindicator whose populations tend to decrease in polluted or impacted areas. *Amphiodia urtica* remains the most abundant invertebrate overall in the PLOO area. While populations have declined slightly from pre- to post-discharge periods, a number of factors may be responsible for this change, including:

- Juvenile *Amphiodia urtica* are difficult to reliably identify to species and may be recorded at the genus or family level, resulting in an undercount as a species,
- *Amphiodia urtica* are sensitive to changes in sediment particle size, which can vary with oceanographic conditions, leading to significant variation in populations over time,
- The patchiness of sediments near the outfall and the corresponding shifts in assemblage structure suggest that changes in the area may be influenced, in part, by localized physical disturbance such as shifting sediments, and
- Populations of *Amphiodia urtica* are affected by regional oceanographic trends, and populations at the near-ZID stations reflect general trends seen at reference stations far removed from the PLOO.

Overall, populations of *Amphiodia urtica* remain within the range of natural variability seen throughout the SCB, and *Amphiodia urtica* remains as the most abundant echinoderm in the PLOO vicinity.

Data on crustaceans known to be sensitive to organic enrichment show similar effects, including amphipods in the genera *Ampelisca* and *Rhepoxynius*. Abundances of amphipod show little difference between near-ZID and reference stations, and over 90 percent of post-discharge samples were with the tolerance interval boundaries for the San Diego mainland shelf.

Mollusk populations also indicate no significant outfall-related effects. In general, increases in mollusk populations have been observed both at near-ZID and farfield stations, but populations of the bivalve *Parvilucina tenuisculpa* (an indicator species associated with moderate organic enrichment) have declined over time, albeit within the range of those that occur throughout the SCB.

Summary. Benthic communities near the PLOO continue to be dominated by ophiuroid-polychaete based assemblages, with few major changes having occurred since monitoring began in 1991. Although some minor changes in benthic assemblages have appeared off Point Loma during the post-discharge period, these assemblages are still similar to (1) those present prior to PLOO discharge and (2) natural indigenous communities of the southern California continental mid-shelf.

The brittle star *Amphiodia urtica* continues to dominate assemblages during both pre- and post-discharge periods. While shifts and variations in community composition have occurred

22 Other indicator species include capitellids in the genus *Mediomastus*, the dorvilleid *Dorvillea longicornis* and the opheliid *Armandia brevis*.

over time, these shifts are likely reflective of large-scale oceanographic events (e.g., El Niño/La Niña conditions) that affect the SCB.

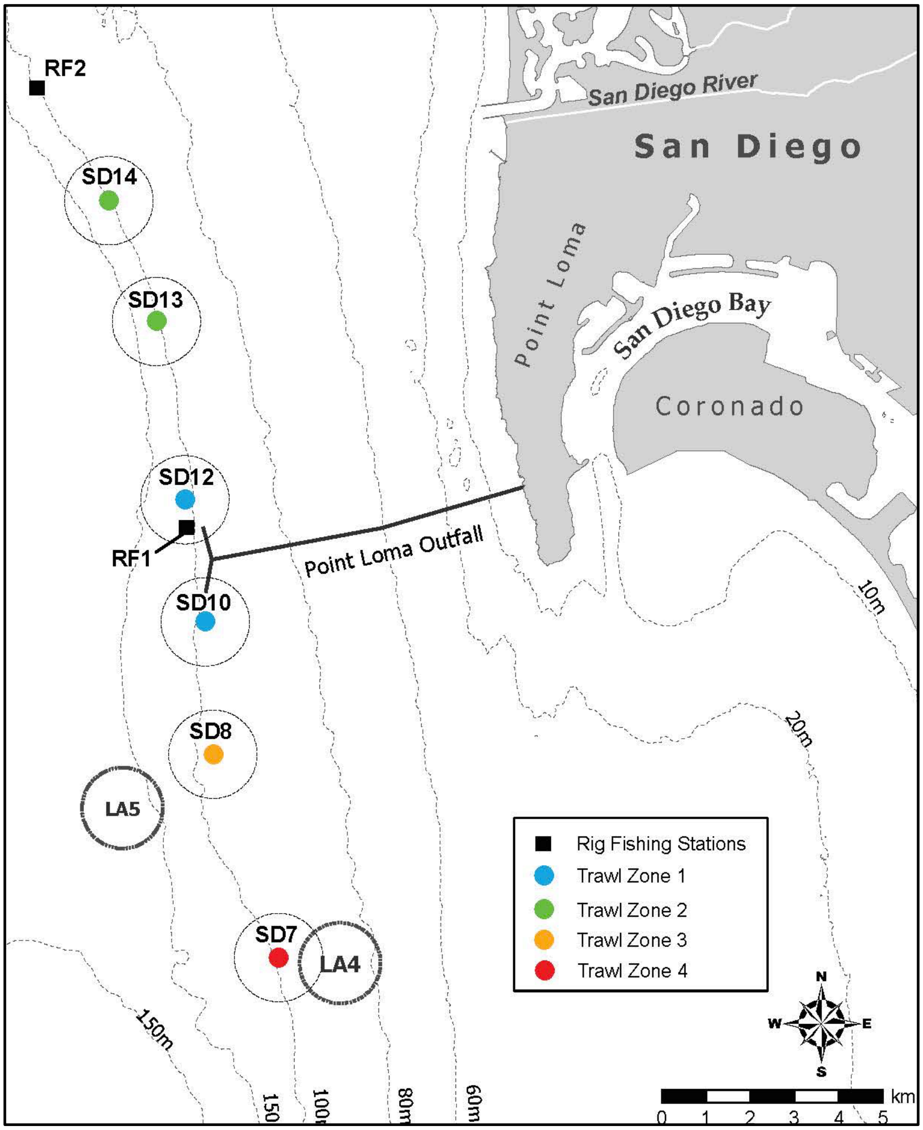
A trend of increased species diversity and infaunal abundances have been observed during the post-discharge period at stations nearest the PLOO, but this represents a pattern that is opposite of what would be expected if degradation were occurring. Further, the increases in abundances were accompanied by little change in species dominance near the outfall, a pattern also inconsistent with what would be expected if the habitat were degraded.

Although variable, infaunal communities off Point Loma have remained characteristic of undisturbed benthic habitats in terms of the number of species, number of individuals (abundance), and dominance. The values for these parameters in the PLOO region are similar to other sites off San Diego and throughout the entire SCB. In spite of this overall stability, comparisons of data from the pre- and post-discharge periods indicate a few trends. For example, there was a general increase in the total infaunal abundance and number of infaunal species in the years after wastewater discharge began, although a similar pattern was already present prior to discharge. The increase in species richness was most pronounced nearest the outfall, contrary to what would be expected if environmental degradation were occurring. Increases in infaunal abundance were also generally accompanied by decreases in dominance (i.e., higher Swartz dominance index values), another pattern contrary to known pollution effects. Considering the nature of the above changes, benthic communities off Point Loma are not being dominated by a few pollution-tolerant species.

Overall, after 27 years of outfall operation, the discharge of wastewater through the PLOO has not caused any significant biological changes in benthic community structure that may be interpreted as degradation. A BIP of benthic species continues to exist beyond the PLOO ZID, and benthic populations continue to be balanced and healthy.

Demersal Fishes and Megabenthic Invertebrates. Numerous species of demersal fish and megabenthic invertebrates inhabit the continental shelf and slopes off the coast of Point Loma. Trawl-caught fish and invertebrate data are currently collected at six monitoring stations located along the 98 m depth contour (see Figure III.C-2). Additionally, a rig fishing station (RF1) exists at the edge of the PLOO ZID, and a second rig fishing reference station (RF2) exists approximately 10 km north of the PLOO.

Figure III.D.2 :
Location of PLOO Rig-Fishing and Otter Trawl Stations[23]



As documented within Appendix C1, communities of demersal fish and megabenthic invertebrates were analyzed on the basis of 30 pre-discharge trawls and 291 post-discharge trawls at the six PLOO trawl stations. The status and changes over time of the demersal fish and megabenthic invertebrate communities off Point Loma are discussed in detail in Appendix C1. These assessments focused on key community parameters such as the number of species (species richness), total abundances, and changes in the abundance of dominant or common species. Table III.D-5 compares pre- and post-discharge data for these parameters for trawl-caught fish, while Table III.D-6 compares pre- and post-discharge data for trawl-caught

23 See Appendix C1. Figure III.D-2 also shows the location of PLOO monitoring stations for rig fishing and for otter trawls. For reference, the figure also shows the locations of dredge disposal sites LA4 and LA5.

megabenthics. For reference, Tables III.D-5 and III.D-6 also summarizes data from regional surveys conducted at similar depths (mid-shelf areas) within the SCB.[24]

Table III.D-5:
Summary of Pre- and Post-Discharge Conditions - Trawl Data for Fish

Parameter	Pre-Discharge, 1991-1993			Post-Discharge, 1994-2020			SCB Regional Surveys[E]
	All Sites[B] Mean (min-max)	Nearfield Stations[C]	Farfield Stations[D]	All Sites[B] Mean (min-max)	Nearfield Stations[C]	Farfield Stations[D]	
Species Richness	14 (8 - 22)	13 (8 – 19)	14 (9 – 22)	15 (6 - 260)	15 (6 – 21)	16 (9 – 26)	14 (3 – 27)
Abundance	214 (51 – 453)	208 (63-399)	217 (41-453)	357 (44 – 2322)	406 (44 – 2322)	332 (50 – 1060)	326 (6 – 3196)
Diversity (H')	1.4 (0.7 - 2.3)	1.4 (0.7 – 2.3)	1.5 (1.1 – 2.0)	3.5 (0.7 - 2.2)	1.5 0.7 – 2.2)	1.5 (0.8 – 2.2)	1.6 (0.3 – 2.4)

Table III.D-5 Notes:

A From Table C1-9 of Appendix C1. PLOO data are from 10-minute trawls conducted during winter and summer surveys.

B Data from PLOO trawl stations (see Figure IIII.D.2). Mean values shown above, with the range of minimum and maximum values shown in parentheses.

C Data for nearfield Stations SD10 and SD12 (see Figure III.D-2).

D Data for farfield Stations SD7, SD8, SD13 and SD14 (see Figure III.D-2)

E SDB data from SCCWRP regional surveys for 1994, 1889, 2003, 2008, 2013 and 2018. Values are expressed as mean values for the mid-shelf strata. The range of minimum and maximum values are shown in parentheses.

Species Richness. Overall, 13 different species combined to account for over 95 percent of all trawl-caught fish. The Pacific sanddab was by far the most abundant species across the region, accounting for more than 55 percent of the catch during the pre-discharge period and over 40 percent of the catch during the post-discharge period.[25] Other species that typically comprised 5 percent of the catch included: halfbanded rockfish, yellowchin sculpin, longspine combfish and Dover sole. Most of these species are common in the types of soft-bottom habitats that characterize much of this region and the mainland shelf of the SCB, and there appears to be only minor differences between the pre- and post-discharge periods at the nearfield and farfield sites.

24 Includes regional surveys conducted by SCCWRP as part of the Bight '94, Bight '98, Bight '03, Bight '08, Bight '13 and Bight '18 assessments.

25 Pacific sanddab comprised 41 percent of the catch at nearfield stations and 51 percent of the catch at farfield stations during the post-discharge period (1994-2020). See Table C1-20 of Appendix C1.

**Table III.D-6:
Summary of Pre- and Post-Discharge Conditions - Trawl Data for Megabenthics**

Parameter	Pre-Discharge, 1991-1993			Post-Discharge, 1994-2020			SCB Regional Surveys[E]
	All Sites[B] Mean (min-max)	Nearfield Stations[C]	Farfield Stations[D]	All Sites[B] Mean (min-max)	Nearfield Stations[C]	Farfield Stations[D]	
Species Richness	11 (5 - 20)	11 (6 – 16)	11 (5 – 20)	12 (2 - 29)	12 (3 – 29)	12 (2 – 26)	12 (1 – 41)
Abundance	2,013 (24 - 8,026)	2,458 (1,104 - 8,026)	1,791 (24 - 6,047)	2,300 (14-46,255)	3,177 (36 - 46,255)	1,855 (14 - 36,118)	703 (1 - 22,179)
Diversity (H')	0.48 (0.03 - 1.92)	0.14 (0.3 - 0.29)	0.65 (0.03 - 1.92)	0.5 (0 - 2.1)	0.4 (0 – 2)	0.6 (0 – 2.1)	1.2 (0.03 – 2.6)

Table III.D-6 Notes:

A From Table C1-11 of Appendix C1. PLOO data are from 10-minute trawls conducted during winter and summer surveys.

B Data from PLOO trawl stations (see Figure IIII.D.2). Mean values shown above, with the range of minimum and maximum values shown in parentheses.

C Data for nearfield Stations SD10 and SD12 (see Figure III.D-2).

D Data for farfield Stations SD7, SD8, SD13 and SD14 (see Figure III.D-2)

E SDB data from SCCWRP regional surveys for 1994, 1889, 2003, 2008, 2013 and 2018. Values are expressed as mean values for the mid-shelf strata.

A total of at least 125 benthic species have been recorded in trawls conducted off Point Loma between 1991 and 2020. The sea urchin *Lytechinus pictus* dominated these assemblages, accounting for about 97% of the total catch during the pre-discharge period and over 60% during the post-discharge period.[26] The other abundant species during the post-discharge period was the red crab *Pleuroncodes planipes*, which comprised roughly 30 percent of the catch during the post-discharge period.[27]

Patterns of change observed over time at the nearfield trawl stations were similar to those observed at the farfield stations, and values at all stations were within the range of natural variability observed as part of the SCB regional surveys. Overall, a cyclic pattern of increase followed by decrease followed by increase has occurred over time at all stations. No spatial trends in trawl-caught invertebrate species have occurred that indicate outfall-related effects. While higher post-discharge species richness values were observed at the three south stations (SD7, SD8 and SD10), these differences are likely due to differences over time in sediment composition and not proximity to the PLOO.

Abundance. Two species (sea urchin *Lytechinus pictus* and red crab *Pleuroncodes planipes*) comprise over 90 percent of the megabenthic invertebrates in San Diego area ocean waters. As a result, variability in abundance is primarily due to fluctuations in these two species. Historically, the red crab *Pleuroncodes planipes* was encountered sporadically in San Diego area ocean waters, but warmer waters associated with El Niño cycles typically result in increases in populations of red crab.

26 Sea urchin comprised 62 percent of the catch at all PLOO stations during the post-discharge period (64 percent at nearfield stations and 59 percent at farfield stations.

27 Red crab comprised 31 percent of the catch at all PLOO stations during the post-discharge period (26 percent at nearfield stations and 37 percent at farfield stations.

Diversity. Since two species (sea urchin and red crab) typically account for more than 90 percent of the trawl-caught megabenthic invertebrates, diversity (H') values are typically low. Significant cyclic variation in diversity (H') values have occurred over the past 30 years. Patterns of change in diversity, however, have been similar at the nearfield and farfield stations during the pre- and post-discharge period. Further, diversity values have remained within the natural variability observed in SCB regional surveys.

Summary. Overall, analyses of temporal and spatial patterns did not reveal any effects on trawl-caught fish and invertebrate communities off Point Loma that could be attributed to the discharge of wastewater via the PLOO. Despite high variability of both types of communities, patterns of change in species richness and abundance were similar at stations near the outfall and farther away. This conclusion is supported by multivariate analyses conducted by the City as part of the 2018-2019 PLOO biennial receiving water report, which demonstrate that cyclic variations in local populations of demersal fish and megabenthic invertebrates are more likely due to natural factors such as changes in ocean temperature or other large-scale oceanographic events.[28]

Although abundances of dominant fish such as the Pacific sanddab declined at stations nearest the discharge site relative to overall post-discharge populations, Pacific sanddab remained within the range of natural variability described for SCB reference areas. Additionally, no changes in fish and invertebrate community structure were detected in the nearfield assemblages that corresponded to the initiation of wastewater discharge. Finally, the lack of physical abnormalities or indicators of disease (e.g., fin rot, lesions, tumors) also suggest that fish populations have remained healthy off Point Loma since monitoring began.[29]

Bioaccumulation of Toxic Materials. Demersal fishes can accumulate chemical contaminants from the environment, including surrounding waters, benthic sediments, suspended particulates and from the food they consume. Benthic species can accumulate pollutants through adsorption of dissolved constituents, ingestion and assimilation of pollutants from food sources. The City currently monitors the bioaccumulation of contaminants in fish and benthic species inhabiting areas surrounding the PLOO by analyzing liver tissues of species collected from four trawl zones (6 stations) and muscle tissues of species collected at two rig fishing stations (see Figure III.D-2). These stations are located along the mainland shelf at the 98 m depth contour at a depth similar to where wastewater is discharged from the PLOO.

Table III.D-7 summarizes liver sampling for the period 1995-2020, which included 11 species of trawl-caught fish. Table III.D-8 summarizes muscle tissue sampling for 1995-2020, which includes 15 species of rig-caught fish.[30,31] Patterns and trends for the key bioaccumulation parameters are discussed in detail within Appendix C5.

Overall, concentrations of metals and organic compounds found within fish liver and muscle tissues are consistent with concentrations from other areas of SCB, including reference sites. None of the muscle tissue samples from sport fish collected during the surveys had concentrations of mercury or total DDT above the U.S. Food and Drug Administration (USFDA)

28 SDPUD (2021).
29 See Appendix C1.
30 The period 1995-2000 is used within Appendix C5, as data collected prior to 1995 were excluded due to the use of analytical methods that are not comparable to present-day methods.
31 See Table C5-1 in Appendix C5 for a list of trawl-caught and rig-caught (hook and line-caught) fish species.

action limits. Although several species had arsenic, chromium and selenium concentrations above median international standards for human consumption, elevated levels of these contaminants are not uncommon in sport fish from the rest of the San Diego region.

No evidence exists that the PLOO discharge has caused abnormal body burdens of any toxic pollutant known to have adverse effects on marine fish or their consumers. While a number of shore-based contaminant sources exist in the San Diego area, fish in the region do not appear to be significantly affected by contamination from the PLOO or from any shore-based source. Concentrations of most contaminants in the tissues of fish collected off Point Loma remain low. Finally, because many contaminants are only detectable in liver tissues and thus represent a very small overall amount of the mass of a fish, the potential for further bioaccumulation of these pollutants in the food chain off Point Loma is minimal. In summary, bioaccumulation in the PLOO area does not impact the existence or maintenance of a BIP beyond the PLOO ZID.

Plankton. The City is not required to monitor plankton, but water quality data collected by the City indicate that the outfall should not have a noticeable effect on plankton. The discharge depth of the San Diego outfall traps the nutrient-laden wastewater at a depth of 40 meters or more, well below the optimum depth for phytoplankton growth (and the surface zone where most zooplankton are found). Additionally, long-term studies of the City's water quality data have shown that there is no noticeable change in water clarity, visual observations at the surface, dissolved oxygen, or changes in chlorophyll α concentrations (see Figures II.B-13 and II.B-14).

Table III.D-7:
Summary of Bioaccumulation in Liver Tissue - Trawl-Caught Fish, 1995-2020 [A]

Category	Parameter	Percent of Samples in which Constituent is Detected	Liver Tissue Concentration (ppb) [B] All Trawl-Caught Species			
			Minimum Value	Median Value	Maximum Value	Mean Value
Toxic inorganic compounds	Arsenic	85 %	0.06	3.65	18.5	4.59
	Cadmium	92 %	0.36	3.15	19.2	4.02
	Chromium	59 %	0.05	0.33	22.8	0.66
	Copper	100 %	0.86	4.89	166.0	8.27
	Lead	19 %	0.07	0.40	8.80	1.00
	Mercury	89 %	0.02	0.09	0.58	0.11
	Nickel	17 %	0.08	0.26	18.9	0.80
	Selenium	98 %	0.18	0.99	3.68	1.17
	Silver	22 %	0.03	0.09	2.20	0.22
	Tin	49 %	0.20	1.10	11.1	1.95
	Zinc	100 %	8.61	25.5	213	35.7
Toxic organic compounds	Aldrin	0 %	ND	ND	ND	ND
	Chlordane alpha	7 %	2.1	4.4	58	10.2
	Chlordane gamma	0 %	ND	ND	ND	ND
	Dieldrin	2 %	2.3	3.1	15.8	6.2
	Endosulfan alpha	0 %	ND	ND	ND	ND
	Endosulfan beta	0 %	ND	ND	ND	ND
	Endosulfan sulfate	0 %	ND	ND	ND	ND

Category	Parameter	Percent of Samples in which Constituent is Detected	Liver Tissue Concentration (ppb) [B] All Trawl-Caught Species			
			Minimum Value	Median Value	Maximum Value	Mean Value
Toxic organic compounds (continued)	Endrin	0 %	ND	ND	ND	ND
	Endrin aldehyde	0 %	ND	ND	ND	ND
	Heptachlor	1 %	12.5	18.8	25.0	18.8
	Heptachlor epoxide	0 %	ND	ND	ND	ND
	HCH alpha	< 1 %	1.8	1.8	1.8	1.8
	HCH beta	6.0 %	2.2	2.7	22	4.1
	HCH delta	0 %	ND	ND	ND	ND
	HCH gamma	< 1 %	19	19	19	19
	Hexachlorobenzene	26 %	1.7	5.3	120	7.8
	Methoxychlor	0 %	ND	ND	ND	ND
	Mirex	0 %	ND	ND	ND	ND
	Nonachlor (cis)	0 %	ND	ND	ND	ND
	Nonachlor (trans)	27 %	2.6	7.1	91	11.9
	Oxychlordane	0 %	ND	ND	ND	ND
	Toxaphene	0 %	ND	ND	ND	ND
	Total DDT [C]	98 %	35.0	400.5	4252	653
	Total PCB [D]	96 %	14.0	272.2	5320	420

Table III.D-7 Notes:

A Liver tissue data from trawl-caught organisms for the period 1995-2020. From Tables C5-3 through C5-28 of Appendix C1.
B Concentration in parts per billion (ppb).
C Includes DDT, DDD and DDE compounds.
D Includes all PCB congeners.

Table III.D-8:
Summary of Bioaccumulation in Muscle Tissue, Rig-Caught Fish, 1995-2020 [A]

Category	Parameter	Percent of Samples in which Constituent is Detected	Muscle Tissue Concentration (ppb) [B] All Rig-Caught Species			
			Minimum Value	Median Value	Maximum Value	Mean Value
Toxic inorganic compounds	Arsenic	86 %	0.40	2.01	13.5	2.64
	Cadmium	22 %	0.01	0.05	0.18	0.07
	Chromium	50 %	0.04	0.19	1.78	0.25
	Copper	61 %	0.05	0.42	8.96	0.94
	Lead	3 %	0.07	0.33	0.42	0.29
	Mercury	95 %	0.02	0.11	0.79	0.16
	Nickel	10 %	0.03	0.15	0.38	0.15
	Selenium	97 %	0.14	0.38	0.88	0.39
	Silver	5 %	0.05	0.05	0.50	0.12
	Tin	37 %	0.21	0.74	2.12	0.94
	Zinc	99 %	1.02	3.67	6.91	3.71

Category	Parameter	Percent of Samples in which Constituent is Detected	Muscle Tissue Concentration (ppb) [B] All Rig-Caught Species			
			Minimum Value	Median Value	Maximum Value	Mean Value
Toxic organic compounds	Aldrin	0 %	ND	ND	ND	ND
	Chlordane alpha	1 %	0.6	0.6	0.6	0.6
	Chlordane gamma	0 %	ND	ND	ND	ND
	Dieldrin	0 %	ND	ND	ND	ND
	Endosulfan alpha	0 %	ND	ND	ND	ND
	Endosulfan beta	0 %	ND	ND	ND	ND
	Endosulfan sulfate	0 %	ND	ND	ND	ND
	Endrin	0 %	ND	ND	ND	ND
	Endrin aldehyde	0 %	ND	ND	ND	ND
	Heptachlor	1 %	12.5	18.8	25.0	18.8
	Heptachlor epoxide	0 %	ND	ND	ND	ND
	HCH alpha	0 %	ND	ND	ND	ND
	HCH beta	1 %	5.8	5.8	5.8	5.8
	HCH delta	1 %	7.6	7.6	7.6	7.6
	HCH gamma	0 %	ND	ND	ND	ND
	Hexachlorobenzene	12 %	0.2	0.5	15	1.4
	Methoxychlor	0 %	ND	ND	ND	ND
	Mirex	0 %	ND	ND	ND	ND
	Nonachlor (cis)	0 %	ND	ND	ND	ND
	Nonachlor (trans)	2 %	0.4	0.7	2.4	1.2
	Oxychlordane	0 %	ND	ND	ND	ND
	Toxaphene	0 %	ND	ND	ND	ND
	Total DDT [C]	92 %	0.3	6.8	217.3	14.0
	Total PCB [D]	39 %	0.2	3.5	69.0	9.3

Table III.D-8 Notes:

A Muscle tissue data from trawl-caught organisms for the period 1995-2020. From Tables C5-3 through C5-28 of Appendix C1.
B Concentration in parts per billion (ppb).
C Includes DDT, DDD and DDE compounds.
D Includes all PCB congeners.

Overall, no information exists that suggests there is any discernible effect of the outfall on plankton populations.

Kelp Forests. Wastewater is discharged to the ocean via the PLOO diffusers approximately 5 km (3.1 miles or 2.7 nm) offshore from the Point Loma kelp forest. No evidence exists that this discharge has adversely impacted the kelp bed or associated invertebrate and fish communities. Ocean monitoring data collected to date do not indicate that PLOO discharge has had any adverse impact on the kelp bed through onshore movement of bacteria, solids, or nutrients. In addition, long-term studies of the Point Loma and La Jolla kelp forests conducted by the SIO dating back to the early 1970s have also shown there to be no negative effects on this nearshore ecosystem due to the discharge of wastewater via the PLOO (see Appendix G of this application).

Marine Birds. Only a few bird species are present in the area near the PLOO diffuser. Since the waste field will be confined to depths of 40 m (131 ft) or more, it is concluded that reissuance of the modified 301(h) permit will not affect local bird populations or habits.

Endangered Species. Endangered species are discussed in Appendices H and I. Key conclusions regarding endangered or threatened species include the following:

- Endangered, threatened or rare species are unlikely to be discernibly adversely affected by the proposed discharge. No detectable concentrations of total DDT or PCBs are found in the PLWTP effluent. Any existing or historic sediment concentrations of these same constituents in the offshore waters are the result of historically deposited materials or from other sources,
- Preferred prey of listed endangered species potentially found in the vicinity of the discharge are not likely to be found at the depth of the waste field. For example, northern anchovies and juvenile rockfish, which are fed upon by the brown pelican and least tern, are not encountered at 98 m (320 foot) depths,
- Any regulator concerns regarding unknown effects of CECs on endangered species will be addressed as part of coordination with EPA and NOAA Fisheries to ensure compliance with the ESA,
- There is no indication of adverse impacts from operation of the PLOO on environmental conditions or biological communities that could affect the health and well-being of endangered species or threaten their critical habitat,
- The PLOO discharge complies with all federal and state standards including Ocean Plan water quality objectives for the protection of marine aquatic life, protection of human health (noncarcinogens) and protection of human health (carcinogens),
- Future flows and contaminant concentrations from the PLOO would be at or below currently permitted levels. Thus, the proposed, future discharge of treated wastewater from the PLOO is not likely to affect endangered species or threaten their critical habitat,
- The ocean environment, including sediments and resident biological life forms, in the vicinity of the PLOO discharge are healthy and representative of reference conditions within the SCB. Additionally, there is no discernable pattern of impact as a function of distance from the outfall,
- While CECs are commonly present in treated wastewater and routine monitoring for CECs has not historically been a part of past PLOO monitoring programs, it is anticipated that San Diego will coordinate with regulatory agencies and those involved in CEC research work to identify the potential for including appropriate chemical compounds in future monitoring efforts. This will provide valuable information to assist in assessing the PLOO discharge,
- There has been no indication of change in any physical or chemical water quality parameter (e.g., dissolved oxygen, pH) attributable to wastewater discharge off Point Loma. Instead, changes in oceanographic parameters have historically been associated with varying climate regimes and with natural events such as storm activity and the presence of plankton blooms, and

- No evidence exists to suggest that bioaccumulation in prey is occurring, or that marine mammal populations will be impacted by the discharge.

In summary, it is concluded that reissuance of the proposed modified PLOO NPDES permit will not result in any changes which would adversely impact endangered species.

Determination of a Balanced Indigenous Population : Regulations promulgated pursuant to Section 301(h) of the Clean Water Act require that modified 301(h) discharges result in the maintenance of a BIP beyond the boundary of the ZID.

The data provided in Appendices C1 through C5 support the demonstration that a BIP of benthic infaunal organisms and demersal fishes exists beyond the PLOO ZID. Evidence is conclusive that communities near and beyond the ZID boundary and at reference sites are similar. For example, total abundance, diversity, species dominance and abundances generally showed similar patterns or insignificant differences between near ZID and reference areas. Remote vehicle television observations in the areas around and offshore of the Point Loma outfall (see Appendix F) have documented the absence of visible sedimentation within and beyond the ZID.

Organic and contaminant loading of sediments is not evident in the discharge vicinity. Further, the ZID boundary is characterized by a non-degraded benthic infaunal community that is representative of indigenous species and populations living under natural conditions. Key community factors such as abundance, diversity, BRI, and patterns of key "indicator" species are being maintained within the limits of variability that typify naturally occurring regional benthic communities of southern California's outer continental shelf.

Projected Future Conditions: As discussed above, data from the City's comprehensive monitoring program conclusively demonstrates that a BIP exists beyond the boundaries of the ZID. Continuation of 301(h) modified TSS concentration requirements within the PLOO discharge is not projected to adversely affect the presence of a BIP in the vicinity of the PLOO. Reasons for this conclusion include:

- No changes in permitted PLOO effluent concentration limits are proposed,
- No increase in permitted PLOO mass emissions is proposed,
- Except for phenol and ammonia-nitrogen, the discharge complies with applicable NPDES mass emission benchmarks which are based on mass emission rates from 1990-1995,
- The PLOO provides a high degree of initial dilution, and is highly effective in preventing deposition of sediments in and around the ZID,
- No trends are evident in the existing data that would suggest the potential for future significant changes in sediment chemistry,
- No trends are evident in the benthic data that would suggest the potential for future degradation in species diversity, abundance of organisms, dominance or BRI,
- No trends are evident in the bioaccumulation data that would suggest the potential for future significant changes in bioaccumulation of toxic constituents in fish tissues,

- The proposed PLOO discharge will continue to comply with applicable Ocean Plan water quality objectives and with federal water quality criteria for the protection of marine aquatic habitat,
- The PLOO discharge has not resulted in discernible changes in receiving water dissolved oxygen, water clarity, or turbidity,
- The PLOO discharge has not resulted in any discernible impacts on benthic species, fish, mammals or plankton,
- No trends are evident that would suggest the potential for future adverse changes in sediment dissolved oxygen or receiving water dissolved oxygen, and
- After more than a decade of PLWTP effluent disinfection operations, consistent compliance has been maintained with all applicable Ocean Plan receiving water quality objectives, including objectives for chlorinated compounds.

Based on the combination of these factors, it is concluded that a BIP will continue to be maintained beyond the PLOO ZID.

III.D.2 Have distinctive habitats of limited distribution been impacted adversely by the current discharge and will such habitats be impacted adversely by the modified discharge?

No impacts to distinctive habitats of limited distribution will occur.

The Point Loma kelp bed is the only habitat of limited distribution in the vicinity of the PLOO. (See response to Questionnaire Section II.C.2.)

As documented in Appendix G and in the above responses to Questionnaire Section III.D.1, the PLOO discharge has not and will not adversely impact the Point Loma kelp bed.

III.D.3 Have commercial or recreational fisheries been impacted by the current discharge (e.g., warnings, restrictions, closures, or mass mortalities) or will they be impacted adversely by the modified discharge?

SUMMARY: Commercial or recreational fisheries have not been impacted by the current discharge. Further, no impacts are projected to occur as a result of renewal of 301(h) requirements for PLWTP.

Commercial and recreational fishing activities in the Point Loma vicinity are detailed in Appendix H. Appendix H also presents recent data describing the commercial and recreational catch and landed value of the catch.

As detailed in Appendix H, commercial and recreational fisheries off Point Loma are not adversely affected by the current PLOO discharge and are not projected to be adversely affected by continuation of the discharge. Further, no Point Loma area fishery resources are underutilized as a result of effects from PLOO discharge. These conclusions are based on the following evidence:

- No warnings, closures, or mass mortalities of fish have occurred in either the nearshore or offshore areas of Point Loma since the initiation of the extended PLOO discharge in November 1993,
- Department of Fish and Wildlife, State of California Department of Health Services, or San Diego County Department of Environmental Health and Quality have not issued

any fishery-related health advisories for the waters in the vicinity of the extended PLOO,

- Concentrations and mass emissions of metals in the PLOO discharge have been reduced by a significant margin during the past 40 years as a result of the City's industrial and nonindustrial source control programs,
- No outfall-related violations of Ocean Plan water quality objectives for coliform or toxic compounds have occurred at kelp bed stations since the extended PLOO outfall discharge was initiated in November 1993,
- As documented in Tables III.B-22 through III.B-24, the PLOO discharge complies with Ocean Plan water quality objectives for the protection of public health and for the protection of aquatic habitat,
- As documented in Tables III.B-17 through III.B-24, receiving waters in the vicinity of the extended PLOO comply with federal saltwater acute criteria, federal saltwater chronic criteria, and federal water quality criteria for the protection of public health from consumption of organisms,
- Routine trawling and collection of fish and benthic species (performed as part of the City's comprehensive receiving water quality monitoring program) have not revealed any difference in the incidence of fin erosion, fish disease, or other abnormalities between the outfall vicinity and control stations. (See response to Questionnaire Section III.D.4.),
- Bioaccumulation studies performed as part of the receiving waters monitoring program show no adverse outfall-related effects. (See Appendix C5 and response to Questionnaire Section III.D.4.), and
- While harmful algae blooms (HABs) have been recorded in the SCB region for over a century, no evidence exists that links the PLOO discharge to such events.[32] HABs tend to originate in shallower waters and are linked to seasonal upwelling events. The depth of the PLOO discharge inhibits the effluent from reaching the surface waters due to thermal stratification, which typically results in the plume being trapped offshore at depths of 40 to 60 m below the surface.[33] Algae blooms are most prevalent during summer months in the SCB region.[34] During this time, thermal stratification is the strongest and plume trapping depths are greatest.[35] Even in the winter months, when vertical stratification of the water column is weakest, the PLOO plume does not typically rise to the point where it impacts surface waters.[36]

32 Svejkovsky (2003-2017); Hess (2018-2021).
33 SDPUD (2018, 2021); Rogowski et al (2012, 2013).
34 Smith et al. (2019)
35 Bartlett et al (2004).
36 Svejkovsky (2003-2017); Hess (2018-202).

III.D.4 Does the current or modified discharge cause the following within or beyond the ZID: [40 CFR 125.62(c)(3)]: M

a. **Mass mortality of fishes or invertebrates due to oxygen depletion, high concentrations of toxics, or other conditions?**
   - **An increased incidence of disease in marine organisms?**
   - **An abnormal body burden of any toxic material in marine organisms?**
   - **Any other extreme, adverse biological impacts?**

SUMMARY: No mass mortality, increased disease, or other extreme biological effects have occurred.

Mass Mortality of Fish. Mass mortalities of fish or invertebrates have not been reported in the area of the outfall by field marine biologists working for the City.

Incidence of Disease. All trawled fish caught in the monitoring program are visually examined for gross morphological evidence of diseases and ectoparasites. Three types of ectoparasites have been observed in recent years: leeches, the cymothoid isopod (fish lice) *Elthusa vulgaris*, and copepods (including the eye parasite *Phyryxocephalus cincinatus*). Since all but *P. cincinatus* are mobile parasites, the fish collected in a trawl sample may lose and/or acquire parasites during the normal collection, sorting, and processing of the sample.

The incidence of observed parasitism in post-discharge monitoring was within the range of incidences found prior to initiation of the discharge at the new location. Additionally, the incidences of ectoparasitism were low compared to collections in many areas of the SCB. Parasites on trawled macroinvertebrates were also rare.

No fin erosion or tumors were found on trawl caught fish in the discharge area. Further, incidences of fin lesions, other diseases and abnormalities, and parasitism were low or nonexistent. Overall, no evidence exists that the PLOO discharge causes any extreme abnormalities in fish or invertebrates.

Tissue Burden. As presented in Appendix C5 and summarized in response to Questionnaire Section III.D.1, the discharge from the extended outfall does not appear to cause abnormal body burden of any toxic pollutant known to have adverse effects on the organism or consumers.

The presence of PCB and DDT compounds in fish caught for bioaccumulation analyses is not attributed to the PLOO discharge, as the discharge does not contain detectable concentrations of these constituents. Further, no spatial pattern of DDT or PCB sediment contamination exists around the outfall.

Rather than being related to the outfall discharge, tissue burden levels of some trace metals, pesticides, and PCBs appear to be related to regional influences from other sources such as the LA-5 dredge disposal site.

Other Biological Impacts. No other extreme, adverse, biological impact is known to have occurred or is expected to occur. The City's monitoring program, however, will continue to examine fish and invertebrates for any such effects.

III.D.5 For discharges to saline estuarine waters:

a. **Does or will the current or modified discharge cause substantial differences in the benthic population within the ZID and beyond the ZID?**

b. **Does or will the current or modified discharge interfere with migratory pathways within the ZID?**

The question is not applicable. The PLOO does not discharge to saline estuarine waters, nor does the PLOO discharge affect any coastal saline estuarine waters.

III.D.6. For improved discharges, will the proposed improved discharge(s) comply with the requirements of 40 CFR 125.61(a) through 125.61(d)? [40 CFR 125.61(e)]

The question is not applicable. This 301(h) NPDES application is based on a current discharge, as defined by 40 CFR 125.58(h).

III.D.7. For altered discharges, will the altered discharge(s) comply with the requirements of 40 CFR 125.61(a) through 125.61(d)? [40 CFR 125.61(e)]

The question is not applicable. The proposed PLOO discharge is a current discharge, as defined by 40 CFR 125.58(h).

III.D.8. If your current discharge is to stressed waters, does or will your current or modified discharge(s): [40 CFR 125.61(f)]

a. **Contribute to, increase, or perpetuate such stressed condition?**

b. **Contribute to further degradation of the biota or water quality if the level of human perturbation from other sources increases?**

c. **Retard the recovery of the biota or water quality if human perturbation from other sources decreases?**

The question is not applicable. As discussed in the response to Questionnaire Section II.B.2, the PLOO does not discharge to stressed waters.

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III.E IMPACT ON RECREATIONAL ACTIVITIES

III.E.1. Describe the existing or potential recreational activities likely to be affected by the modified discharge(s) beyond the zone of initial dilution.

SUMMARY: SCUBA diving is the primary offshore recreational activity that could potentially be impacted by the PLOO discharge. Swimming, snorkeling, and surfing also occur in nearshore waters.

A wide variety of recreational activities occur in Point Loma marine waters. These recreational activities are described in detail in Appendix H and summarized below.

The ocean shoreline along the southern portion of Point Loma is predominantly on a military reservation (Fort Rosecrans). The extreme southern portion of Point Loma is within the Cabrillo National Monument. As a result, access to the shoreline is restricted to several designated tidepooling areas within the boundaries of the national monument. Because shoreline access is limited, most recreational activities are focused on the Point Loma kelp bed and in nearshore waters. SCUBA diving is particularly popular in the kelp bed. Only limited diving occurs outside the area of the kelp bed.

Ocean recreation at Point Loma includes aesthetic enjoyment, sightseeing, sunbathing, hiking, picnicking, tide-pooling, whale watching, boating, sailing, and sport fishing. These types of activities are designated as non-contact water recreation by the Regional Board and are defined as "involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible."[1]

Ocean recreation off Point Loma also includes swimming and wading, skim boarding, water skiing and wake boarding, snorkeling, surfing, sail boarding, kite-sailing, kayaking, outrigger canoeing, paddle boarding, free diving, SCUBA diving, and personal watercraft (PWC) (jet ski) operation. These activities are designated by the Regional Board as water contact recreation and are defined as "involving body contact with water, where ingestion of water is reasonably possible."[2]

Statistical data on specific locations of recreational activity off Point Loma were developed in the mid-1980s by Wolfson and Glinski who made daily field observations of the positions of individual boats and watercraft.[3] These observations documented that most ocean recreation in the vicinity of Point Loma occurred in the nearshore area, with fishing and diving concentrated in the kelp bed and along its' margins. Power boating and sailing were the only recreational activities observed with any regularity beyond the outer edge of the kelp bed (1.6 km from shore). The intensity of these recreational activities rapidly diminished with increasing distance offshore.

The territorial waters of the State of California extend to 3 nm offshore. The U.S. Government has exclusive jurisdiction from 3 to 12 nm offshore. Although no studies have been conducted of recreational use in federal waters off Point Loma, information demonstrating the lack of such recreational use is available from observations of the crews of the San Diego PUD

1 See Beneficial Uses chapter of the Basin Plan (Regional Board, 2019).
2 *Ibid.*
3 Wolfson and Glinski (1986).

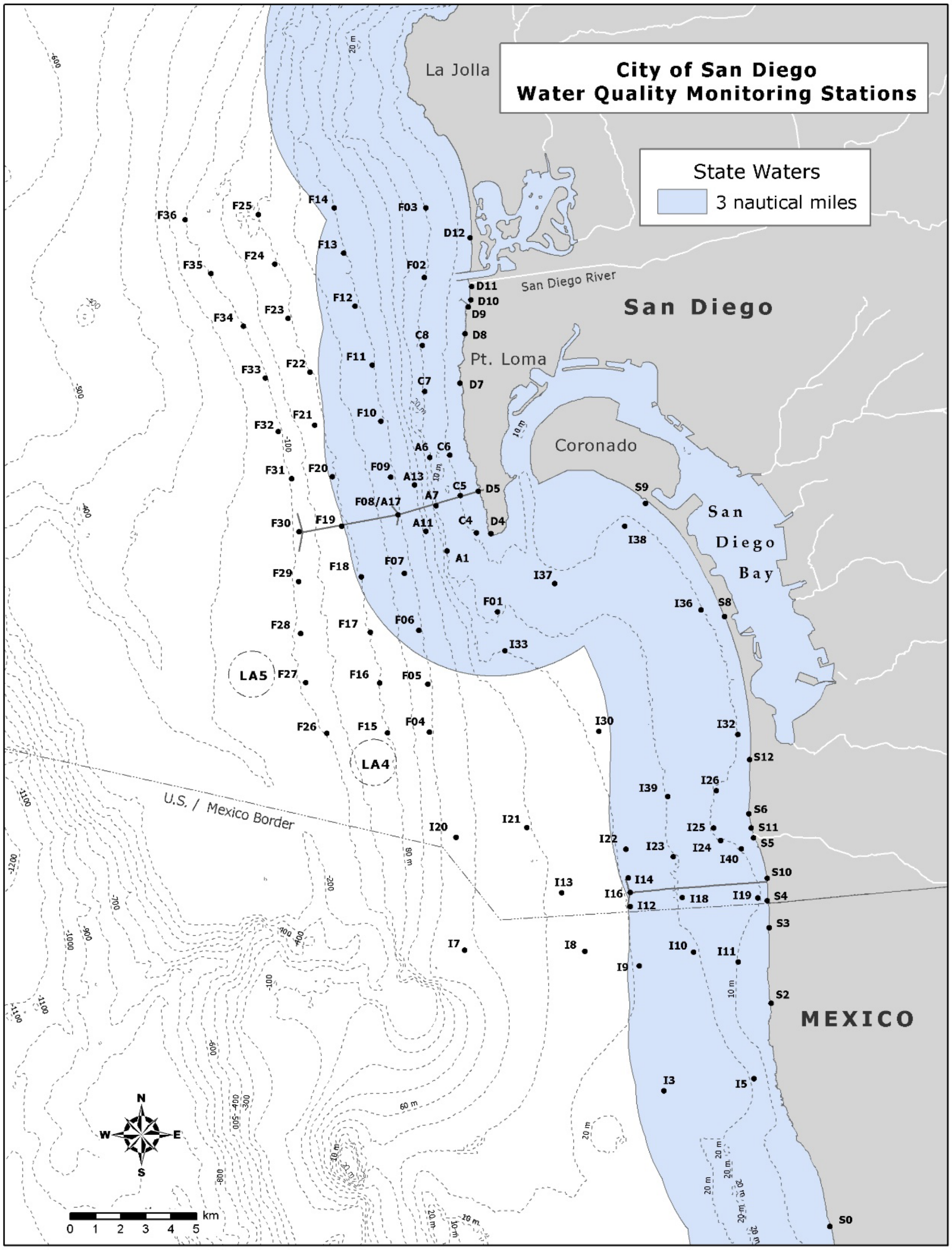
monitoring vessels. The PLOO ocean monitoring program conducts water quality sampling along 7.5 miles (12 km) of shoreline and at a grid of offshore stations extending from 5.4 miles (8.7 km) south of the outfall to 8.1 miles (13.1 km) north of the outfall. Figure III.E-1 presents the location of monitoring stations. During the past two decades, the City monitoring vessels have averaged 150-200 days per year in the coastal waters of San Diego. During this time, SDPUD ocean monitoring crews have not observed a single incident of water contact recreation (diving, swimming, kayaking, jet-skiing, etc.) in the offshore federal waters.[4]

Large vessels, principally U.S. Navy ships, commercial carriers (cargo transports, oil tankers, barges) and cruise ships generally transit the Point Loma area beyond five miles offshore. Most ship traffic funnels into and out of San Diego Bay well to the south of the outfall area. Recreational vessels (fishing and pleasure boats) in federal waters off Point Loma are usually heading to or returning from offshore fishing banks and islands. Power and sail boats traversing the Point Loma area generally cruise along the outer edge of the kelp bed and are rarely seen more than a mile and a half offshore.

Recreational fishing in Point Loma waters takes place primarily in the nearshore zone and in the kelp bed area. SDPUD monitoring crews report occasionally seeing commercial passenger fishing vessels (Party Boats) and sport fishing craft as far out as the decommissioned outfall (1.6 nm offshore) but practically never further offshore.

4 Visual observations are logged (per requirements established in the PLOO NPDES monitoring program) by City ocean monitoring crews as part of sampling conducted at each of the offshore PLOO monitoring stations. During this time, no reports of water contact recreation has been reported by City staff in offshore federal waters. Interview conducted with City boat crews and monitoring staff confirm the lack of observed water contact recreation in the deep offshore federal waters.

Figure III.E-1 City of San Diego Water Quality Monitoring Stations



Note: Light blue shading represents State of California jurisdictional waters.

Swimming, surfing, and snorkeling occur in shallow water, inside the kelp bed. The vast majority of PWC operators, water skiers, wake boarders, board sailors, kite boarders, kayakers, canoers, and paddle boarders are seen inshore of the kelp bed.

Recreational SCUBA diving off Point Loma is focused on the kelp bed, with dive boats rarely sighted beyond 2 nm offshore. State waters transitions to federal waters at a bottom depth of approximately 80 m (263 ft) off Point Loma, which is a depth well beyond recreational SCUBA diving limits. Table III.E-1 summarizes water contact recreational activities off Point Loma, based on monitoring crew observations and information presented in Appendix H. Virtually all swimming, surfing, diving, paddling, fishing from paddle craft, board sailing, water skiing, and PWC operation is confined to waters less than 3.7 km (2 nm) from shore.

Table III.E-1 :
Water Contact Recreation Observed in the Vicinity of Point Loma [A]

Activity	Inshore Waters	Nearshore Waters	Kelp Bed	Offshore State Waters		Federal Waters
	0 to 10 ft (0 to 3.3 m) Depth	10 to 30 ft (3.3 to 9.1 m) Depth	1000 ft – 1 nm (0.3 – 1.9 km) Offshore	1-2 nm (1.9 – 3.7 km) offshore	2-3 nm (3.7 – 5.6 km) Offshore	3-12 nm (5.6-22.2 km) Offshore
Swimming and wading	✓					
Skim boarding	✓					
Water skiing/ wake boarding	✓	✓				
Snorkeling	✓	✓				
Surfing	✓	✓				
Sail/Kite board	✓	✓	✓			
Kayak/canoeing	✓	✓	✓			
Paddle boarding	✓	✓	✓	✓		
Free diving		✓	✓	✓		
SCUBA diving		✓	✓	✓		
Personal watercraft			✓	✓		

Table III.E-1 Notes:
A Summary of observed recreational activities reported by Wolfson and Glinski (1986) and by SDPUD ocean monitoring staff conducting ocean monitoring off the coast of Point Loma. See Appendix H for details.

Overall, a number of factors combine to prevent water contact recreation from occurring in federal waters off the coast of Point Loma, including:

- Lack of diving or sporting attractions in the deeper offshore waters compared to nearshore waters
- Offshore water depths that extend well beyond the depth range of recreational divers

- Adverse wind and current conditions in open offshore waters that create dangers for personal watercraft and self-propelled craft
- Shipping lane traffic that creates dangers for small watercraft
- Haze and fog may limit visibility of the shoreline
- Range restrictions (fuel-related or otherwise) associated with personal watercraft and self-propelled craft

III.E.2. What are the existing and potential impacts of the modified discharge(s) on recreational activities? Your answer should include but not be limited to a discussion of fecal coliform bacteria.

SUMMARY: The PLOO discharge complies with NPDES Permit standards and does not adversely impact recreational activities. The current discharge ensures compliance with recreational body-contact bacteriological standards at all depths (ocean surface to ocean bottom) in all State-regulated ocean waters. The renewed 301(h) waiver discharge will continue to comply with water quality standards for the protection of recreation and will not adversely impact recreational activities.

Bacteriological Standards to Protect Body-Contact Recreation. The City of San Diego analyzes seawater samples collected along the shoreline and in offshore coastal waters to characterize water quality conditions in the region and to identify possible impacts of wastewater discharge on the marine environment. To provide information about the dilution and dispersion of discharged wastewater, densities of fecal indicator bacteria (total coliform, fecal coliform and enterococcus) are measured and evaluated in context with oceanographic data including ocean currents and stratification conditions. The water quality monitoring also demonstrates consistent compliance with the water contact standards specified in the Ocean Plan, which defines bacterial, physical, and chemical water quality objectives and standards to protect beneficial uses of state ocean waters.[5]

Water quality standards to protect human health in recreational waters are assessed by measuring the concentration of fecal indicator bacteria (FIB) to infer the presence of fecal matter and associated fecal pathogens. Fecal matter originates from the intestines of warm-blooded animals, and the presence of fecal bacteria is used as an indicator of human pathogens that can cause illness in recreational water users.[6] Indicator bacteria may not cause illness themselves but have been linked to the presence of harmful pathogens.[7] FIB are used as a surrogate for human pathogens because they are easier and less costly to measure than the pathogens themselves.

As documented within Appendices D and P, ocean current data, plume tracking efforts, and satellite imaging indicate that:

- Ocean currents are predominantly longshore and net movement of the PLOO discharge is upcoast/downcoast,

5 Bacteriological receiving water quality objectives for body contact recreation are established within Table 1 and Table 2 of the 2019 Ocean Plan (State Board, 2019). The Ocean Plan water quality objectives have been approved by EPA as representing water quality standards defined by and enforceable under provisions of the CWA.
6 Boehm and Soller (2013); Harwood et al. (2013); EPA (2014).
7 Arnold et al. (2013); EPA (2014).

- Waters discharged offshore stay offshore, and
- Shore-based discharges are carried upcoast or downcoast and stay near the shore.[8]

As a result, PLOO operations are likely to affect only offshore waters, while shore-based contamination sources are likely to affect beach and shore water quality. Multiple shore-based sources of potential bacterial contamination exist in the Point Loma region. Key shore-based sources of bacterial contamination include San Diego Bay and the Tijuana and San Diego Rivers.[9] Storm drain discharges and wet-weather runoff from local watersheds can also flush contaminants seaward.[10] Additionally, beach wrack (e.g., kelp, seagrass), storm drains impacted by tidal flushing, and beach sediments can act as reservoirs, cultivating bacteria until release into nearshore waters by returning tides, rainfall, and/or other disturbances.[11] The presence of dogs and birds and their droppings has also been associated with bacterial exceedances that may impact nearshore water quality.[12]

Receiving Water Objectives and Limitations. Table III.E-2 summarizes current Ocean Plan receiving water bacteriological standards to protect body contact recreational uses (REC-1). The current 2019 version of the Ocean Plan protects REC-1 beneficial uses by establishing FIB standards for fecal coliform and enterococcus. Table III.E-2 also presents receiving water limitations established within Order No. R9-2017-0007, which are based on Ocean Plan REC-1 standards that were in effect at the time the Order No. R9-2017-0007 was adopted.[13] The 2015 version of the Ocean Plan established REC-1 standards for total coliform, fecal coliform and enterococcus.

As shown in Table III.E-2, the current 2019 version of the Ocean Plan no longer establishes REC-1 standards for total coliform. Fecal coliform REC-1 standards within the current (2019) version of the Ocean Plan remain unchanged from the prior version, but two subtle changes in enterococcus objectives have been implemented, including:

- A Statistical Threshold Value[14] of 110 CFU/100 ml is now used in lieu of the single sample maximum enterococcus limit of 104 CFU/100 ml that was established in the prior version of the Ocean Plan, and
- The enterococcus geometric mean objective is now expressed on the basis of a 6-week geometric mean instead of a 30-day geometric mean.

8 See Appendices D and P. Also see Rogowski (2012, 2013); SDPUD (2018, 2021).

9 Hess (2019,2020).

10 Colford et al. (2007); Sercu et al. (2009); Griffith et al. (2010).

11 Martin and Gruber (2005); Yamahara et al. (2007); Phillips et al. (2011); Griffith et al. (2013).

12 Wright et al. (2009); Griffith et al. (2010); Araújo et al. (2014).

13 The 2015 version of the Ocean Plan (which included amendments addressing desalination facility intakes and brine discharges) was adopted by the State Board on May 6, 2015 (State Board Resolution No. 2015-0033) and became effective on January 28, 2016.

14 The Statistical Threshold Value (STV) is not to be exceeded in more than 10 percent of the samples in a given month. The STV standard of 110 CFU/100 milliliters is thus essentially a 90^{th} percentile value as opposed to a single sample maximum value.

Table III.E-2:
Ocean Plan REC-1 Receiving Water Bacteriological Objectives and Receiving Water Limitations Established in Order No. R9-2017-0007

Parameter	Receiving Water Limitations Implemented within Order No. R9-2017-0007[A] (CFU/100 ml)		2019 Ocean Plan Water Quality Objectives for REC-1 Waters[B,C] (CFU/100 ml)			
	Single Sample Maximum	30-Day Geometric Mean[D]	Single Sample Maximum	30-Day Geometric Mean[D]	Statistical Threshold Value[E]	6-Week Rolling Geometric Mean[F]
Total coliform	10,000 or 1,000[G]	1,000	NA	NA	NA	NA
Fecal coliform	400	200	400	200[4]	NA	NA
Enterococcus	104	35	NA	NA	110[5]	30[6]

Table III.E-2 Notes:

- A Order No. R9-2017-0007 establishes receiving water limitations on the basis of Ocean Plan REC-1 water quality objectives that were in effect (2015 version of the Ocean Plan) at the time Order No. R9-2017-0007 was adopted. The 2015 Ocean Plan established these standards in terms of "density per 100 milliliters", while Order No. R9-2017-0007 expressed the standards in terms of colony forming units (CFU) per 100 milliliters (CFU/100 ml). Order No. R9-2017-0007 applies the Ocean Plan REC-1 water quality objectives to all ocean waters within three nautical miles of the coast.
- B Ocean Plan recreational body-contact (REC-1) bacteriological water quality objectives apply to State-regulated receiving waters that are within 1000 ft (300 m) of the shore, within the 30 ft (9.1 m) depth contour, in designated kelp beds, or in other state-regulated ocean waters designated by Regional Boards as being subject to REC-1 (body contact recreation) use. The above receiving water standards do not apply within designated ocean outfall zones of initial dilution. As noted in Footnote A, EPA and the Regional Board apply the Ocean Plan REC-1 water quality objectives to all state-regulated ocean waters (e.g., waters within three nautical miles of the shore).
- C Updated Ocean Plan REC-1 water quality objectives implemented in the 2019 version of the Ocean Plan. The 2019 version of the Ocean Plan expressed the water quality objectives in terms of CFU/100 ml.
- D Calculated on the basis of the five most recent samples from each site.
- E The Statistical Threshold Value (STV) is defined by the 2019 version of the Ocean Plan as the value not to be exceeded by more than 10 percent of the samples in any month.
- F Six-week rolling geometric mean to be calculated on a weekly basis.
- G The single sample maximum for total coliform is 1,000 organisms per 100 milliliters when the fecal coliform to total coliform ratio exceeds 10 percent. The single sample maximum for total coliform is 10,000 organisms per 100 ml when the fecal to total coliform ratio is not in excess of 10 percent.

Receiving Water Monitoring for Bacteriological Parameters. The PLOO monitoring program is designed to assess general water quality and determine the level of compliance with regulatory standards in the current NPDES discharge permit.[15] Eight stations located in or near the Point Loma kelp bed are monitored on a weekly basis for total coliform, fecal coliform and enterococcus to determine water quality conditions and Ocean Plan compliance in areas used for body-contact recreational activities such as SCUBA diving, surfing, fishing, and kayaking. These include stations C4, C5, and C6 located near the inner edge of the kelp bed along the

15 See page E-2 of the Monitoring and Reporting Program of Order No. R9-2017-0007.

9 m depth contour and stations A1, A6, A7, C7, and C8 located near the outer edge of the kelp bed along the 18 m depth contour (Figure III.E-1).[16]

An additional 36 stations ("F" stations) that are located offshore of the kelp bed stations are monitored on a quarterly basis for enterococcus to estimate dispersion of the wastewater plume. A total of 15 of these stations (F1, F2, F3, F6, F7, F8, F9, F10, F11, F12, F13, F14, F18, F19 and F20) are located within the state-regulated three nautical mile limit. The offshore "F" stations are arranged in a grid surrounding the discharge site along or adjacent to the 18, 60, 80 and 98 m depth contours (Figure III.E-1). Seawater samples are collected at three discrete depths at the kelp stations and 18 m and 60 m offshore stations, four depths at the 80 m offshore stations, and five depths at the 98 m offshore stations. Table III.E-3 summarizes monitoring at the kelp bed and offshore stations.

Compliance with Bacteriological Requirements. As noted, Order No. R9-2017-0007, which became effective on October 1, 2017, requires the PLOO to comply with Ocean Plan REC-1 water quality objectives that were in effect at the time the Order was adopted. Ocean monitoring conducted by the City of San Diego since Order No. R9-2017-0007 became effective demonstrate compliance with the receiving water bacteriological limits established in the Order. The monitoring also demonstrates compliance with bacteriological water quality objectives established within the 2019 version of the Ocean Plan. This compliance is achieved through (1) effective dilution and dispersion of the PLOO discharge and (2) effluent disinfection at the PLWTP to reduce PLWTP effluent concentrations of FIB parameters to a level that ensure compliance with the recreational body contact standards.

Table III.E-3:
Seawater Sampling Depths at Water Quality Stations

Station Type	Station Depth Contour	Sample Depths within the Water Column (m) [A]								
		1	3	9	12	18	25	60	80	98
Kelp Stations [B]	9 m	✓	✓	✓						
	18 m	✓			✓	✓				
Offshore Stations [C]	18 m	✓			✓	✓				
	60 m	✓					✓	✓		
	80 m	✓					✓	✓	✓	
	98 m	✓					✓	✓	✓	✓

Table III.E-3 Notes:

A Depths at which seawater samples are collected for bacteriological analysis at the PLOO kelp bed and offshore.

B Includes Stations A1, A6, A7, C4, C5, C6, C7 and C8. Order No. R9-2017-0007 labels these eight receiving water monitoring stations as "kelp stations." See Figure III.E-1 for the location of these monitoring stations.

C Order No. R9-2017-0007 labels Stations F1 through F36 as "offshore stations". See Figure III.E- for the location of these stations.

16 Order No. R9-2017-0007 labels receiving water monitoring stations A1, A6, A7, C4, C5, C6, C7 and C8 as "kelp stations". This same nomenclature (e.g., "kelp stations") is used herein, even though not all of these stations are located within the Point Loma Kelp bed.

Appendix H presents total coliform, fecal coliform, and enterococcus receiving water monitoring data during 2017-2020 and assesses compliance with the Ocean Plan bacteriological water quality objectives presented in Table III.E-2. As summarized in Appendix H, the PLOO has achieved virtually 100 percent compliance with Ocean Plan bacteriological water quality objectives at the monitoring stations within state-regulated waters since Order No. R9-2017-0007 became effective.

Total Coliform. Table III.E-4, summarizes PLOO compliance with total coliform receiving water limitations established in Order No. R9-2017-0007 at the kelp stations during 2017-2020. As shown in Table III.E-4, near 100 percent compliance was achieved with total coliform single sample maximum limits during 2017-2020. Only five exceedances of the single sample maximum limit were observed in nearly 5000 samples at these stations during 2017-2020, and none of these exceedances appear linked to the PLOO.[17] As also shown in Table III.E-4, 100 percent compliance was achieved with the 30-day geometric mean standard during 2017-2020. Maximum observed total coliform 30-day geometric means during 2017-2020 were far below the Ocean Plan objective of 1000 CFU/100 ml.

Table III.E-4:
PLOO Compliance with Ocean Plan Total Coliform Water Quality Objectives [A]
Kelp Stations, 2017-2020 [B]

Station	Sample Depth (m)	Total Coliform Samples at Kelp Stations, 2017-2020					
		Number of Samples	Number of Samples Exceeding the REC-1 Single Sample Maximum Limit [C]	Percent of Samples that Complied with the REC-1 Single Sample Maximum Limit	Number of Samples Which Caused the 30-Day Geometric Mean Limit to be Exceeded [D]	Percent of Samples that Complied with the REC-1 30-Day Geometric Mean Limit	Maximum Observed Total Coliform 30-Day Geometric Mean [E] (CFU/100 ml)
A1	1	213	0	100 %	0	100 %	47
	12	213	1	99.5 %	0	100 %	21
	18	213	1	99.5 %	0	100 %	61
A6	1	213	1	99.5 %	0	100 %	22
	12	213	0	100 %	0	100 %	20
	18	213	1	99.5 %	0	100 %	21
A7	1	213	0	100 %	0	100 %	16
	12	213	0	100 %	0	100 %	14
	18	213	1	99.5 %	0	100 %	53
C4	1	213	0	100 %	0	100 %	14
	3	213	0	100 %	0	100 %	13
	9	213	0	100 %	0	100 %	18

17 As documented in Appendix H, one of these exceedances occurred in September 2018 at the surface at Station A6 at a time when the PLOO trapping depth was near maximum. Additionally, bacteriological concentrations were low at Station A6 at the 9 and 18 m depths, and concentrations were negligible at surrounding stations. As a result, available evidence indicates that this exceedance is not related to the PLOO operation. The four additional exceedances during 2017-2020 at the kelp bed stations occurred after multiple days of precipitation are the cause of these isolated exceedances are unknown.

Station	Sample Depth (m)	Total Coliform Samples at Kelp Stations, 2017-2020					
		Number of Samples	Number of Samples Exceeding the REC-1 Single Sample Maximum Limit [C]	Percent of Samples that Complied with the REC-1 Single Sample Maximum Limit	Number of Samples Which Caused the 30-Day Geometric Mean Limit to be Exceeded [D]	Percent of Samples that Complied with the REC-1 30-Day Geometric Mean Limit	Maximum Observed Total Coliform 30-Day Geometric Mean [E] (CFU/100 ml)
C5	1	213	0	100 %	0	100 %	20
	3	213	0	100 %	0	100 %	23
	9	213	0	100 %	0	100 %	13
C6	1	213	0	100 %	0	100 %	8.0
	3	213	0	100 %	0	100 %	30
	9	213	0	100 %	0	100 %	20
C7	1	213	0	100 %	0	100 %	10
	12	213	0	100 %	0	100 %	8.0
	18	213	0	100 %	0	100 %	22
C8	1	213	0	100 %	0	100 %	21
	12	213	0	100 %	0	100 %	10
	18	213	0	100 %	0	100 %	18

Table III.E-4 Notes:

A Order No. R9-2017-0007 implements Ocean Plan REC-1 standards for total coliform, which include a single sample maximum limit of 10,00 per 100 ml (1000 per 100 ml if the fecal to total coliform ratio exceeds 10 percent) and a 30-day geometric mean limit of 1000 per 100 ml.

B Based on total coliform monitoring data from January 2017 through December 2020, as reported in monthly reports submitted by the City of San Diego to the Regional Board per requirements established in Order R9-2017-0007. Order No. R9-2017-0007 identifies Stations A1, A6, A7, C4, C5, C6, C7 and C8 as "kelp stations," all of which are within the three-nautical-mile limit of state regulation. See Figure III.E-1 for monitoring station locations.

C Order No. R9-2017-0007 and the Ocean Plan establish a single sample maximum for total coliform of 10,000 organisms per 100 milliliters and a single sample maximum limit of 1,000 per 100 ml if the fecal to total coliform ratio exceeds 10 percent.

D Order No. R9-2017-0007 and the Ocean Plan establish a 30-day geometric mean standard for total coliform of 1,000 per 100 ml.

E Order No. R9-2017-0007 establishes a total coliform 30-day geometric mean limit of 1,000 CFU/100 ml. The above maximum computed 30-day geometric means are based on total coliform values at the listed station and listed depths during the period January 2017 through December 2020. The Ocean Plan and Order No. R9-2017-0007 require that the 30-day geometric mean be calculated using a statistically sufficient number of samples (generally not less than five samples equally spaced over a 30-day period). For demonstration purposes, the above 30-day geometric means included months where four samples were collected during the month at each station and depth, and months where five samples were collected at each station and depth during the month. See Appendix H.

Fecal Coliform. Table III.E-5 summarizes compliance with Ocean Plan REC-1 bacteriological objectives for fecal coliform. As shown in the table, fecal coliform concentrations exceeded the Ocean Plan single sample limit in only one of almost 5,000 receiving water samples at these stations during 2017-2020, and this occurrence is not related to the PLOO discharge.[18]

18 The exceedance (a fecal coliform concentration of 2400 per 100 ml) occurred at the surface at Station A6 on September 17, 2018. The exceedance was unlikely to be related to the PLOO discharge, as the PLOO discharge plume is maintained well below the surface by thermal stratification during September. Additionally, bacteria concentrations at this time were minimal at all other depths at Station A6 and at all surrounding stations. The exceedance is concluded as being an isolated anomaly not related to the PLOO discharge. It is unknown whether this singular fecal coliform result is due to a marine mammal, discharge from a boat, sample contamination or some other localized occurrence.

As also shown in Table III.E-5, 100 percent compliance with the fecal coliform 30-day geometric mean limitation was achieved during 2017-2020 at the kelp stations. Maximum observed fecal coliform 30-day geometric means during 2017-2020 were far below the Ocean Plan objective of 200 CFU/100 ml. Additionally, as documented in Appendix H, observed fecal coliform 30-day geometric means at these stations tended to be lowest during June through November, the time of year when recreational use is highest.

Enterococcus at Kelp Stations. As noted, Order No. R9-2017-0007 established enterococcus receiving water limitations on the basis of water quality objectives established in the 2015 Ocean Plan. Table III.E-6 summarizes PLOO compliance with enterococcus receiving water limitations established in Order No. R9-2017-0007 at the kelp stations during 2017-2020. During 2017-2020, near 100 percent compliance was achieved with the enterococcus single sample maximum limits established in Order No. R9-2017-0007. Only seven of over 5000 kelp station samples during 2017-2020 exceeded the 104 per 100 ml limit. One of these exceedances occurred at the surface at a time (September 2018) when PLOO plume trapping depths were greatest.[19] Four kelp bed exceedances occurred during or immediately after sustained storm periods, and two additional enterococcus exceedances are unexplained, as concentrations of total and fecal coliform in these same samples were negligible.[20]

Table III.E-7 summarizes PLOO compliance with enterococcus receiving water quality objectives established in the 2019 Ocean Plan. Out of over 5000 samples during 2017-2020, seven samples exceeded an enterococcus concentration of 110 per 100 ml, which is the Ocean Plan STV limit not to be exceeded more than 10 percent of the month.

**Table III.E-5:
PLOO Compliance with Ocean Plan Fecal Coliform Water Quality Objectives [A]
Kelp Stations, 2017-2020 [B]**

Station	Sample Depth (m)	Fecal Coliform Samples at Kelp Stations, 2017-2020					
		Number of Samples	Number of Samples Exceeding the REC-1 Single Sample Maximum Limit [C]	Percent of Samples that Complied with the REC-1 Single Sample Maximum Limit	Number of Samples Which Caused the 30-Day Geometric Mean Limit to be Exceeded [D]	Percent of Samples that Complied with the REC-1 30-Day Geometric Mean Limit	Maximum Observed Fecal Coliform 30-Day Geometric Mean [E] (CFU/100 ml)
A1	1	213	0	100 %	0	100 %	5.9
	12	213	0	100 %	0	100 %	14
	18	213	0	100 %	0	100 %	24

19 A surface sample at Station A7 exceeded 104 per 100 ml on September 9, 2019 at a time of the year when the PLOO plume trapping depth is near maximum. Negligible FIB concentrations were observed at this time at the 9 and 18 m depths at Station A7, and negligible FIB concentrations were observed at this time at all surrounding monitoring stations at all depths. These factors offer strong evidence that the exceedance was unrelated to the PLOO discharge.

20 Four exceedances occurred during or after sustained storm periods, including exceedances at Stations A7 and C8 on January 13, 2017, and exceedances on January 23, 2019 at Station A1 at 9 and 18 m depths. Two additional exceedances occurred on November 4, 2019 at Station C7 at 1 and 18 m depths, but total and fecal coliform concentrations at these same depths were negligible, as were FIB concentrations at all surrounding stations. Causes of these isolated enterococcus exceedances are unknown.

Station	Sample Depth (m)	Fecal Coliform Samples at Kelp Stations, 2017-2020					
		Number of Samples	Number of Samples Exceeding the REC-1 Single Sample Maximum Limit [C]	Percent of Samples that Complied with the REC-1 Single Sample Maximum Limit	Number of Samples Which Caused the 30-Day Geometric Mean Limit to be Exceeded [D]	Percent of Samples that Complied with the REC-1 30-Day Geometric Mean Limit	Maximum Observed Fecal Coliform 30-Day Geometric Mean [E] (CFU/100 ml)
A6	1	213	1	99.5 %	0	100 %	12
	12	213	0	100 %	0	100 %	6.9
	18	213	0	100 %	0	100 %	12
A7	1	213	0	100 %	0	100 %	4.7
	12	213	0	100 %	0	100 %	8.5
	18	213	0	100 %	0	100 %	12
C4	1	213	0	100 %	0	100 %	3.2
	3	213	0	100 %	0	100 %	3.1
	9	213	0	100 %	0	100 %	4.0
C5	1	213	0	100 %	0	100 %	4.4
	3	213	0	100 %	0	100 %	3.0
	9	213	0	100 %	0	100 %	3.6
C6	1	213	0	100 %	0	100 %	3.1
	3	213	0	100 %	0	100 %	2.3
	9	213	0	100 %	0	100 %	2.5
C7	1	213	0	100 %	0	100 %	3.8
	12	213	0	100 %	0	100 %	3.5
	18	213	0	100 %	0	100 %	5.0
C8	1	213	0	100 %	0	100 %	3.9
	12	213	0	100 %	0	100 %	3.0
	18	213	0	100 %	0	100 %	4.4

Table III.E-5 Notes:

A Order No. R9-2017-0007 implements Ocean Plan REC-1 standards for fecal coliform, which include a single sample maximum limit of 400 per 100 ml and a 30-day geometric mean limit of 200 per 100 ml.

B Based on total coliform monitoring data from January 2017 through December 2020, as reported in monthly reports submitted by the City of San Diego to the Regional Board per requirements established in Order R9-2017-0007. Order No. R9-2017-0007 identifies Stations A1, A6, A7, C4, C5, C6, C7 and C8 as "kelp stations," all of which are within the three-nautical-mile limit of state regulation. See Figure III.E-1 for monitoring station locations.

C Order No. R9-2017-0007 and the Ocean Plan establish a single sample maximum for fecal coliform of 400 organisms per 100 milliliters.

D Order No. R9-2017-0007 and the Ocean Plan establish a 30-day geometric mean standard for fecal coliform of 200 per 100 milliliters.

E Order No. R9-2017-0007 establishes a 30-day geometric mean fecal coliform limit of 400 CFU/100 ml. The above maximum computed 30-day geometric means are based on fecal coliform values at the listed station and listed depths during the period January 2017 through December 2020. The Ocean Plan and Order No. R9-2017-0007 require that the 30-day geometric mean be calculated using a statistically sufficient number of samples (generally not less than five samples equally spaced over a 30-day period). For demonstration purposes, the above 30-day geometric means included months where four samples were collected during the month at each station and depth, and months where five samples were collected at each station and depth during the month. See Appendix H.

Table III.E-6: PLOO Compliance with Enterococcus Receiving Water Limitations of Order No. R9-2017-0007 [A] Kelp Stations, 2017-2020 [B]

Station	Sample Depth (m)	Enterococcus Samples at Kelp Stations, 2017-2020					
		Number of Samples	Number of Samples Exceeding an Enterococcus Concentration of 100 per 100 ml [C]	Percent of Samples that Complied with 104 per ml Receiving Water Limitation of Order No. R9-2017-0007	Maximum Observed Enterococcus 30-Day Geometric Mean [D,E] (CFU/100 ml)	Number of Months Where 30-day Geometric Mean Exceeded an Enterococcus Concentration of 35 per 100 ml [D,E]	Percent of Months that Complied with the 30-day Geometric Mean Limit of 35 per 100 ml [D,E]
A1	1	213	0	100 %	4.2	0	100 %
	12	213	1	99.5 %	5.8	0	100%
	18	213	1	99.5 %	7.7	0	100%
A6	1	213	1	99.5 %	6.2	0	100%
	12	213	0	100 %	4.9	0	100 %
	18	213	1	99.5 %	10.3	0	100%
A7	1	213	0	100 %	4.2	0	100%
	12	213	0	100 %	4.1	0	100 %
	18	213	0	100 %	6.8	0	100%
C4	1	213	0	100 %	3.6	0	100%
	3	213	0	100 %	3.2	0	100 %
	9	213	0	100 %	3.7	0	100%
C5	1	213	0	100 %	2.6	0	100%
	3	213	0	100 %	3.6	0	100 %
	9	213	0	100 %	2.5	0	100%
C6	1	213	0	100 %	2.9	0	100%
	3	213	0	100 %	4.0	0	100 %
	9	213	0	100 %	3.7	0	100%
C7	1	213	1	99.5 %	5.6	0	100%
	12	213	0	100 %	9.4	0	100 %
	18	213	1	99.5 %	8.2	0	100 %
C8	1	213	0	100 %	3.8	0	100%
	12	213	0	100 %	3.3	0	100%
	18	213	1	99.5 %	6.3	0	100%

Table III.E-6 Notes:

A Order No. R9-2017-0007 implements Ocean Plan REC-1 water quality objectives from the 2015 version of the Ocean Plan. Order No. R9-2017-0007 establishes enterococcus receiving water quality limitations on the basis of a single sample maximum limit (104 per 100 ml) and a 30-day geometric mean (35 per 100 ml).

B Based on enterococcus monitoring data from January 2017 through December 2020 for kelp stations, as reported in monthly reports submitted by the City of San Diego to the Regional Board per requirements established in Order R9-2017-0007. All above stations are within the three-nautical-mile limit of state regulation. See Figure III.E-1 for monitoring station locations.

C Order No. R9-2017-0007 and the Ocean Plan establish a single sample maximum for enterococcus of 104 per 100 milliliters.

D Order No. R9-2017-0007 establishes a 30-day geometric mean enterococcus limit of 35 CFU/100 ml.

E The above maximum computed 30-day geometric means are based on enterococcus values at the listed station and listed depths in each calendar month during the period January 2017 through December 2020. Order No. R9-2017-0007 require that the 30-day geometric mean be calculated using a statistically sufficient number of samples (generally not less than five samples equally spaced over a 30-day period). For demonstration purposes, the above 30-day geometric means include months where four samples were collected at each station and depth and months where five samples were collected at each station and depth during the month. See Appendix H.

Table III.E-7: PLOO Compliance with 2019 Ocean Plan Enterococcus Water Quality Objectives [A] Kelp Stations, 2017-2020 [B]

Station	Sample Depth (m)	Enterococcus Samples at Kelp Stations, 2017-2020					
		Total Number of Samples	Number of Samples Exceeding a Concentration of 110 per 100 ml [C]	99th Percentile Enterococcus Concentration (CFU/100 ml)	90th Percentile Enterococcus Concentration (CFU/100 ml) [C]	Maximum Observed Enterococcus 6-week Rolling Geometric Mean [D,E] (CFU/100 ml)	Percent Compliance with the Ocean Plan 6-week Rolling Geometric Mean Limit of 30 per 100 ml [D,E]
A1	1	213	0	8	2	4.3	100 %
	12	213	1	23	2	16.7	100%
	18	213	1	41	4	24.6	100%
A6	1	213	1	19	2	6.5	100%
	12	213	0	20	2	7.2	100 %
	18	213	1	55	4	11.3	100 %
A7	1	213	0	19	2	2.7	100 %
	12	213	0	31	2	10.4	100 %
	18	213	0	23	4	17.4	100%
C4	1	213	0	4	2	2.9	100 %
	3	213	0	4	2	2.9	100 %
	9	213	0	6	2	3.2	100 %
C5	1	213	0	4	2	3.8	100 %
	3	213	0	6	2	2.8	100 %
	9	213	0	4	2	3.3	100 %
C6	1	213	0	4	2	2.9	100 %
	3	213	0	6	2	2.2	100 %
	9	213	0	5	2	2.4	100 %
C7	1	213	1	13	2	3.4	100 %
	12	213	0	21	2	3.5	100 %
	18	213	1	13	2	3.8	100 %
C8	1	213	0	15	2	3.5	100 %
	12	213	0	6	2	2.8	100 %
	18	213	1	21	2	3.5	100 %

Table III.E-7 Notes:

A The 2019 Ocean Plan establishes REC-1 enterococcus water quality objectives on the basis of a Statistical Threshold Value and a 6-week rolling geometric mean.

B Based on enterococcus monitoring data from January 2017 through December 2020 for kelp stations, as reported in monthly reports submitted by the City of San Diego to the Regional Board per requirements established in Order R9-2017-0007. All above stations are within the three-nautical-mile limit of state regulation. See Figure III.E-1 for monitoring station locations.

C The Ocean Plan establishes a STV limit enterococcus of 110 per 100 milliliters, which is not to be exceeded in more than 10 percent of the samples during a given month.

D The Ocean Plan establishes a 6-week rolling geometric mean (to be calculated on a weekly basis) enterococcus limit of 30 CFU/100 ml.

E The above maximum computed 6-week rolling geometric means are based on enterococcus values at the listed station and listed depths for the period January 2017 through December 2020, where geometric means are computed on a weekly basis. See Appendix H.

As shown in Table III-E-7, however, 99th percentile enterococcus values were far below this STV objective, and 90th percentile enterococcus values were less than 4 per 100 ml at all kelp stations at all depths.

Table III.E-7 also shows maximum enterococcus 6-week rolling geometric means at the kelp stations during 2017-2020. As shown in Table III.E-7, the PLOO discharge achieved 100 percent compliance with the Ocean Plan REC-1 6-week geometric mean enterococcus objectives at the kelp stations during 2021.

Enterococcus at Offshore Stations in State-Regulated Waters. Order No. R9-2017-0007 requires quarterly enterococcus monitoring at offshore stations F1 through F36. Fifteen of these offshore stations (see Figure III.E-1) are located within state-regulated waters.[21] Table III.E-8 summarizes enterococcus concentrations at these offshore stations during 2017-2020. As shown in Table III.E-8, enterococcus concentrations during 2017-2020 were consistently less than 2 per 100 ml throughout near-surface waters and the portion of the water column that is within reach of recreational divers.[22] Higher enterococcus concentrations were rare and were limited to depths of 60 m (197 ft) or more. These instances of higher enterococcus concentrations are likely related to PLOO plume incursion, but during 2017-2020, enterococcus concentrations exceeded the Ocean Plan STV value (not to be exceeded more than 10 percent of the time in a month) in approximately 2.7% of the samples, and all of these occurrences were at depth.[23]

Table III.E-8 also presents percentile breakdowns of enterococcus concentrations at the offshore stations within state-regulated waters during 2017-2020. Since only quarterly enterococcus monitoring results are available for these offshore stations, an insufficient number of samples each month are collected to assess compliance with the Ocean Plan STV limit of 110 per 100 ml or the 6-week rolling geometric mean limit of 30 per 100 ml. As indicated by the percentile breakdowns presented in Table III.E-8, however, available data indicate that if multiple enterococcus samples were collected each month, compliance with the Ocean Plan STV and 6-week rolling geometric mean limits would be achieved.[24]

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21 This includes Stations F1, F2, F3, F6, F7, F8, F9, F10, F11, F12, F13 and F14 which are within the state-regulated three-nautical-mile limit as well as Stations F18 and F20 which are at the 80 m depth contour immediately inside the three-nautical-mile state-regulated limit, and Station F19 which is at the 80 m depth contour at the three-nautical-mile limit. See Figure III.E-1.

22 This includes samples collected at depths of 1 m (3.3 ft) and 25 m (82 ft).

23 As shown in Table III.E-8, a total of 20 samples out of 752 samples (2.7%) exceeded an enterococcus concentration of 100 per 100 ml. A total of 11 of these exceedances occurred at or near the three-nautical-mile limit at depth (60 m or deeper).

24 Only two of the 90th percentile values at the offshore stations exceeded an enterococcus concentration of 100 per 100 ml, and these values occurred at depth (F18 at 60 m and F19 at 80 m). When averaged with samples at other depths at these stations, compliance with the STV limits would be achieved. Compliance with the 6-week rolling mean limits would also be achieved as median enterococcus values were less than 30 per 100 ml at all locations and all depths, and virtually all surface and near-surface enterococcus concentrations were negligible.

Table III.E-8:
Enterococcus at Offshore Monitoring Stations in State-Regulated Waters
18, 60 and 80 m Contours, 2017-2020 [A]

Station	Sample Depth	Offshore Stations in State-Regulated Waters at the 18, 60 and 80 m Depth Contours					
		Total Number of Samples	Number of Samples Exceeding a Concentration of 100 per 100 ml [B]	Percent of Samples Exceeding a Concentration of 100 per ml	Enterococcus Concentration (CFU/100 ml) [C]		
					90th Percentile	75th Percentile	50th Percentile
F1	1	16	0	100 %	< 2	< 2	< 2
	12	16	0	100 %	< 2	< 2	< 2
	18	16	0	100 %	< 2	< 2	< 2
F2	1	16	0	100 %	3	< 2	< 2
	12	16	0	100 %	< 2	< 2	< 2
	18	16	0	100 %	< 2	< 2	< 2
F3	1	16	0	100 %	< 2	< 2	< 2
	12	16	0	100 %	< 2	< 2	< 2
	18	16	0	100 %	< 2	< 2	< 2
F6	1	16	0	100 %	< 2	< 2	< 2
	25	16	0	100 %	< 2	< 2	< 2
	60	16	0	100 %	27	14	4
F7	1	16	0	100 %	< 2	< 2	< 2
	25	16	0	100 %	< 2	< 2	< 2
	60	16	1	99.5 %	37	23	7
F8	1	16	0	100 %	< 2	< 2	< 2
	25	16	1	99.5 %	< 2	< 2	< 2
	60	16	1	99.5 %	45	26	18
F9	1	16	1	99.5 %	< 2	< 2	< 2
	25	16	0	100 %	< 2	< 2	< 2
	60	16	1	99.5 %	34	20	10
F10	1	16	0	100 %	< 2	< 2	< 2
	25	16	0	100 %	< 2	< 2	< 2
	60	16	1	93.8 %	87	28	11
F11	1	16	0	100 %	< 2	< 2	< 2
	25	16	0	100 %	< 2	< 2	< 2
	60	16	2	87.5 %	67	22	14
F12	1	16	0	100 %	2	< 2	<2
	15	16	0	100 %	< 2	< 2	< 2
	60	16	1	93.8 %	18	11.5	10
F13	1	16	0	100 %	< 2	< 2	< 2
	25	16	0	100 %	2	< 2	< 2
	60	16	0	100 %	66	23	9
F14	1	16	0	100 %	< 2	< 2	< 2
	25	16	0	100 %	< 2	< 2	< 2
	60	16	0	100 %	20	8.0	< 2
F18	1	16	0	100 %	< 2	< 2	< 2
	25	16	0	100 %	2	< 2	< 2
	60	16	2	87.5 %	200	29	4
	80	16	2	87.5 %	97	45	24

Station	Sample Depth	Offshore Stations in State-Regulated Waters at the 18, 60 and 80 m Depth Contours					
		Total Number of Samples	Number of Samples Exceeding a Concentration of 100 per 100 ml [B]	Percent of Samples Exceeding a Concentration of 100 per ml	Enterococcus Concentration (CFU/100 ml) [C]		
					90th Percentile	75th Percentile	50th Percentile
F19	1	16	0	100 %	< 2	< 2	< 2
	25	16	0	100 %	< 2	< 2	< 2
	60	16	1	93.8 %	73	14	5
	80	16	4	75 %	160	84	18
F20	1	16	0	100 %	< 2	< 2	< 2
	25	16	0	100 %	< 2	< 2	< 2
	60	16	1	93.8 %	32	6	< 2
	80	16	1	93.8 %	87	38	23

Table III.E-8 Notes:

A Based on enterococcus monitoring data from January 2017 through December 2020 for kelp stations, as reported in monthly reports submitted by the City of San Diego to the Regional Board per requirements established in Order R9-2017-0007. All above stations are within the three-nautical-mile limit of state regulation. See Figure III.E-1 for monitoring station locations.

B The Ocean Plan establishes a REC-1 enterococcus STV objective (not to be exceeded in more than 10 percent of the samples during a month) of 110 per 100 ml.

C Percentile values for each station and each sampling depth are computed using all enterococcus data collected at the given station and depth during 2017-2020.

Enterococcus at Offshore Stations Beyond State-Regulated Waters. Order No. R9-2017-0007 establishes enterococcus receiving water limits[25] in federal waters (e.g., waters beyond the three-nautical-mile limit of state regulation) where "primary contact recreation" occurs. Such primary contact recreation is defined as recreation where immersion is likely, such as swimming, skin-diving, water-skiing.

As documented in Appendix H, no such primary contact recreation has been observed or reported beyond the three-nautical-mile limit of state regulation. In the event that any primary recreational use was ever to occur in the offshore waters outside of the three-nautical-mile limit, such use would be limited to surface and near-surface waters. Table III.E-9 summarizes enterococcus monitoring at stations located outside the three-nautical-mile limit during 2017-2020. As shown in Table III.E-9, enterococcus concentrations were negligible in all surface and near surface offshore waters during 2017-2020.

Shore Stations. Order No. R9-2017-0007 also requires bacteriological monitoring at seven shore stations ("D" stations). As noted in Appendix H, while useful for assessing impacts from storm runoff or shore-based contaminant sources, the shore "D" stations are of little benefit in assessing PLOO discharge impacts. Historical outfall receiving water data, ocean current data, remote sensing (satellite imagery) and plume tracking results (see Appendices D and P) demonstrate that predominant upcoast/downcoast ocean currents maintain the PLOO discharge plume far offshore, and that thermal stratification typically prevents the PLOO discharge plume from surfacing. Additionally, ocean monitoring stations located between the PLOO, and the shore stations consistently show compliance with Ocean Plan REC-1 objectives, demonstrating that the PLOO plume does not influence water quality at the shore stations.

25 Enterococcus limits applied to federal waters where "primary contact recreation" occur include a 30-day geometric mean of 35 per 100 ml and a STV (not to be exceeded more than 10 percent of the time) of 130 per 100 ml.

The Tijuana River (approximately 10 miles south of the PLOO) is a major source of chronic contamination that impacts beach water quality in Imperial Beach and Coronado. Temporary events such as wet weather runoff and sewer spills can also result in short-term effects on beach water quality. A general relationship between storm runoff and elevated bacterial levels at shore stations has been evident since water quality monitoring began in the Point Loma region. Demonstrating this, Table III.E-10 summarizes occurrences during 2017-2020 when beach samples showed enterococcus concentrations in excess of 100 per 100 ml. As shown in the table, most enterococcus exceedances at stations near the San Diego River (D8, D9, D10 and D11) occurred during the November through April rain season.

Satellite imagery during 2017-2020 confirm that runoff from the San Diego River typically travels upcoast or downcoast and remains within approximately one mile of the shore.[26]

Heal the Bay, a non-profit environmental group, collects data from the City and County of San Diego as well as other numerous sources and prepares an annual Beach Report Card™.[27] Table III.E-11 presents the Heal the Bay grades for 2020. Beaches from the southern tip of Point Loma to Pacific beach, including a beach station at the PLWTP, received grades of A or A+.[28]

Table III.E-9:
Summary of PLOO Offshore Enterococcus Monitoring Outside of State-Regulated Waters Offshore Stations Along the 60, 80 and 98 m Contours, 2017-2020 [A]

Station	Depth (m)	Enterococcus Percentile Concentration, 2017-2020 [B] CFU/100 ml				Station	Depth (m)	Enterococcus Percentile Concentration, 2017-2020 [B] CFU/100 ml		
		90th Percentile	75th Percentile	50th Percentile				90th Percentile	75th Percentile	50th Percentile
F4	1	2	2	2		F27	1	2	2	2
	25	2	2	2			25	2	2	2
F5	1	2	2	2		F28	1	2	2	2
	25	2	2	2			25	2	2	2
F15	1	2	2	2		F29	1	2	2	2
	25	2	2	2			25	2	2	2
F16	1	2	2	2		F30	1	2	2	2
	25	2	2	2			25	2	2	2
F17	1	2	2	2		F31	1	2	2	2
	25	2	2	2			25	2	2	2
F21	1	2	2	2		F32	1	2	2	2
	25	2	2	2			25	2	2	2
F22	1	2	2	2		F33	1	2	2	2
	25	2	2	2			25	2	2	2
F23	1	2	2	2		F34	1	2	2	2
	25	2	2	2			25	2	2	2

26 Sediment-laden runoff from the San Diego River is visible in satellite imagery, which allows the river discharge to be visually tracked. Imagery from Hess (2019, 2020).
27 Heal the Bay (2020).
28 One exception to this is a location on Sunset Cliffs which experiences chronic shore-based storm drain contamination during wet weather.

Station	Depth (m)	Enterococcus Percentile Concentration, 2017-2020 [B] CFU/100 ml		
		90th Percentile	75th Percentile	50th Percentile
F24	1	2	2	2
	25	2	2	2
F25	1	2	2	2
	25	2	2	2
F26	1	2	2	2
	25	3	2	2
F35	1	2	2	2
	25	2	2	2
F36	1	2	2	2
	25	2	2	2

Table III.E-9 Notes:

A Based on enterococcus monitoring data from January 2017 through December 2020 at Monitoring Stations F4, F5, F15 through F17, and F21 through F36, as reported in monthly reports submitted by the City of San Diego to the Regional Board per requirements established in Order R9-2017-0007. All of the above stations are outside the three-nautical-mile limit of state regulation. See Figure III.E-1 for monitoring station locations.

B Percentile values for each station and each sampling depth are computed using all enterococcus data collected at the given station and depth during 2017-2020.

Table III.E-10:
Summary of Elevated Enterococcus Concentrations at Shore Stations, 2017-2020 [A]

Shore Station	Location	Number of Samples 2017-2020	Number of Samples with Enterococcus Concentrations >100 per 100 ml	
			November-April [B]	May-October [C]
D4	Point Loma	210	0	1
D5	Point Loma	213	1	0
D7	Point Loma	180	5	1
D8-A	Sunset Cliffs	71	4	0
D8-B	Sunset Cliffs	141	8	1
D9	Ocean Beach	200	5	2
D10	Ocean Beach	215	3	1
D11	San Diego River	228	13	2
D12	Mission Beach	217	1	3
Total of Samples		1,675	40	11

Table III.E-10 Notes:

A Based on enterococcus monitoring data from January 2017 through December 2020 at Monitoring Stations D4, D5, D6, D8, D9, D10, D11 and D12, as reported in monthly reports submitted by the City of San Diego to the Regional Board per requirements established in Order R9-2017-0007. See Figure III.E-1 for monitoring station locations.

B Dry season months with limited precipitation.

C Wet season months where significant majority of all annual precipitation occurs.

Table III.E-11:
San Diego Coastal Beach Grades 2019 – 2020 [A]

Location	Dry Periods	Wet Weather
Point Loma Lighthouse (Southern tip of Point Loma)	A	A
Point Loma Treatment Plant	A+	A
Sunset Cliffs	A	D [B]
Ocean Beach Pier	A	A
Ocean Beach	A	A
Ocean Beach jetty	A	A
Mission Beach	A+	A+
Pacific Beach	A+	A+

Table III.E-11 Notes:

A From Heal the Bay (2020).

B Location near a Sunset Cliffs storm drain that can discharge contaminated runoff to the ocean during storm periods.

The Tijuana River continues to be a significant source of bacteriological contaminants both during wet weather and dry weather conditions. The San Diego County Department of Environmental Health and Quality (DEHQ) posts notices and closes beaches in San Diego County when monitoring indicates bacteria levels exceed state standards. During 2020, the County of San Diego implemented beach closures 27 times south of Encinitas, and all 27 closures occurred in the vicinity of the Tijuana River.[29]

No beach closures occurred in the vicinity of Point Loma during 2020.[30] Further, no beach advisories (indicating exceedance of REC-1 water quality standards) occurred at Point Loma during 2020. The only beach advisories issued by DEHQ in the general area of Point Loma during 2020 occurred at Dog Beach at the mouth of the San Diego River, where five advisories were issued.[31]

Summary. Data developed as part of the long-term, comprehensive City of San Diego bacteriological monitoring program (which includes ocean current monitoring, plume tracking studies and evaluation of satellite imagery) indicate that the PLOO wastewater plume does not come near or contact the shoreline. Shoreline water quality in the Point Loma area continues to be excellent, and any short-term public health risk that may occur is associated with exposure to pathogens transported from land, not from the ocean discharge of wastewater 93.3 to 95.4 m (306 - 313 ft) deep[32] and approximately 7.2 km (4.5 statute miles or 4 nm) offshore.

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29 Includes closures implemented at Imperial Beach, the Silver Strand and City of Coronado.
30 San Diego County Department of Environmental Health and Quality (2021).
31 *Ibid*. Dog beach is located at the mouth of the San Diego River approximately seven miles north of the PLWTP. The area is a recreational site for dogs and occasional bacteriological contamination occurs from runoff and/or pet-related wastes.
32 The PLOO discharge ports are between 306 and 313 feet (93.3 and 94.5 m) below Mean Lower Low Water. Due to the height of the diffuser and outfall ballast, the depth to the ocean bottom at the end of the PLOO diffuser is approximately 320 feet (98 m).

III.E.3. Are there any Federal, State, or local restrictions on recreational activities in the vicinity of the modified discharge(s)? If yes, describe the restrictions and provide citations to available references.

Appendix H documents recreational activities in the vicinity of the PLOO discharge. There are no federal, state, or local restrictions on recreational activities in the vicinity of the PLOO.

III.E.4. If recreational restrictions exist, would such restrictions be lifted or modified if you were discharging a secondary treatment effluent?

No such restrictions exist that are related to the PLOO discharge.

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III.F MONITORING PROGRAM

III.F.1. Describe the biological, water quality, and effluent monitoring programs which you propose to meet the criteria of 40 CFR 125.63. Only those scientific investigations that are necessary to study the effects of the proposed discharge should be included in the scope of the 301(h) monitoring program [40 CFR 125.63(a)(1)(I)(B)].

SUMMARY: The City proposes to maintain the existing comprehensive influent, effluent, toxicity, sludge, receiving water, sediment chemistry, benthic species, pelagic species and bioaccumulation monitoring established within Monitoring and Reporting Program R9-2017-0007. Only a few minor changes are proposed to the core program in order to bring the PLOO monitoring program consistent with monitoring requirements established by the Regional Board in the 2021 SBOO NPDES permits. The City proposes to continue full participation in the SCB regional monitoring programs, as well as several other regional monitoring efforts. Additionally, the City will continue to pursue its enhanced ocean monitoring efforts via special projects that address specific receiving water quality or other discharge-related issues. Finally, the City will continue to coordinate with the Regional Board to address the monitoring goals and recommendations established within the Regional Board's "A Framework for Monitoring and Assessment in the San Diego Region."

Consistency with San Diego Water Board Direction. The City's comprehensive receiving water monitoring program allows for the collection of data to (1) evaluate compliance, (2) assess trends in water quality, sediments, and aquatic habitat, (3) measure the health of ocean waters and (4) ensure that beneficial uses are protected. Each of the prior NPDES monitoring programs established by the Regional Board and EPA[1] were designed to achieve these objectives, in part, by:

- Maintaining consistency in sampling requirements and locations which allows for the development and assessment long-term data bases of water quality, sediment quality, and metrics for measuring biological effects and habitat, and
- Introducing new elements as required to assess new parameters or issues concerns.

Through this approach, more than 30 years of monitoring data have been developed to characterize water quality, sediments and aquatic habitat in the vicinity of the PLOO and at reference stations far removed from the PLOO.

In addition to extending the data base developed under prior NPDES permits, the current PLOO ocean monitoring program established within Order No. R9-2017-0007 is in keeping with regional monitoring coordination efforts and Regional Board goals, including:

Model Monitoring Program. The *Model Monitoring Program for Large Ocean Discharges in Southern California* (MMP)[2] was developed by SCCWRP near the turn of the 21st century to serve as a tool for coordinating regional ocean outfall monitoring efforts and addressing key questions of

1 Includes monitoring requirements established within the following PLOO NPDES permits: Order No. 95-06 adopted in 1995, Order No. R9-2002-0025 adopted in 2002 (and Addendum No. 1 to Order No. R9-2002-0025 adopted in 2003), Order No. R9-2009-0001 adopted in 2009 and Order No. R9-2017-0007 adopted in 2017.

2 Schiff et al. (2002).

interest to regulators and stakeholders. Over the past two decades, Regional Boards in the Los Angeles, Santa Ana and San Diego Regions have utilized the MMP in:

- Standardizing (to the degree appropriate) ocean outfall monitoring programs within the SCB,
- Addressing location-specific compliance and water quality issues, and
- Assessing regional water quality or environmental issues.

Order No. R9-2009-0001 (adopted by the Regional Board in 2009) brought the PLOO monitoring program in full alignment with the MMP, and this alignment is continued through the monitoring provisions established in Order No. R9-2017-0007.

Framework for Monitoring and Assessment in the San Diego Region. In 2012, the Regional Board developed and adopted *A Framework for Monitoring and Assessment in the San Diego Region* (Monitoring Framework).[3,4] The Monitoring Framework recommended revision of a discharge-oriented monitoring approach in favor of a question-driven approach that addressed the following elements:

- Assess water quality conditions and evaluate the viability of water quality to support beneficial uses
- Identify stressors causing any unsatisfactory conditions
- Identify the source of the primary stressors
- Evaluate the effectiveness of actions to mitigate/eliminate the stressors

San Diego Regional Water Board Practical Vision. In 2021, the Regional Board updated the San Diego Regional Water Board Practical Vision (Practical Vision) which sets forth Regional Board goals and a strategic plan for implementing the goals.[5] Chapter 2 of the Practical Vision addresses monitoring and emphasizes the importance of monitoring and assessment programs consistent with the 2012 Monitoring Framework to protect and restore the health of waters within the San Diego Region. The 2021 Practical Vision also identified specific monitoring projects to be implemented within the next seven years. These specific monitoring projects, in part, include assessing transboundary flows from the Tijuana River to estuary and coastal waters and monitoring and assessment of harmful algae blooms.

The present-day PLOO monitoring program, which covers an extensive portion of San Diego's coastal waters, is consistent with the MMP, the 2012 Regional Board Monitoring Framework and the 2021 Practical Vision. In accordance with the MMP, the 2012 Monitoring Framework and 2021 Practical Vision, the City of Diego is committed to maintaining a comprehensive monitoring and reporting program and will embrace any appropriate modifications that may be required in the future. The basis for the program involves three elements:

3 Busse and Posthumus (2012).
4 Regional Board Order No. R9-2012-0069 (adopted on December 12, 2012) endorsed the 2012 Framework as a tool for developing and implementing improved monitoring programs in the San Diego Region.
5 Regional Board (2021c).

- A core NPDES permit compliance monitoring program that includes influent and effluent water quality monitoring, and monitoring of receiving waters, receiving water sediments, fish, and benthic species
- Participation in regional surveys that may involve many agencies and academic organizations and provides information about the general SCB as well as its bays and estuaries
- Special projects designed to address and answer specific questions about some aspect of the ocean environment

Core Monitoring Program. The details and requirements of the current core PLOO monitoring program are established in Order No. R9-2017-0007, which became effective on October 1, 2017. The City remains committed to maintaining a comprehensive and robust ocean monitoring and reporting program for the San Diego coastal region, and to coordinating with the Regional Board to further improve the program in line with the goals and objectives of the 2012 Regional Board Monitoring Framework and 2021 Regional Board Practical Vision. Thus, only minor modifications are proposed to the existing monitoring program for the Point Loma region, all of which are designed to address the regional perspective included in the Regional Monitoring Framework or to be compatible with monitoring requirements established in the 2021 SBOO discharge permits.[6] Table III.F-1 summarizes minor proposed revisions to the core monitoring program.

Regional Surveys. The City of San Diego has been and will continue to be a full participant in the comprehensive surveys of the SCB that are coordinated by SCCWRP approximately every five years.

Table III.F-1:
Proposed Monitoring Revisions to
Core Monitoring Program Established in Order No. R9-2017-0007[A]

Monitoring Category	Proposed Revision	Purpose of Revision
Offshore water quality monitoring	Add quarterly monitoring for total alkalinity and spectrophotometric pH monitoring at Stations F13, F15 and F35	• To be used to calibrate pH results measured by CTD (conductivity, temperature, depth profiler) and to calculate aragonite saturation state.[B] • Proposed change is consistent with offshore water quality sampling requirements established for the SBOO monitoring program in Order No. R9-2021-0011.
Shore and offshore monitoring	Revise station coordinates to decimal degrees	• GPS devices used by SDPUD to locate monitoring stations operate using decimal degrees (e.g., Latitude 32.739448) as opposed to degrees-minutes-seconds.
Shoreline Station D8	Replace Shoreline Station D8 with Station D8-B	• Station D8-B (32.739448, -117.25499) is safer and more accessible compared to Station D8-A (32.736997, -117.255333).

6 In 2021, the Regional Board established monitoring requirements for the SBOO within Order No. R9-2021-0011 (City of San Diego SBWRP) and Order No. R9-2021-0001 (International Boundary and Water Commission South Bay International Wastewater Treatment Plant).

Monitoring Category	Proposed Revision	Purpose of Revision
Sediment and fish tissue monitoring	Add polybrominated diphenyl ethers (PBDEs or BDEs) to the list of parameters chemically analyzed in sediments and fish tissue	• Similar requirements are established for the SBOO monitoring program within Order No. R9-2021-0011.
California Environmental Data Exchange Network (CEDEN)	Do not include requirement for submission of receiving water data to CEDEN	• The City makes already makes all ocean monitoring data freely available via its website and is willing to continue submitting data via CIWQS. • Submission of data to CEDEN is expensive involves significant staff time to resolve errors. • The usefulness of the CEDEN submitted data is questionable, particularly taxonomic data where species name changes are not accounted for in the CEDEN database.

Table III.F-1 Notes:

A See Appendix K for details.

B SDPUD collected total alkalinity/spectrophotometric pH samples quarterly at PLOO offshore water quality stations F13, F15, and F35 at surface, thermocline and bottom depths from spring 2019 through winter 2020 in conjunction with the SCCWRP Bight '18 Ocean Acidification and Hypoxia Component and has subsequently continued to collect these samples on a voluntary basis.

Special Projects. The adaptive nature of the existing program allows for the inclusion of any special monitoring projects the City chooses to implement to assess treatability, receiving water quality, or other issues. No changes in the NPDES monitoring program are required to accommodate such special monitoring projects; such special projects can be initiated and completed within the scope of the existing program. Upon completion of a project, if it is found necessary to modify the core NPDES program to reflect the results of the project, such proposed changes can be presented to and discussed with regulators at that time.

As documented within Appendix K, the City of San Diego has been actively working on, collaborating with other researchers or agencies, or supporting a large number of important special projects or enhanced ocean monitoring studies over the past two decades. Many of these projects were identified as the result coordination with the Regional Board, EPA, SCCWRP and regional stakeholders. Table III.F-2 presents examples of special projects or enhanced monitoring efforts that have been recently completed or are presently underway.

Table III.F-2: Proposed Monitoring Revisions to Core Monitoring Program Established in Order No. R9-2017-0007[A]

Special Study	Study Description
San Diego Kelp Forest Ecosystem Monitoring Project.	Since 1992, the City has continued to support and fund kelp bed ecosystem research conducted by SIO. The goal of the research is to assess the health of San Diego's kelp forests and monitoring the effects of the PLOO discharge on the local coastal ecosystem relative to other factors. Work on the current 5-year SIO agreement through June 2024 is underway.
Remote Sensing of the San Diego/Tijuana Coastal Region	This project represents a long-term effort funded jointly by the City and U.S. International Boundary and Water Commission since 2002 to utilize satellite and aerial imagery observations to better understand regional water quality conditions off San Diego. The project is conducted by Ocean Imaging (Littleton, CO), and is focused on detecting and tracking the dispersion of wastewater plumes from local ocean outfalls and nearshore sediment plumes originating from stormwater runoff or outflows from local bays and rivers. A summary of findings from the 2014–2020 annual coastal remote sensing reports is included in Appendix F of this application.
Plume Tracking Monitoring Plan (PTMP)	Following up on 2012 plume tracking studies conducted by SIO,[A] this project involves the deployment of RTOMs at the terminal ends of the PLOO and SBOO to provide real-time data on ocean conditions, and the deployment of a ROTV in conjunction with the RTOMS to enhance the collection of water quality data in order to provide higher resolution maps of plume dispersion and location via adaptive sampling. The PTMP is expected to significantly enhance the City's environmental monitoring capabilities in order to address current and emerging issues relevant to the health of San Diego's coastal waters, including plume dispersion, subsurface current patterns, ocean acidification, hypoxia, nutrient sources, and coastal upwelling. Data from the moorings are presented in Appendix D of this application.
Sediment Toxicity Monitoring of the San Diego Ocean Outfall Regions	This project continues a 3-year pilot study implemented as a new joint regulatory requirement for the Point Loma and South Bay outfall regions in 2015. Findings for study were summarized by the City of San Diego (2019) in report that recommended continued sediment toxicity monitoring through 2021. Sediment data collected to date (through 2020) are presented in Appendix C3 of this application. Appendix C3 also presents sediment toxicity results integrated with other lines of evidence following the State of California's sediment quality assessment framework as modified for use in previous Bight programs.[C]
San Diego Regional Benthic Condition Assessment Project	This multi-phase study represents an ongoing, long-term project designed to assess the condition of continental shelf and slope habitats throughout the entire San Diego region. The first phase of this project involved analyzing benthic infauna and sediment particle size data to assess the condition of deeper (>200 m) continental slope habitats off San Diego. Results from this effort are utilized within Appendix C2 of this application to determine reference conditions for the PLOO core monitoring stations.[D] The second phase of this project entails examination of temporal trends in benthic infauna communities from PLOO core monitoring stations. Preliminary results from this effort are presented in Appendix C4 of this application.
San Diego Sediment Mapping Study	This represents a two-phased project conducted in collaboration with SCCWRP in which sampling was conducted in 2004 for Phase 1 and in 2012 for Phase 2. Phase 1 was designed to estimate spatial variance in sediment quality and benthic infauna community condition over an area spanning both the PLOO and SBOO monitoring regions. The goal of Phase 2 was to generate a completed map of sediment chemistry conditions within an area surrounding the PLOO.[E] The City is planning on resuming collaboration with SCCWRP on this effort in the near future.

Table III.F-2 Notes:

A See Appendix K for details.

B Plume tracking studies were developed and implemented pursuant to requirements established within Order No. R9-2009-0001. Results are reported by Rogowski et al. (2012, 2013).

C State Board (2009); Bay et al. (2013); B13CIA (2017).

D Detailed results of the study are presented in Parnell et al. (2021).

E The findings for Phase 1 and the preliminary results from Phase 2 were included as a summary report in Appendix C4 of City of San Diego (2015).

III.F.2 Describe the sampling techniques, schedules, and locations, analytical techniques, quality control and verification procedures to be used.

No changes in the sampling techniques, schedules, locations, analytical techniques, quality control, or verification procedures established in Order No. R9-2017-0007 (NPDES CA0107409) are recommended at this time.

The City of San Diego maintains a rigorous quality control program for sample collection and laboratory analysis. A copy of the City's *Environmental Chemistry Laboratory Quality Assurance Report* has been submitted to EPA and the Regional Board. A copy of the City's current *Quality Assurance Manual for the Ocean Monitoring Program* has also been submitted to EPA and the Regional Board.

The quality assurance reports document sampling methods, preservation techniques, analytical techniques, quality assurance/verification procedures, statistical techniques, and taxonomic procedures. To avoid duplication, these previously submitted documents are not reproduced herein, but are incorporated by reference as part of the City's 301(h) application.

III.F.3 Describe the personnel and financial resources available to implement the monitoring programs upon issuance of a modified permit and to carry it out for the life of the modified permit.

SUMMARY: The City has the available personnel, equipment, and financial resources to carry out the 301(h) monitoring program.

As noted in the response to Question III.F.1, the City proposes maintaining the comprehensive monitoring program established under Order No. R9-2017-0007 (NPDES Permit No. CA0107409).

This comprehensive monitoring program is administered by the City of San Diego's Environmental Monitoring and Technical Services Division. Including administrative support, the program is carried out by a staff of over 110 with an annual budget of over $25 million. Table III.F-3 summarizes FY 2022 program staffing for the monitoring effort. Table III.F-4 summarizes the FY 2022 program budget.

The ocean monitoring section includes a professional staff of over forty, including marine biologists, microbiologists, toxicologists, laboratory technicians, data management specialists, and boat operators.[7] As part of the ocean monitoring program, receiving water, sediment, benthic organisms, and fish are collected by two marine monitoring vessels, the *Monitor III* (42 foot-length) and the *Oceanus* (48 foot-length). The City also maintains extensive chemistry, marine, and microbiological laboratories, and a computer database.

Wastewater influent, effluent, residuals, fish tissue and sediment chemistry analyses are performed by the City of San Diego's Environmental Chemistry Laboratory. The laboratory is currently staffed by over 50 chemists, laboratory technicians, and data base management personnel.

7 As shown in Table III.F-3, this includes personnel from the Marine Biology and Ocean Operations group, Microbiology and Toxicology Laboratories, and Laboratory Data Management and Quality Systems Support group.

The City's laboratories have been certified by the State of California's Environmental Laboratory Accreditation Program (ELAP). Analyses are performed according to approved methods.

Table III.F-3: Summary of Fiscal Year 2022
Staffing Environmental Monitoring and Technical Services Division
Ocean Monitoring Program and Program Support [A,B]

Group	Personnel	Budgeted Staff Positions Fiscal Year 2021-22[A,B]
Division Management [C]	Deputy Director	1
	Program Manager	1
	Total	**2**
Marine Biology and Ocean Operations	Senior Marine Biologist	1
	Marine Biologist III	4
	Marine Biologist II	14
	Senior Boat Operator/Boat Operator	3
	Total	**22**
Microbiology and Toxicology Laboratories	Senior Biologist/Lab Director	1
	Biologist III	2
	Biologist II	9
	Laboratory Technician	5
	Total	**16**
Environmental Chemistry Laboratory	Senior Chemist/Lab Director	1
	Associate Chemist	7
	Assistant Chemist	29
	Laboratory Technician	15
	Support Staff	1
	Total	**53**
Laboratory Data Management and Quality System Support [C]	Senior Chemist/Quality Manager	1
	Associate Chemist	2
	Assistant Chemist	5
	Biologist II	1
	Total	**9**
NPDES Permit Coordination [C]	Biologist III	1
	Assistant Chemist	1
	Biologist II	1
	Total	**3**
Business and Administrative support [C]	Supervising Management Analyst	1
	Associate Management Analyst	2
	Other Clerical Staff	3
	Total	**6**
Program Totals		111

Table III.F-3 Notes:

A Fiscal Year 2022 began July 1, 2021 and ends June 30, 2022.

B Budgeted positions as of January 2022.

C Includes program support positions that assist the ocean monitoring program and laboratories as well as other programs (1) within the Environmental Monitoring and Technical Services Division or (2) elsewhere within the Public Utilities Department.

Additionally, in accordance with requirements established in Order No. R9-2017-0007, regional ocean monitoring efforts are coordinated through SCCWRP in conjunction with EPA, the State Board and Regional Boards from Regions 4, 8 and 9.[8,9] As part of this regional monitoring effort, SDPUD's laboratories have coordinated with SCCWRP in conducting regional program method comparability studies.

Quality assurance procedures for the Environmental Chemistry Laboratory and Ocean Monitoring group (including the marine biology, marine microbiology and toxicology laboratories) are detailed in quality assurance reports that are annually updated, including:

- Environmental Chemistry Services Quality Assurance Activity Report[10]
- Quality Assurance Plan for Coastal Receiving Waters Monitoring[11]
- Annual Receiving Waters Monitoring & Toxicity Testing Quality Assurance Report[12]

These quality assurance reports are incorporated by reference as part of the City's 301(h) application.

Table III.F-4: Summary of Fiscal Year 2022 Budget Environmental Monitoring and Technical Services Division Ocean Monitoring Program and Program Support [A,B]

Category	Fiscal Year 2022 Budget [A,B]
Personnel [C]	$ 16,027,813
Non-Personnel [D]	$ 9,400,538
TOTAL	$ 25,428,351

Table III.F-4 Notes:

A Fiscal Year 2022 began July 1, 2021 and ends June 30, 2022.

B Personnel funding listed is as of January 2022 and include fringe (such as benefits).

C Includes program support positions that assist the ocean monitoring program and laboratories as well as other programs (1) within the Environmental Monitoring and Technical Services Division or (2) elsewhere within the Public Utilities Department.

D Non-personnel expenses include, but are not limited to, equipment, contracts, research support, etc.

8 Regional monitoring requirements for the PLOO that are established within the Monitoring and Reporting Program of Order No. R9-2017-0007 include participation in Southern California Regional Bight Program coordinated by SCCWRP. See Section V.B, Attachment E to Order No. R9-2017-0007.

9 SCCWRP regional monitoring activities are, in part, coordinated in conjunction with EPA, the State Board, and Regional Boards from the Los Angeles Region (Region 4), the Santa Ana Region (Region 8) and the San Diego Region (Region 9).

10 SDPUD, 2020a.

11 SDPUD, 2020b

12 SDPUD, 2020c.

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III.G EFFECTS OF DISCHARGE ON OTHER SOURCES

III.G.1. Does (will) your modified discharge(s) cause additional treatment or control requirements for any other point or nonpoint pollution source(s)?

SUMMARY: No other regional ocean dischargers will be affected by the PLOO discharge.

A number of other point and non-point dischargers exist within the San Diego County region. Near-shore discharges within the United States include storm drain discharges, discharges from natural watercourses, a brine discharge from the Claude "Bud" Lewis Carlsbad Desalination Plant (see Section III.C of this Large Applicant Questionnaire) and aquarium or mammal confinement discharges. Nearshore discharges in Mexican federal waters include a surf zone wastewater discharge from the Tijuana municipal wastewater plant.

As documented in Section II.B and Appendix P, ocean currents off the San Diego coast are predominantly long-shore. Since the PLOO discharge is approximately 7.2 km (4.5 statute miles) offshore, the discharge has virtually no impact on shoreline water quality. Conversely, the nearshore discharges (including storm runoff and storm drains) tend to move upcoast and downcoast within nearshore waters but have little impact on offshore water quality.

While offshore waters (including waters passing through PLOO ZID) tend to remain offshore, sufficient distance exists between PLOO and other regional outfall facilities to ensure that the regional discharges do not impact each other. Table III.G-1 presents a list of existing NPDES dischargers to offshore coastal waters of San Diego County. Table III.G-2 presents a description of outfall discharge facilities. As shown in Table III.G-2, the PLOO discharge is the only deep-water ocean discharge in the region. All other San Diego County outfall discharges are to depths of 37 m (120 ft) or less. The nearest discharge to PLOO is the South Bay Ocean Outfall; the South Bay outfall diffuser is located approximately 18 km (11 miles) southwest of the PLOO diffuser.

Three ocean outfall discharges of treated effluent occur in San Diego County north of the PLOO. The three discharges account for approximately 4.2 m^3/sec (96 mgd) of undisinfected secondary and tertiary wastewater.

**Table III.G-1:
Regional Municipal Wastewater Discharger
Offshore Ocean Outfall Discharges**

Facility	Discharger	Nature of Discharge	NPDES Permit	Permitted Flow [A]
Oceanside Ocean Outfall	City of Oceanside	Secondary and tertiary treated wastewater plus reverse osmosis brine	Order No. R9-2019-0166 [B] NPDES CA0107433	1.00 m^3/sec (22.9 mgd)
	Fallbrook Public Utility District	Tertiary treated wastewater	Order No. R9-2019-0169 NPDES CA0108031	0.12 m^3/sec (2.7 mgd)
	U.S. Marine Corps Base Camp Pendleton	Secondary and tertiary treated wastewater plus reverse osmosis brine	Order No. R9-2019-0167 NPDES CA0109347	0.16 m^3/sec (3.6 mgd)

Facility	Discharger	Nature of Discharge	NPDES Permit	Permitted Flow [A]
Encina Ocean Outfall	Encina Joint Powers Authority	Secondary treated wastewater [C]	Order No. R9-2018-0059 NPDES CA0107395	1.90 m^3/sec (43.3 mgd)
San Elijo Ocean Outfall	City of Escondido	Secondary treated wastewater plus industrial brine [C]	Order No. R9-2018-0002 NPDES CA0107981	0.79 m^3/sec (18.0 mgd)
	San Elijo Joint Powers Authority	Secondary treated wastewater [C]	Order No. R9-2018-0003 NPDES CA0107999	0.23 m^3/sec (5.25 mgd)
IBWC South Bay Ocean Outfall	International Boundary and Water Commission	Secondary treated wastewater	Order No. R9-2021-0001 NPDES CA0108928	1.1 m^3/sec (25 mgd)
	City of San Diego	Secondary treated wastewater and excess tertiary treated water [C]	Order No. R9-2021-0011 NPDES CA0109045	0.66 m^3/sec (15 mgd)

Table III.G-1 Notes:

- A Average daily flow limits imposed by NPDES permits. Actual discharges through the outfalls are typically less than the permitted flows.
- B As amended by Regional Board Order No. R9-2020-0190.
- C The discharge may occasionally contain excess tertiary treated flows or tertiary treated flows that do not meet Title 22 recycled water specifications.

Table III.G-2: Physical Characteristics of Regional Outfall Discharges

Outfall Facility	Distance from PLOO Discharge	Outfall Discharge Depth	Discharge Distance Offshore	Assigned Initial Dilution [A]	Total Permitted Flow [B]
Oceanside Ocean Outfall	60 km north (37 miles)	30 m (100 ft)	2,400 m (8,000 ft)	87	1.27 m^3/sec (29.1 mgd)
Encina Ocean Outfall	50 km north (31 miles)	37 m (120 ft)	2,700 m (9,000 ft)	144	1.90 m^3/sec (43.3 mgd)
San Elijo Ocean Outfall	37 km north (23 miles)	30 m (100 ft)	3,000 m 10,000 ft	237	1.02 m^3/sec (23.25 mgd)
South Bay Ocean Outfall	18 km south (11 miles)	28 m (93 ft)	8700 m (23,600 ft)	94.6	1.1 m^3/sec (25 mgd)

Table III.G-2 Notes:

- A Initial dilution on which NPDES effluent concentration limits are based.
- B Flow limits on outfall discharges are established in NPDES permits issued by the Regional Board.

III.G.2. Provide the determination required by 40 CFR 125.63(b) or, if the determination has not yet been received, a copy of a letter to the appropriate agency(s) requesting the required determination.

The City has submitted a letter to the California Regional Water Quality Control Board, San Diego Region, requesting the determination required by 40 CFR 125.63(b). A copy of the letter is presented in Appendix U.

REFERENCES

Regional Water Quality Control Board, San Diego Region (Regional Board) and U.S. Environmental Protection Agency (EPA). 2017. *Order No. R9-2017-0007, NPDES No. CA0107409, Waste Discharge Requirements and National Pollutant Discharge Elimination System Permit for the City of San Diego E.W. Blom Point Loma Wastewater Treatment Plant Discharge to the Pacific Ocean through the PLOO, San Diego County.*

Regional Water Quality Control Board, San Diego Region (Regional Board). 2018a. *Order No. R9-2018-0002, NPDES No. CA0107981, Waste Discharge Requirements for the City of Escondido Hale Avenue Resource Recovery Facility and Membrane Filtration/Reverse Osmosis Facility Discharge to the Pacific Ocean through the San Elijo Ocean Outfall.*

Regional Water Quality Control Board, San Diego Region (Regional Board). 2018b. *Order No. R9-2018-0003, NPDES No. CA0107999, Waste Discharge Requirements for the San Elijo Joint Powers Authority San Elijo Water Reclamation Facility Discharge to the Pacific Ocean through the San Elijo Ocean Outfall.*

Regional Water Quality Control Board, San Diego Region (Regional Board). 2018c. Order No. R9-2018-0059, NPDES No. CA0107395, Waste Discharge Requirements for the Encina Wastewater Authority Encina Water Pollution Control Facility and Satellite Wastewater Treatment Plants Discharge to the Pacific Ocean through the Encina Ocean Outfall.

Regional Water Quality Control Board, San Diego Region (Regional Board). 2019. *Order No. R9-2019-0167, NPDES No. CA0107347, Waste Discharge Requirements for the Marine Corps Base Camp Pendleton Southern Regional Tertiary Treatment Plant and Advanced Water Treatment Plant at Haybarn Canyon Discharge to the Pacific Ocean through the Oceanside Ocean Outfall.*

Regional Water Quality Control Board, San Diego Region (Regional Board). 2019. *Order No. R9-2019-0169, NPDES No. CA0108031, Waste Discharge Requirements for the Fallbrook Public Utility District Fallbrook Water Reclamation Plant and Santa Margarita Groundwater Treatment Plant Discharge to the Pacific Ocean through the Oceanside Ocean Outfall.*

Regional Water Quality Control Board, San Diego Region (Regional Board). 2020. *Order No. R9-2019-0166 as Amended by Order No. R9-2020-0190, NPDES No. CA0107433, Waste Discharge Requirements for City of Oceanside San Luis Rey Water Reclamation Facility, La Salina Wastewater Treatment Plant and Mission Groundwater Purification Facility Discharge to the Pacific Ocean through the Oceanside Ocean Outfall.*

Regional Water Quality Control Board, San Diego Region (Regional Board). 2021a. *Order No. R9-2021-0001, NPDES No. CA0108928, Waste Discharge Requirements for the United States Section of the International Boundary and Water Commission South Bay International Wastewater Treatment Plant Discharge to the Pacific Ocean through the South Bay Ocean Outfall.*

Regional Water Quality Control Board, San Diego Region (Regional Board). 2021b. *Order No. R9-2021-0011, NPDES No. CA0109045, Waste Discharge Requirements for the City of San Diego South Bay Water Reclamation Plant Discharge to the Pacific Ocean through the South Bay Ocean Outfall.*

III.H TOXICS CONTROL PROGRAM

III.H.1. a. Do you have any known or suspected industrial sources of toxic pollutants or pesticides?

SUMMARY: Yes. The City of San Diego maintains a robust program that identifies known and suspected industrial sources of toxic pollutants. The City's monitoring program assesses all toxic pollutants and pesticides defined in 40 CFR 125.58(aa) and includes sample analyses for both wet weather and dry weather conditions. Pursuant to requirements in Order No. R9-2017-0007, the City collects influent and effluent samples on a weekly basis for metals, cyanide, ammonia, chlorinated pesticides, phenolic compounds and PCBs. Analyses for organophosphate pesticides, dioxin, purgeable (volatile) compounds, base neutral compounds and butyl tins are performed on a monthly basis. As part of the City's Industrial Wastewater Control Program (IWCP), industries that may potentially discharge toxic inorganic or organic constituents to the sewer system are surveyed, discharge permits are issued and enforced, and industrial discharges are monitored. Additionally, the City conducts an annual system-wide nonindustrial toxics survey program to further identify sources of toxic constituents within the Metro System.

Overview of Industrial Wastewater Control Program (IWCP). The IWCP identifies and regulates industrial sewer users throughout the City of San Diego and the 11 other Participating Agencies whose wastewater is treated at the PLWTP. As part of this comprehensive program, the IWCP:

- Maintains and constantly updates a data base of existing and potential industrial dischargers (industrial users, or IUs) that discharge to the Metro System or use or maintain pollutants that could potentially be discharged to the sewer,
- Establishes and annually re-evaluates local limits (local sewer discharge pretreatment standards) to ensure compliance with applicable PLWTP effluent limits, to protect health and safety, and prevent treatment inhibition/interference,
- Monitors the state and federal regulatory process to identify changes in regulations that warrant modification of IWCP practices or operations,
- Classifies dischargers into groups based on federal regulations, industry category, discharge characteristics, onsite pollutants, and potential threat to sewer operations,
- Regulates IUs through issuance, review, and renewal of industrial wastewater discharge permits that include enforceable pollutant limits, implement applicable federal pretreatment standards, implement applicable local limits, impose monitoring provisions, and implement civil and criminal penalties for discharge violations,
- Implements a program for both announced and unannounced inspection of IUs,
- Monitors and enforces pretreatment and source control discharge limits through a multi-level enforcement program that includes, as appropriate, issuance of Notices of Violations (NOVs), issuance of Administrative Orders, levying penalties and fees, revoking permits, implementing civil action, or referral for criminal penalties,

- Implements a monitoring program to characterize wastewater quality at specific IUs and at various locations within the Metro System,
- Maintains a robust record-keeping, scheduling and reporting system to support IWCP implementation and ensure compliance with applicable pretreatment reporting requirements,
- Reviews PLWTP influent/effluent data to assess trends in wastewater quality, and
- Implements, as necessary, special studies to assess pretreatment needs, discharge trends, or to track suspected pollutant discharges.

As part of this, the IWCP identifies Categorical Industrial Users[1] (CIUs) that are subject to technology-based federal categorical pretreatment standards for regulated industrial sectors, and IUs whose discharge flows or pollutant loads warrant classification as a Significant Industrial Users (SIUs). The IWCP also identifies which groups of industries are to be regulated via issuance of a discharge permit, which are to be regulated through enforceable effluent limits, and which are to be regulated through imposition of Best Management Practices (BMPs).

Program to Maintain Inventory of Known or Suspected Pollutant Sources. The IWCP, in part, utilizes the following methods to maintain a complete and current inventory of IUs and to identify new IUs.

- Reviewing IU application requests
- Referrals from the County of San Diego, Department of Environmental Health and Quality, Hazardous Materials Division
- Referrals from the City of San Diego, Development Services Department, Mechanical Plan Check Section
- Referrals from the Public Works Departments of Participating Agencies permit and plan check centers
- Referrals from the City of San Diego Economic Development Department, including applications for business licenses
- Online information, including databases for state-regulated businesses or industries
- Drive-by surveys and online satellite maps
- Information provided through industry contacts, including information on competitors

Appendix M presents the 2020 annual report for the City's IWCP.[2] The 2020 IWCP annual report presents details on how the IWCP identifies and characterizes known sources of toxic pollutants that are discharged (or could potentially be discharged) to the sewer. Additionally, the IWCP annual report:

1 EPA has established industry-specific technology-based categorical standards (expressed as numerical limits or management standards) for 35 industrial sectors. The categorical standards are established within 40 CFR 405 through 40 CFR 471.

2 City of San Diego (2021a), presented as Appendix M herein.

- Describes the structure of the IWCP, including program organization, personnel and operating budget,
- Summarizes the history of the IWCP,
- Presents an overview of the City of San Diego's Household Hazardous Waste (HHW) Program for minimizing the discharge of toxic pollutants into sewers, storm drains and landfills,
- Presents an overview of the City of San Diego's program for diverting low-flow urban runoff and stormwater into the sewer to protect the quality of beaches and coastal waters,
- Describes how the IWCP permits and regulates IUs through the issuance of various classes of sewer discharge permits,
- Identifies SIUs and CIUs, SIU/CIU permit requirements, and changes in SIU/CIU dischargers during the year,
- Identifies all active permits for the various classes of regulated dischargers (including trucked waste dischargers),
- Summarizes IWCP inspection and monitoring requirements and IWCP analytical capabilities,
- Summarizes the IWCP enforcement and compliance program and identifies all enforcement actions taken during the year by type, including publishing the name of industries in Significant Non-Compliance (SNC), issuing NOVs, requiring supplemental monitoring, issuing compliance orders or administrative penalty orders, assessing fees and penalties, revoking permits, or referring cases for criminal or civil court action, and
- Summarizes trends in PLWTP influent and effluent concentrations of toxic constituents.

Known or Suspected Pollutant Sources. As documented in Appendix M, the IWCP classifies IUs into a number of groups based on the type of industry and characteristics of the waste stream. Table III.H-1 summarizes industrial classifications within the IWCP.

Table III.H-1:
Summary of IWCP Permit Classes [A]

IWCP Permit Class	Class Description (see Appendix M for details)
Class 1	Industries subject to Federal Categorical Pretreatment Standards. These users require source control, pretreatment, or both.
Class 2	Class 2 industries have potential toxic discharges at flows greater than 25,000 gallons per day (gpd) but are not regulated under categorical pretreatment standards. Class 2 industrial users may be regulated with numerical limits or Best Management Practices (BMPs). Groundwater remediation projects receive Class 2 permits. Class 2C permits are issued to industries that, in addition to conducting processes subject to federal categorical pretreatment standards that do not discharge to sewer, perform processes which have some toxic constituents in their discharge that are not subject to federal categorical pretreatment standards. Class 2Z permits are issued to facilities that, in addition to conducting processes subject to federal categorical pretreatment standards that do not generate process wastewater, perform processes which have some toxic constituents in their discharge that are not subject to federal categorical pretreatment standards.
Class 3	Class 3 permits are issued to targeted industrial sectors to regulate conventional pollutants. Class 3 permits may implement numeric limits or BMPs. Construction dewatering receive Class 3 permits and are classified as SIUs if discharge flows exceed 25,000 gpd. Class 3C permits regulate facilities that, in addition to conducting processes subject to federal categorical pretreatment standards that do not discharge to sewer, perform processes that discharge process wastewater containing conventional pollutants. Class 3Z permits regulate facilities that, in addition to conducting processes subject to federal categorical pretreatment standards that do not generate process wastewater, perform processes that discharge process wastewater containing conventional pollutants.
Class 4 (No permit required)	Class 4 facilities include industries with sanitary flow only and Class 2 and 3 facilities with flows below permitting thresholds (25 gpd and 2500 gpd respectively). Class 4C facilities have processes subject to federal categorical pretreatment standards that generate process wastewater and have elected to go zero discharge to sewer. Class 4Z facilities have processes subject to federal categorical pretreatment standards that generate no process wastewater are issued Class 4Z letters. Class 4M BMP facilities include dental offices with processes subject to the federal categorical Dental Rule under 40 CFR Part 441.
Class 5 (No permit required)	Class 5 facilities include industries with sanitary flow only and have minimal potential to generate industrial wastewater.
Trucked Waste Permit	Trucked waste permits are issued to trucked waste haulers that authorize the disposal of hauled wastes into the Metro System at designated dumpsites. Domestic hauler permits are issued for domestic septic tank/cesspool, holding tank and portable toilet wastes. Industrial hauling permits are issued for hauling of industrial wastes under generator-specific permits.
Temporary Groundwater Discharge Permits	Temporary Groundwater Discharge Permits are issued for flows resulting from construction dewatering and groundwater remediation projects, where no alternative disposal method is reasonably available and the discharges to not meet requirements for regulation under Class 2 or Class 3.

IWCP Permit Class	Class Description (see Appendix M for details)
Batch Discharge Permits	Batch Discharge Authorizations are for one-time, or short-term non-routine discharges not otherwise covered by a current permit.
Table III.H-1 Notes: A See Section 3 of Appendix M for a complete description of each class of discharger.	

Table III.H-2 summarizes the number of regulated industries and associated industrial flows to the Metro System during calendar year 2020. As shown in Table III.H-2, a total of 36 industries were subject to federal categorical pretreatment standards (CIUs) as of December 31, 2020. Total flows from CIUs average approximately 0.361 mgd, which is approximately one-quarter of one percent of the average annual PLWTP inflow. As documented within Appendix M (see Section 3.8 on page 3), the number of CIUs within the Metro System has declined approximately 50 percent from the 73 CIUs that were discharging in calendar year 2001.

Table III.H-2:
Summary of Metro System CIUs and SIUs [A]

Class	IUs Regulated through Permits	Estimated Flow from IUs (mgd) [B]	Percent of PLWTP Inflow [C]
Class 1 (CIUs) [D]	36	0.361	0.25%
Class 2, 2C, 2D [E,F]	307	3.120	2.16%
Class 3, 3C, 3D [F,G]	54	1.201	0.83%
Trucked wastes	126	0.160 [H]	0.11%
Industrial users regulated through Best Management Practices (BMPs)	913	Not estimated [I]	NA
Total Permits	1,436	4.842	3.36%
Class 4C and 4Z	35	---	---
Class 4 and 5	2,300	---	---

Table III.H-2 Notes:

A See Section 3.11, page 8 of Appendix M for a summary of discharge permits and discharge flows for calendar year 2020.

B Industrial discharge flows are not metered at all facilities. The flows reported here are based on the information available at each industry and include data from meters, calculations, and estimates. See Appendix M. It should be noted that flow estimates for Class 2 and 3 dischargers may be significantly overestimated. The above-listed Class 2 and Class 3 flows include flows from groundwater discharges that are based on the maximum permitted flow rate (in gallons per minute authorized by the permit. Actual daily metered flows from groundwater dischargers may be substantially less than the maximum flow rates authorized in the respective groundwater discharge permits.

C Percent of PLWTP flow based on calendar year PLWTP average annual flow of 144.3 mgd.

D CIUs are Categorical Industrial Users subject to federal categorical pretreatment standards established in 40 CFR Sections 405 through 471.

E Includes three dischargers regulated as Class 2C dischargers and three dischargers regulated as Class 2.

F	Includes 24 groundwater dischargers regulated as Class 2 (remediation) or Class 3 (construction dewatering) dischargers. Groundwater dischargers include both SIUs and slug dischargers.
G	No Class 3C or Class 3Z discharger were in operation in the Metro System during calendar year 2020.
H	Total of 58.398 million gallons of trucked waste were discharged into the Metro System during 2020. This includes 22.700 million gallons of domestic wastewater and 35.698 million gallons of industrial flows. The trucked industrial flows included 24,800 gallons of treated grease trap wastewater and 3.161 million gallons of sludge and high strength wastewater from treatment facilities and landfills. Average daily trucked waste flows shown above are computed on the basis of total annual trucked flows a 366-day year for calendar year 2020. See pages 66-67 of Appendix M for a monthly breakdown of trucked waste flows.
I	Flows from BMP industries are not metered or estimated.

As shown in Table III.H-2, nearly 400 Class 1, 2 and 3 industrial users (IUs) are regulated within the Metro System. As of December 31, 2020, a total of 38 of the Class 2 and Class 3 industries were regulated as SIUs, as defined under 40 CFR 403.3. Flows from non-categorical SIUs represent a significant majority of all Metro System industrial flows. Total potential flows from all industrial users to the Metro System during 2020 is estimated at 4.8 mgd, which is constitutes approximately 3.4 percent of the PLWTP inflow.[3]

A significant majority of the permitted IUs within the Metro System are smaller dischargers that are regulated through the issuance of BMP Discharge Authorizations. Food processing industries, auto/equipment washing, maintenance, and repair facilities, laundries and sanitary services, laboratories, and groundwater dischargers compose the majority of the regulated dischargers.

Update on Regulation of Dental Facilities. Subsequent to the adoption of Order No. R9-2017-0007[4] (NPDES CA0107409), the City has developed and implemented a program to regulate dental offices in accordance with the federal categorical "Dental Rule" that was established in 2017 within 40 CFR 441. In accordance with this 2017 rule, dental offices that place or remove amalgam must operate under BMPs to maintain an amalgam separator and not discharge scrap amalgam or use certain kinds of line cleaners. These dental offices must also submit a one-time compliance report acknowledging they have implemented and are in compliance with the BMPs.

To implement this dental program, the IWCP created discharger inventory and survey forms for dental facilities, and the initial round of dental amalgam BMP surveys were distributed to over 600 facilities in 2018. The IWCP subsequently solicited and collected Dental Rule one-time compliance reports from approximately 550 of these dental offices and has initiated enforcement actions for noncompliance against remaining facilities.

3 This potential 4.8 mgd flow is based on the assumption that flows discharged to the sewer by permitted groundwater dischargers are at the maximum flow allowed within their respective permits. Actual groundwater discharge flows are likely to be less than the maximum permitted flows.

4 Order No. R9-2017-0007 (Regional Board, 2017) became effective on October 1, 2017.

III.H.1 b. If no, provide the certification required by 40 CFR 125.66(a)(2) for small dischargers, and required by 40 CFR 125.66(c)(2) for large dischargers.

The question is not applicable. Industrial sources of toxic pollutants exist within the Metro System service area, as documented herein and within Appendices M and N of this NPDES application.

III.H.1 c. Provide the results of wet and dry weather effluent analyses for toxic pollutants and pesticides as required by 40 CFR 125.66(a)(1).

SUMMARY: 40 CFR 125.66(a)(1) requires that toxic pollutants and pesticides be characterized through 24-hour composite sampling for least one wet-weather event and one dry weather event. The City maintains a comprehensive monitoring program to characterize both influent and effluent samples from the PLWTP. During the course of each year, a number of these samples are collected during dry weather days and some samples are collected during days on which precipitation occurs. To comply with 40 CFR 125.66(a)(1), PLWTP effluent and influent analyses during calendar year 2020 are presented for both wet weather and dry weather conditions.

Through its comprehensive monitoring program, the City of San Diego routinely analyzes the PLWTP influent and effluent for toxic compounds. Influent and effluent samples are collected and analyzed on a weekly basis for metals, cyanide, ammonia, chlorinated pesticides, phenolic compounds, and PCBs. Organophosphorus pesticides, dioxin, purgeable (volatile) compounds, acrolein and acrylonitrile, base/neutral compounds, and tri-, di-, and monobutyltins are monitored on a monthly basis.

PLWTP influent and effluent data have previously been presented in monthly, quarterly, and annual reports submitted to the Regional Board and the EPA via the CIWQS. This 301(h) application focuses on data for calendar year 2020, which is the last calendar year for which a complete twelve months of data is available. Data for calendar year 2021 will be electronically transmitted to regulators when available pursuant to reporting requirements established in Order No. R9-2017-0007.

Toxic Inorganic Constituents in the PLWTP Effluent. The results of the 2020 PLWTP effluent analyses for wet and dry weather conditions were summarized in the response to Question II.A.4. Table II.A-14 (see Section II.A.4.b of this Large Applicant Questionnaire) presents calendar year 2020 PLWTP effluent concentrations during wet and dry weather conditions.

Toxic Inorganic Constituents in the PLWTP Influent. PLWTP influent data are also useful for assessing industrial and non-industrial discharges to the Metro System. Table III.H-3 presents concentrations of toxic inorganic constituents (e.g., metals and cyanide) detected in the PLWTP influent during wet-weather sample days of 2020. Wet weather statistics were computed on the basis of samples collected during days within calendar year 2020 where precipitation was observed (see Table II.A-10 for a list of precipitation events during calendar year 2020). For comparison, Table III.H-4 presents concentrations of toxic inorganic constituents during dry-weather sample days during 2020.

Table III.H-3:
Summary of Metals and Cyanide in Wet Weather Conditions [A]
PLWTP Influent - Calendar Year 2020

Toxic Inorganic Constituent	Maximum MDL [B] (µg/L)	Number of. Wet Weather Samples [C]	Number of Wet Weather Samples with Concentration < MDL [D]	PLWTP Influent Concentration During Wet Weather Days (µg/L) [C]			
				Highest Daily Wet Weather Value [E]	Lowest Daily Wet Weather Value [F]	Average Daily Wet Weather Value [G]	Median Daily Wet Weather Value[H]
Antimony	2.43	12	6	3.02	0.00	0.98	0.61
Arsenic	3.21	12	9	2.20	ND[I]	0.51	ND[I]
Barium	0.095	12	0	96.9	55.9	77.4	75.4
Beryllium	0.4	12	12	ND[I]	ND[I]	ND[I]	ND[I]
Cadmium	0.484	12	9	0.32	ND[I]	0.07	ND[I]
Chromium, total	7.17	12	1	8.77	ND[I]	6.48	6.88
Cobalt	0.618	12	0	1.74	0.85	1.34	1.29
Copper	9.37	12	0	137	85	101	94
Lead	5.93	12	4	5.42	ND[I]	2.29	2.19
Lithium	0.003	12	0	43	27	34	35
Mercury	0.005	12	0	0.103	0.054	0.078	0.078
Molybdenum	0.742	12	0	10.8	6.15	7.55	7.31
Nickel	3.35	12	0	10.6	5.98	7.34	7.21
Selenium	5.78	12	9	2.3	ND[I]	0.53	ND[I]
Silver	1.57	12	9	0.62	ND[I]	0.12	ND[I]
Thallium	3.37	12	12	ND[I]	ND[I]	ND[I]	ND[I]
Vanadium	1.09	12	0	10.70	4.45	5.80	5.52
Zinc	10.4	12	0	232	148	192	191
Cyanide	4.0	12	12	ND[I]	ND[I]	ND[I]	ND[I]

Table III.H-3 Notes:

A From PLWTP monthly monitoring reports submitted to the Regional Board via CIWQS for calendar year 2020, which is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators under separate cover when available per requirements of Order No. R9-2017-0007. Data presented above is for days during 2020 in which quantifiable amounts of precipitation occurred. See Section II.A.4.b of this questionnaire (Table II.A-10) for a list of wet weather days during 2020.

B Maximum (highest) MDL achieved during calendar year 2020 for the listed constituent.

C A total of 12 PLWTP influent samples during 2020 were collected on wet weather days.

D Number of wet weather samples collected during 2020 that had detectable concentrations of the listed constituent.

E Maximum sample value during calendar year 2020 on days when quantifiable amounts of precipitation were reported.

F Minimum sample value during calendar year 2020 on days when quantifiable amounts of precipitation were reported.

G Arithmetic average of individual daily samples collected during 2020. For purposes of averaging, non-detected (ND) samples were assumed to have a concentration of zero and DNQ samples were presumed to have a concentration equal to the DNQ value.

H Median (50th percentile) value during calendar 2020 among the samples collected on wet weather days.

I ND indicates the sample was not detected at the referenced MDL.

Table III.H-4:
Summary of Metals and Cyanide in Dry Weather Conditions [A]
PLWTP Influent - Calendar Year 2020

Toxic Inorganic Constituent	Maximum MDL [B] (µg/L)	Number of. Dry Weather Samples [C]	Number of Dry Weather Samples with Concentration < MDL [D]	PLWTP Influent Concentration During Dry Weather Days (µg/L) [C]			
				Highest Daily Dry Weather Value [E]	Lowest Daily Dry Weather Value [F]	Average Daily Dry Weather Value [G]	Median Daily Dry Weather Value[H]
Antimony	2.43	41	13	4.33	ND[I]	1.05	1.17
Arsenic	3.21	41	18	3.24	ND[I]	1.21	1.80
Barium	0.095	41	0	107	58	83.8	85.7
Beryllium	0.4	41	41	ND[I]	ND[I]	ND[I]	ND[I]
Cadmium	0.484	41	16	1.61	ND[I]	0.23	0.29
Chromium, total	7.17	41	2	12.2	ND[I]	7.25	7.29
Cobalt	0.618	41	0	1.76	0.77	1.16	1.01
Copper	9.37	41	0	334	83	113	107
Lead	5.93	41	7	10.6	ND[I]	3.10	3.07
Lithium	0.003	41	0	57	23	36	36
Mercury	0.005	41	0	0.571	0.004	0.104	0.081
Molybdenum	0.742	41	0	12.7	5.91	8.11	7.99
Nickel	3.35	41	0	10.4	5.55	7.64	7.42
Selenium	5.78	41	0	2.95	ND[I]	1.13	1.12
Silver	1.57	41	18	0.88	ND[I]	0.30	0.36
Thallium	3.37	41	41	ND[I]	ND[I]	ND[I]	ND[I]
Vanadium	1.09	41	0	8.85	3.78	4.87	4.62
Zinc	10.4	41	0	244	149	188	188
Cyanide	4.0	41	41	ND[I]	ND[I]	ND[I]	ND[I]

Table III.H-4 Notes:

A From PLWTP monthly monitoring reports (SDPUD, 2020) submitted to the Regional Board via CIWQS for calendar year 2020, which is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators at a later date per reporting requirements of Order No. R9-2017-0007. Data presented above are for days during 2020 in which no quantifiable amounts of precipitation occurred. See Section II.A.4.b of this questionnaire (Table II.A-10) for a list of wet weather days during 2020.

B Maximum (highest MDL achieved during calendar year 2020 for the listed constituent.

C A total of 41 PLWTP influent samples during 2020 were collected on days with no reportable precipitation.

D Number of dry weather samples collected during 2020 that had detectable concentrations of the listed constituent.

E Maximum sample value during calendar year 2020 on days when no quantifiable precipitation was reported.

F Minimum sample value during calendar year 2020 on days when no quantifiable precipitation was reported.

G Arithmetic average of individual daily samples collected during 2020. For purposes of averaging, non-detected (ND) samples were assumed to have a concentration of zero and DNQ samples were presumed to have a concentration equal to the DNQ value.

H Median (50th percentile) value during calendar 2020 among the samples collected on days with no reportable precipitation.

I ND indicates the sample was not detected at the referenced MDL.

It should be noted that the statistics of the wet- and dry-weather sampling may be skewed by an occasional abnormal influent value and the fact that significantly more dry-weather data are available than wet-weather data. No marked differences or trends, however, are evident in comparing the wet- and dry-weather PLWTP influent concentrations.

Toxic Organic Constituents in the PLWTP Effluent. PLWTP effluent concentrations for toxic organic constituents are summarized in the response to Question II.A.4. As required within Section II.A.4, Tables II.A-16 through II.A-28 present the results of PLWTP effluent monitoring for toxic organic compounds.

Toxic Organic Constituents in the PLWTP Influent. For comparison, Table III.H-5 presents toxic organic constituents that were detected in the PLWTP influent during 2020. As shown in Table III.H-5, volatile organic compounds commonly occurring in the PLWTP influent include chloroform, methylene chloride and toluene. Base neutral compounds typically occurring in the PLWTP influent include bis(2-ethylhexyl) phthalate and diethyl phthalate. No chlorinated pesticides or PCBs were typically found in the PLWTP influent, but the organophosphorus pesticide pyridine was detected in the PLWTP influent in the majority of the 2020 PLWTP influent samples.

As presented within the response to Question II.A.4, a number of halogenated or brominated compounds are formed in the Point Loma effluent as a result of PLWTP effluent chlorination and dechlorination, including:

- Bromodichloromethane (dichlorobromomethane)
- Bromomethane (methyl bromide)
- Chloroethane (ethyl chloride)
- Chloroform
- Chloromethane (methyl chloride)
- Chlorodibromomethane (dibromochloromethane)
- Methylene chloride (dichloromethane)

As shown in Table III.H-5, however, of these halogenated and brominated compounds, only chloroform and methylene chloride are commonly found in the PLWTP influent and neither of these compounds appear related to industrial sources.

Table III.H-6 presents concentrations of toxic organic constituents detected in the PLWTP influent during wet-weather sample days of 2020. Wet weather statistics were computed on the basis of PLWTP influent samples collected during days within calendar year 2020 where precipitation was observed. Table III.H-7 presents concentrations of toxic inorganic constituents in the PLWTP influent during dry-weather sample days during 2020.

Table III.H-5: Summary of Detected Toxic Organic Pollutants in the PLWTP Influent, 2020 [A]

Category	Toxic Organic Pollutant	Total Number of 2020 PLWTP Influent Samples [B]	Number of Influent Samples with Detectable Concentrations [C]	Number of Influent Samples with Quantifiable Concentrations [D]
Volatile Organic Compounds	Bromoform	12	1	0
	Bromodichloromethane	12	1	0
	Chloroform	12	12	6
	Chlorodibromomethane	12	1	0
	Bromodichloromethane	12	1	0
	Ethylbenzene	12	3	0
	Methylene chloride	12	10	0
	Toluene	12	12	1
	All other monitored volatile organics	12	0	0
Acid Extractable Compounds	2,4,6-trichlorophenol	53	1	0
	4-methylphenol	53	53	53
	Phenol	53	53	53
	All other monitored acid extractables	53	0	0
Base Neutral Compounds	2-methyl naphthalene	12	1	1
	Bis(2-ethylhexyl) phthalate	12	12	12
	Diethyl phthalate	12	11	11
	All other monitored base neutrals	12	0	0
Pesticides and PCBs	2,4-DDD	53	1	0
	4,4' DDD	53	1	0
	Gamma BHC	53	1	1
	All other pesticides and PCBs	53	0	0
Organophosphorus Pesticides and Herbicides	Malathion	12	2	2
	All other monitored compounds	12	0	0

Table III.H-5 Notes:

A From PLWTP monthly monitoring reports (SDPUD, 2020) submitted to the Regional Board via CIWQS for calendar year 2020, which is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators when available per reporting requirements of Order No. R9-2017-0007. See Section II.A.4 for a summary of PLWTP effluent concentrations.

B Total number of PLWTP influent samples collected during 2020.

C Number of PLWTP influent samples during 2020 in which concentrations were detected above the MDL.

D Number of PLWTP influent samples during 2020 in which concentrations were detected above the Reporting Limit (RL). Does not include samples with concentrations reported as DNQ.

Table III.H-6: Summary of Toxic Organic Pollutants in Wet Weather Conditions [A] PLWTP Influent - Calendar Year 2020

Toxic Inorganic Pollutant	MDL[B] (µg/L)	Number of. Wet Weather Samples [C]	Number of Wet Weather Samples with Concentration < MDL [D]	PLWTP Influent Concentration During Wet Weather Days (µg/L)			
				Maximum Wet Weather Value [E]	Minimum Wet Weather Value [F]	Mean Wet Weather Value [G]	Median Wet Weather Value [H]
Volatile Organic Compounds							
Chloroform	0.299 - 0.466	4	4	2.36	1.18 DNQ[I]	1.73J [J]	1.70 [J]
Methylene chloride	0.283 - 0.563	4	4	0.718 DNQ[I]	ND[K]	0.67 [J]	0.67 [J]
Toluene	0.241 - 0.245	4	4	2.03	0.66 DNQ[I]	1.09 [J]	0.85 [J]
All other monitored volatile organic compounds	---	4	0	ND[K]	ND[K]	ND[K]	ND[K]
Acid Extractable Compounds							
4-methylphenol	0.0733 - 0.398	12	12	82.9	51.4	67.3	69.8
Phenol	0.44 - 1.9	12	12	55.5	31.3	45.9	47.9
All other monitored acid-extractable compounds	---	12	0	ND[K]	ND[K]	ND[K]	ND[K]
Base Neutral Compounds							
Bis(2-ethylhexyl) phthalate	2.46 - 3.52	4	4	13	7.25	9.7	9.2
Diethyl phthalate	0.301 - 1.55	4	4	3.13	2.10	2.68	2.75
All other monitored base neutral compounds	---	4	0	ND[K]	ND[K]	ND[K]	ND[K]
Chlorinated Pesticides and PCBs							
All other monitored chlorinated pesticides and PCBs [L]	---	4	0	ND[K]	ND[K]	ND[K]	ND[K]

Table III.H-6 Notes:

- A From PLWTP monthly monitoring reports (SDPUD, 2020) submitted to the Regional Board via CIWQS for calendar year 2020, which is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators under separate cover when available per requirements of Order No. R9-2017-0007. Data presented above are for days during 2020 in which quantifiable amounts of precipitation occurred. See Table II.A-10 for a list of wet weather days during 2020.
- B The range (maximum and minimum) of MDLs achieved during calendar year 2020 for the listed constituent.
- C A total of 12 PLWTP influent samples during 2020 were collected on wet weather days.
- D Number of wet weather samples collected during 2020 that had detectable concentrations of the listed constituent.
- E Maximum sample value during calendar year 2020 on days when quantifiable amounts of precipitation were reported.
- F Minimum sample value during calendar year 2020 on days when quantifiable amounts of precipitation were reported.
- G Arithmetic average of individual daily samples collected during 2020. For purposes of averaging, non-detected (ND) samples were assumed to have one-half the concentration of the referenced MDL. The above calendar year 2020 averages may differ from those reported in the 2020 Point Loma annual report, which were computed assuming a concentration of zero for non-detected samples.
- H Median (50^{th} percentile) value during calendar 2020 among the samples collected on wet weather days.
- I Values shown are detected not quantifiable (DNQ) where the concentration was detected above the MDL but below the Reporting Limit (RL).
- J Mean and median values computed using both quantifiable sample results (e.g., concentrations above the RL) and DNQ values.
- K ND indicates that the minimum value was not detected (e.g., concentration below the MDL).
- L No chlorinated pesticides were detected above the RL in 2020.

Table III.H-7: Summary of Toxic Organic Pollutants in Dry Weather Conditions [A]
PLWTP Influent - Calendar Year 2020

Toxic Inorganic Pollutant	MDL [B] (µg/L)	Number of. Dry Weather Samples [C]	Number of Dry Weather Samples with Concentration < MDL [D]	PLWTP Influent Concentration During Dry Weather Days (µg/L) [C]			
				Maximum Dry Weather Value [E]	Minimum Dry Weather Value [F]	Mean Dry Weather Value [G]	Median Dry Weather Value [H]
Volatile Organic Compounds							
Chloroform	0.299 - 0.466	8	8	2.71	1.15 DNQ[I]	1.89 [J]	2.01 [J]
Methylene chloride	0.283 - 0.563	8	6	0.78 DNQ[I]	0.506 DNQ[I]	0.63 [J]	0.60 [J]
Toluene	0.241 - 0.245	8	8	0.93 DNQ[I]	0.465 DNQ[I]	0.70 [J]	0.68 [J]
All other monitored volatile organic compounds	---	8	0	ND[K]	ND[K]	ND[K]	ND[K]
Acid Extractable Compounds							
4-methylphenol	0.0733 - 0.398	41	41	90.6	34.9	65.4	66.1
Phenol	0.44 - 1.9	41	41	77	23.7	47.9	47.9
All other monitored acid-extractable compounds	---	41	0	ND[K]	ND[K]	ND[K]	ND[K]
Base Neutral Compounds							
Bis(2-ethylhexyl) phthalate	2.46 - 3.52	8	8	21.3	7.4	11.5	9.2
Diethyl phthalate	0.461 - 9.37	9	8	3.10	ND[K]	2.71	2.88
All other monitored base neutral compounds	---	8	0	ND[K]	ND[K]	ND[K]	ND[K]
Chlorinated Pesticides and PCBs							
All other monitored chlorinated pesticides and PCBs [L]	---	4	0	ND[K]	ND[K]	ND[K]	ND[K]

Table III.H-7 Notes:

A From PLWTP monthly monitoring reports (SDPUD, 2020) submitted to the Regional Board via CIWQS for calendar year 2020, which is the most recent year for which a complete 12-month data set is available. Data for calendar year 2021 will be electronically transmitted to regulators when available per requirements of Order No. R9-2017-0007. Data presented above are for days during 2020 in which no quantifiable amounts of precipitation occurred.

B The range (maximum and minimum) of MDLs achieved during calendar year 2020 for the listed constituent.

C Number of PLWTP influent samples during 2020 that were collected on days when no quantifiable amount of precipitation occurred.

D Number of dry weather samples collected during 2020 on days where no quantifiable precipitation occurred.

E Maximum sample value during calendar year 2020 on days when no quantifiable precipitation occurred.

F Minimum sample value during calendar year 2020 on days when no quantifiable precipitation occurred.

G Arithmetic average of individual daily samples collected during 2020. For purposes of averaging, non-detected (ND) samples were assumed to have one-half the concentration of the referenced MDL. The above calendar year 2020 averages may differ from those reported in the 2020 Point Loma annual report, which were computed assuming a concentration of zero for non-detected samples.

H Median (50th percentile) value during calendar 2020 among the samples collected on days when no quantifiable precipitation occurred.

I Values were above the MDL but below the Reporting Limit, and are reported as DNQ (detected not quantifiable).

J Mean and median values computed using both quantifiable sample results (e.g., concentrations above the RL) and DNQ values.

K ND indicates that the minimum value was not detected (e.g., concentration below the MDL).

L No chlorinated pesticides were detected above the reportable limit in 2020.

III.H.1 d. Provide an analysis of known or suspected industrial sources of toxic pollutants and pesticides identified in (1)(c) above in accordance with 40 CFR 125.66(b).

SUMMARY: As part of the IWCP, industries that may potentially discharge toxic organic or inorganic constituents to the sewer system are surveyed, discharge permits are issued, and industrial discharges are monitored. Known or suspected toxic pollutants and pesticides that may originate from industrial sources are identified through this approach.

The City's 2020 IWCP annual report (presented as Appendix M) summarizes industrial users and known or suspected sources of toxic pollutants during calendar year 2020. Appendix M (see pages 41-75 of Chapter 4) also identifies specific toxic organic and inorganic constituents monitored during 2020 and the number of samples collected, including sampling conducted by the IWCP and discharger self-monitoring required by the IWCP.

As documented within Appendix M (see Section 1.2 "Program Effectiveness"), combined metal loadings from Metro System IUs have decreased by more than an order of magnitude during the past 30 years. This reduction has translated to a significant decrease in the PLWTP influent metal loads; PLWTP influent metal loads have been reduced by over 85 percent during the past 30 years. As documented within this 301(h) application, the City has achieved 100 percent compliance with applicable water quality-based concentration limitations for toxic pollutants and pesticides during the effective period of Order No. R9-2017-0007 (NPDES CA0107409).

The City annually reevaluates local limits to ensure protection of Metro System facilities and operators, ensure compliance with NPDES discharge limits, and ensure compliance with applicable biosolids requirements. As part of the City's 2020 annual local limits re-evaluation, the City reviewed industrial and nonindustrial sources of pollutants and pollutant loads and reassessed pollutant load allocations among regulated dischargers.[5]

As shown in Tables III.H-3 through III.H-7, concentrations of toxic constituents in the PLWTP influent were typically not detected (e.g., concentrations were below the applicable MDL) for most constituents. Concentrations were typically low for the few toxic organic compounds that were detected in the PLWTP influent, sometimes below quantifiable reporting limits. The PLWTP monitoring, combined with industry-specific monitoring conducted by the IWCP and discharger self-monitoring, demonstrates the limited IU contributions of toxic constituents within the PLWTP influent. Table III.H-8 presents a general summary of identified or suspected sources for toxic inorganic constituents detected within the PLWTP influent. This general summary is based on information from IWCP industrial surveys, permits, inspections, IWCP monitoring, and discharger self-monitoring reports.

5 City of San Diego (2021b), presented as Appendix N herein.

Table III.H-8: Summary of Sources of PLWTP Pollutants of Concern

Constituent	Contribution by Categorical Industries?	Contribution by Non-categorical Industrial or Commercial Facilities?	Industrial or Nonindustrial Sources [A]
Antimony	Yes	No [B]	No known significant industrial sources
Arsenic	No	No [B]	Pest control poisons, no known significant industrial sources
Barium	Yes	Yes	Radiography
Beryllium	No	No [B]	No known significant industrial sources
Cadmium	Yes	Yes	Metal plating, metalworking and metal alloys, electronics and batteries
Chromium	Yes	Yes	Metal plating, shipbuilding, metalworking and metal alloys
Cobalt	No	Yes	Aerospace metalworking; turbine/rotor manufacturing
Copper	Yes	Yes	Metal plating, working, electronics, tool manufacturing, electroplating, semiconductor manufacturing, shipbuilding, metalworking, water pipe corrosion
Lead	Yes	Yes	Metal plating; metalworking, paints, batteries
Lithium	No	No [B]	No known significant industrial sources
Mercury	No	Yes	Orthodontics, thermostats, thermometers
Molybdenum	Yes	Yes	Aerospace metalworking, turbine/rotor manufacturing, semiconductor manufacturing
Nickel	Yes	Yes	Metal plating, metalworking and metal alloys
Selenium	No	Yes	Water supply
Silver	No	Yes	Photo processing
Thallium	No	Yes	Pest control poisons, photodetectors, nuclear imaging
Vanadium	No	Yes	Aerospace manufacturing; rotor/turbine manufacturing
Zinc	Yes	Yes	Metal working, electronics, tool manufacturing, electroplating, circuit printing, shipbuilding, metalworking, research institutions, water pipe corrosion
Cyanide	Yes	Yes	Electroplating, electronics and semiconductor manufacturing, pharmaceuticals

Table III.H-8 Notes:

A From information presented in the City's 1998 *Urban Area Pretreatment Program*, annual local limits evaluations conducted subsequent to 1998, and historical Metro System industrial user surveys and monitoring.

B No known significant industrial sources.

Table III.H-9 presents a summary of identified or suspected sources for organic toxic constituents found in the PLWTP influent. As shown in the table, household, commercial, and industrial sources can all potentially contribute to the PLWTP influent loads for these constituents.

Table III.H-9:
Summary of Sources of PLWTP Pollutants of Concern

Constituent	Potential Source		Common Uses [A]
	Industrial Sources	Household or Commercial	
Chloroform	✓	✓	Laboratory solvent, pharmaceuticals, cleaning agents, electronics degreasing
Methylene chloride	✓	✓	Paint strippers, metal degreasers, electronics cleaners, refrigerant, laboratory solvent
Acetone	✓	✓	Household and industrial solvent and degreaser, personal care products (e.g., cosmetics and nail polish removers)
EHP	✓	✓	Plasticizer used in PVC plumbing and a variety of household and industrial plastics products, including storage bags
2-butanone	✓	✓	Paints, coatings, and adhesives
1,4-dichloromethane	✓	✓	Disinfectants, disinfecting deodorizers, mothballs, disinfecting cleansers
diethyl phthalate	✓	✓	Solvents, glues/adhesives, paints, photo processing
Ethylbenzene	✓	✓	Styrene, plastics and solvents, plastic wrap
Malathion	✓	✓	Manufactured insecticide used in household, commercial, industrial, and agricultural applications.
MTBE	✓	✓	Fuel additive (oxygenating compound)
Phenolic compounds	✓	✓	Constituent of medical and household disinfectants and pharmaceuticals, laboratory solvent, electronics cleaner, constituent of paints, inks, & photo supplies
Toluene	✓	✓	Solvent-based paint and inks, laboratories, electronics cleaner, metal degreaser, paint stripper, photo supplies, antifreeze

Table III.H-9 Notes:

A From information presented in the City's 1998 *Urban Area Pretreatment Program*, annual local limits evaluations conducted subsequent to 1998, and historical Metro System industrial user surveys and monitoring.

III.H.2. Provide a schedule for development and implementation of a nonindustrial toxics control program to meet the requirements of 40 CFR 125.66(d)(3).

SUMMARY: The question is not applicable, as the City already implements a nonindustrial toxics control program that meets the requirements of 40 CFR 125.66(d)(3). The City of San Diego has implemented a program for the identification and control of toxic pollutants from nonindustrial pollutants for nearly 40 years. The program features a wide range of components directed toward identifying and minimizing (or eliminating) the discharges of toxic constituents to the sewer system from nonindustrial contaminant sources.

Overview of Existing Nonindustrial Toxics Control Program. 40 CFR 125.66(d)(3) requires 301(h) applicants to implement a nonindustrial toxics control program no later than 18 months after issuance of a 301(h) modified NPDES permit. This program is to include:

- A system for identifying nonindustrial sources of toxic pollutants and pesticides
- The development and implementation of a control program, to the extent practicable, for nonindustrial sources of toxic pollutants and pesticides

Since 1982, the City of San Diego has maintained a nonindustrial control program aimed at reducing the introduction of nonindustrial toxic pollutants into the sewer system. Key elements of this program include:

- The Household Hazardous Waste (HHW) Program
- A public education program
- Development and implementation of IU discharge permits and/or BMP Discharge Authorization requirements for select commercial sectors
- Ongoing surveys to identify contaminant sources
- Monitoring to assess program performance

A summary of the City's HHW Program, education program, permit program, BMPs, and surveys are presented in Appendix M.

HHW Program Goals and Objectives. The primary goal of the City's HHW Program is to improve the quality of life in the City of San Diego. The primary focus of the City's strategies is to reduce the amount of HHW generated and to encourage proper disposal of HHW, thereby eliminating illegal and dangerous disposal practices. Overall goals of the program include:

- Educate the residents of San Diego about HHWs. Provide information enabling residents to select and use products in ways that minimize the generation of HHWs. Provide information on appropriate methods of storage and disposal,
- Provide appropriate and convenient HHW collection and disposal opportunities for all City of San Diego residents, and
- Encourage and facilitate the reuse and recycling of HHWs, when feasible.

Objectives of the HHW Program include:

- Continue an active public education program to create a high level of public awareness of the proper storage and disposal of HHW and to encourage source reduction measures (such as the use of alternative household products that are less hazardous and purchasing only the quantity needed),
- Maintain HHW Program outreach at community activities with presentations, booths and information distribution sites,
- Maintain public-private partnerships to enhance community and education outreach and maximize impact of outreach dollars,
- Continue sponsorship of HHW collection services, and increase the number of participants using these services,
- Determine the optimum combination of permanent HHW facilities, and one-day HHW collection events to best serve the needs of City residents, and initiate projects to implement such a system,
- Maintain a permanent HHW collection facility adjacent to the entrance to the Miramar Landfill to create convenient HHW drop-off alternatives for residents, and
- Continue cooperation with privately-operated used oil and vehicle battery collection facilities that provide drop-off services for residents disposing of these HHWs. Provide information through city website of these sites to increase public awareness and use of these drop-off facilities.

The HHW is jointly implemented by the City of San Diego Environmental Services and Public Utilities Departments and is designed to reduce the introduction of pollutants from non-point sources into sewers, storm drains and municipal landfills. The City's permanent household hazardous waste collection facility near the Miramar Landfill is open to City of San Diego residents on Saturdays excluding major holidays (such as Thanksgiving and Christmas weekends); an appointment and proof of residency is required. The City's program also sponsors a number of recycling events each year.

Metro System member agencies also conduct separate HHW programs within their respective areas. As part of these programs, each Metro System member agency implements strategies for handling household hazardous wastes originating within its respective jurisdiction.[6]

Public Outreach Effort. The City's public education and outreach elements are important components of the Metro System non-industrial toxic pollutant reduction strategy. The response to Question III.H.3 summarizes the public education and outreach efforts implemented by the City of San Diego and by Metro System member agencies.

Pollution Reduction Strategies for Commercial Sources. The City's IWCP continues to regulate discharges from laboratories, automotive and radiator shops, boatyards and shipyards, and engine repair/cleaning operations. The City has implemented a sector specific BMP program for dental offices with processes subject to the federal categorical Dental Rule.

6 See Chapter 2, Table 2.5-1 of Appendix M for household hazardous waste services by Metro System member agencies.

Contaminant Source Surveys. A final element of the City's source control program is the City's quarterly collection system monitoring program which:

- Identifies pollutants discharged into the collection system.
- Determines the sources of the pollutants.

The collected pollutant discharge information is used to identify opportunities for pollutant reduction, and to develop effective pollutant reduction strategies.

III.H.3. Describe the public education program you propose to minimize the entrance of nonindustrial toxic pollutants and pesticides into your treatment system. [40 CFR 125.66(d)(1)]

SUMMARY: Public education programs are in effect both within the City of San Diego and within Metro System member agencies. The City of San Diego's comprehensive public education program has been in effect since 1985 and features multiple approaches for educating the public and minimizing the potential for toxic pollutants/hazardous waste to the sewer system. Additionally, each Metro System member agency implements a public education program within their respective jurisdictions that is directed toward minimizing the discharge of toxic pollutants to the sewer system. The IWCP and member agencies coordinate to address public education needs and develop approaches for minimizing the discharge of toxic pollutants to the sewer.

Since 1985, the City of San Diego has conducted an ongoing public education program to minimize the entrance of toxic pollutants and HHW into the treatment system. The City has also conducted an independent, but complementary, public education and outreach program for used oil and oil filters (Used Oil Program).

The City of San Diego uses a variety of methods to inform the public and targeted commercial sectors regarding nonindustrial toxic control pollutant issues, including:

- Placing HHW education and outreach information on the City's web site,
- Operating public information hotline services,
- Giving presentations in English, Spanish or Vietnamese to community, business or school groups,
- Participating in booths at community fairs,
- Developing and distributing informational brochures to private businesses and City facilities where the public had access (e.g., park and recreation centers, libraries, and permit centers),
- Coordinating with local broadcast and print media to generate news stories on HHW collection events and their importance,
- Distributing informational inserts in bi-monthly water/sewer bills, and
- Distributing postcards to residents by targeting areas with upcoming HHW collection events and alternative options for proper disposal of HHW.

As part of the City's HHW collection program, participating residents are surveyed to determine how they learned of the HHW program and to assess the effectiveness of the City's outreach efforts. These surveys note the growing influence of the City's HHW website (located at: https://www.sandiego.gov/environmental-services/ep/hazardous) as an outreach platform. The website provides educational information on:

- What constitutes hazardous waste
- How improper disposal of hazardous waste is both illegal and environmentally unsound
- How to properly dispose of hazardous waste, including such liquid hazardous wastes as automotive fluids, waste petroleum products, medications, paints, solvents, and other HHW liquids
- Customer contact information, including who to contact within the City to seek answers to hazardous waste questions
- Operational hours for the City's permanent HHW acceptance site at 5161 Convoy Street in San Diego and how to make an appointment to disposal of HHW
- Locations and times for upcoming scheduled HHW events where residents can bring in HHW for proper disposal
- City of San Diego rules and prohibitions against illegal discharges to the sewer, storm drain, or to land
- How to report observed violations of waste disposal rules

The outreach surveys also demonstrate that other outreach mechanisms such as direct mailings (fact sheets, handouts, flyers), broadcast and print media coverage, and advertising continue to contribute to improved public understanding of HHW rules and collection/disposal.

In addition to the City of San Diego, each of the Metro System member agencies maintain informational hotlines and/or educational programs (see Table 2.5-1 of Appendix M). The City of San Diego and Metro System member agencies coordinate to maximize effectiveness of regional efforts to educate citizens on proper disposal practices for nonindustrial wastes.

III.H.4. Do you have an approved industrial pretreatment program (40 CFR 125.66(c)(1)?

a. If yes, provide the date of approval.

b. If no, and if required by 40 CFR Part 403 to have an industrial pretreatment program, provide a proposed schedule for development and implementation of your industrial pretreatment program to meet the requirements of 40 CFR Part 403.

Yes. The City of San Diego industrial pretreatment program was approved by EPA on June 29, 1982. The IWCP meets all the requirements of 40 CFR Part 403.

III.H.5. Urban area pretreatment requirement [40 CFR 125.65]

a. Provide data on all toxic pollutants introduced into the treatment works from industrial sources (categorical and noncategorical).

SUMMARY: The City of San Diego has complied with urban area pretreatment requirements by demonstrating that applicable pretreatment requirements are in effect for each toxic pollutant introduced by an industrial discharger. The City's Urban Area Pretreatment Program was submitted to

EPA Region 9 and the Regional Water Board in August 1996. This program was approved by the Regional Water Board on August 13, 1997 and EPA on December 1, 1998.

Toxic Pollutants Discharged to the Metro System. Throughout the Metro System service area, the IWCP identifies and regulates categorical and noncategorical industries that may potentially discharge toxic organic or inorganic constituents to the sewer system.

Appendix M presents a summary of the City's pretreatment program and identifies regulated dischargers. Effluent analyses for individual SIUs are also presented in Appendix M. The IWCP 2020 Annual Pretreatment Program Report (presented as Appendix M) summarizes industrial users and waste loads during calendar year 2020.

Appendix N presents the City's annual update of local limits for calendar year 2020. Wastewater monitoring to support the 2020 local limits update included sampling of:

- The PLWTP plant influent and effluent to identify pollutants of concern (POCs) and to assess PLWTP removal efficiencies (see Tables 1 and 2 of Appendix N)
- The collection system to quantify domestic/commercial pollutant loads (see Table 3 of Appendix N)
- Sludge quality at the Metro Biosolids Center (MBC) to screen for sludge related POCs
- The MBC centrate return to the PLWTP (see Tables 4A and 4B of Appendix N)

As documented within Appendix N, the following four groups of POCs were identified in the 2020 local limits update:

- Heavy metals for which local limits currently exist and for which significant industrial sources have been identified. Metals designated as POCs on the basis of these criteria include cadmium, chromium, copper, lead, nickel and zinc
- Metals with no significant industrial sources but are widely used in specific commercial sectors and can be best controlled through BMP requirements for targeted commercial sectors. This POC group includes mercury and silver
- Toxic organics detected in the PLWTP influent or effluent but for which no local limits are required, including:
    - 2,4,6-trichlorophenol, which was detected in only one sample and likely resulted from a one-time discharge
    - Phenol, which has significant background contributions from domestic sources but only sporadic industrial contributions
    - Bis-(2-ethylhexyl) phthalate, which was determined to come primarily from domestic sources
- Other parameters considered as "special cases," which include:
    - Arsenic, which has no known industrial sources and comes primarily from domestic discharges
    - Cyanide, which is on the EPA list of POCs but maximum concentrations did not exceed evaluation thresholds and no industrial sources were identified

- Selenium, which has no known industrial sources and comes primarily from domestic discharges
- DDT, which were detected in only one sample and may have resulted from a single illicit discharge
- Hexachlorocyclohexanes (HCHs) which (in the form of gamma HCH or lindane) was detected in only one sample and known user are banned in California
- 2,3,7,8-Tetrachlorodibenzo-*p*-dioxins (TCDDs), which has no known industrial sources and primarily result as byproducts of combustion and as contaminants in banned pesticides
- Ammonia-nitrogen, which was determined to be largely from domestic sources and no industrial sources were identified
- BOD, which is on the EPA list of POCs, but there are no evaluation thresholds for any criteria, and TSS, which were largely domestic in origin and no significant industrial sources were identified

As part of the annual local limits update, PLWTP headwork load analyses were conducted to determine allowable loads that were consistent with preventing pass-through, ensuring worker health and safety, preventing treatment inhibition, and ensuring compliance with effluent and sludge requirements and standards.

Appendix M presents data that summarizes industry-by-industry contribution of POCs. Appendix N presents POCs identified through review of IU chemical lists, and notes whether applicable pretreatment requirement exists and whether IUs are in compliance. Appendix N also establishes the allocation of allowable headworks loads among the industrial sources.

III.H.5 b. Note whether applicable pretreatment requirements are in effect for each toxic pollutant. Are the industrial sources introducing such toxic pollutants in compliance with all of their pretreatment requirements? Are these pretreatment requirements being enforced? [40 CFR 125.65(b)(2)]

SUMMARY: Applicable pretreatment requirements are in place for each toxic pollutant, and the City's IWCP enforces compliance with local, state, and federal pretreatment standards and requirements. The City evaluates toxic pollutant loads on an annual basis to assess whether modification to Metro System local limits are warranted.

Applicable Pretreatment Requirements. Applicable pretreatment requirements are in effect for each toxic pollutant. CIUs are regulated to implement applicable technology-based limits for each applicable industrial category for which federal categorical limits have been promulgated by EPA. Additionally, the City's Urban Area Pretreatment Program established local limits for each toxic pollutant introduced by industrial dischargers. The City's Urban Area Pretreatment Program was approved by the Regional Board on August 13, 1997 and approved by EPA on December 1, 1998 (see Finding 8 of the August 24, 2017 EPA Final Decision).

Appendix M presents the annual IWCP 2020 program report. As shown in Appendix M, if applicable federal categorical pretreatment standards have been established, current pretreatment permits apply the federal standards to the discharge permit and require monitoring to determine compliance.

Appendix N presents the update of the City's local limits for calendar year 2020. Table III.H-10 summarizes the findings and recommendations of the local limits update for inorganic POCs (metals and cyanide). Table III.H-11 summarizes the 2020 local limits findings and recommendations for organic POCs.

Industrial Discharger Compliance with Pretreatment Requirements. The primary objectives of the IWCP are to (1) ensure compliance with applicable federal pretreatment standards and requirements and (2) control and reduce mass emissions of industrial pollutants to the Metro System. To accomplish this objective, the IWCP:

- Establishes sewer discharge permits that include effluent standards and/or BMPs,
- Establishes and annually updates local limits,
- Conducts monitoring of the discharges from industrial sources, and
- Requires dischargers to implement self-monitoring and to provide compliance reports.

Table III.H-10:
Summary of Calendar Year 2020 Update of Local Pretreatment Limits [A]
Metals and Cyanides

Pollutant	Controlling Criteria [B]		Existing Local Limit (mg/L)	Recommended 2020 Local Limit		Comments and Proposed Actions
	Source	Value		Value (mg/L)	Type	
Arsenic	B [C]	0.00397 mg/L	NA[I]	NA[I]	--	• No known IU sources • Effluent (but not influent) threshold for conservative benchmark was exceeded • Average influent concentration was well below the benchmark • No local limit determined to be necessary
Cadmium	B [C]	0.00632 mg/L	1.0	1.0	HW[D]	• Some CIU sources but few contributing noncategorical SIU sources • Limit contributing CIUs to federal categorical limits • Use existing CFL for contributing noncategorical SIUs • Monitor non-categorical SIU dischargers to verify contributions • Screen new SIUs (application and initial sampling) and existing SIUs with changes
Chromium	B [C]	0.06405 mg/L	5.0	5.0	HW[D]	• Some CIU sources but few noncategorical SIU sources • Limit contributing CIUs to federal categorical limits • Use existing CFL for contributing noncategorical SIUs • Monitor non-categorical SIU dischargers to verify contributions • Screen new SIUs (application and initial sampling) and existing SIUs with changes

Pollutant	Controlling Criteria [B]		Existing Local Limit (mg/L)	Recommended 2020 Local Limit		Comments and Proposed Actions
	Source	Value		Value (mg/L)	Type	
Copper	B [C]	0.11728 mg/L	11.0	11.0	CFL[F]	• Significant IU sources and residential & military background sources • Limit contributing CIUs to federal categorical limits • Use existing CFL for contributing noncategorical SIUs • Monitor non-categorical SIU dischargers to verify contributions • Screen new SIUs (application and initial sampling) and existing SIUs with changes • Apply investigation action level of 7 mg/L to Navy ship's sanitary waste to ensure no industrial connections
Cyanide [G]	B [C]	0.0070 8 mg/L	1.9	1.9	Existing	• Not detected in PLWTP influent or effluent • Keep existing limit on total cyanide but don't apply where a federal cyanide limit (total cyanide or amenable cyanide) applies
Lead	B [C]	0.0640 5 mg/L	5.0	5.0	HW[D]	• Significant IU sources • Limit contributing CIUs to federal categorical limits • Use existing CFL for contributing noncategorical SIUs • Monitor non-categorical SIU dischargers to verify contributions • Screen new SIUs (application and initial sampling) and existing SIUs with changes
Mercury	B [C]	0.0008 6 mg/L	BMP[H]	BMP[H]	Exiting	• No significant IU sources • 2010 survey of 133 local dentists revealed limited compliance with voluntary recycling and amalgam separator provisions of the 2009 ADA BMPs and EPA/ADA MOU • Implemented EPA's 2017 Dental Amalgam Rule, initiated enforcement for late One-Time Compliance reports
Molybdenum	S [E]	75 mg/kg	NA[I]	NA[I]	--	• Re-evaluate annually
Nickel	B [C]	0.0509 7 mg/L	13	13	CFL[F]	• Some CIU sources but few noncategorical SIU sources • Limit contributing CIUs to federal categorical limits • Use existing CFL for contributing noncategorical SIUs • Monitor non-categorical SIU dischargers to verify contributions • Screen new SIUs (application and initial sampling) and existing SIUs with changes
Selenium	B [C]	0.0019 8 mg/L	NA[I]	NA[I]	--	• No known IU sources • Primarily from domestic sources • No local limit required

Pollutant	Controlling Criteria [B]		Existing Local Limit (mg/L)	Recommended 2020 Local Limit		Comments and Proposed Actions
	Source	Value		Value (mg/L)	Type	
Silver	B [C]	0.01263 mg/L	BMP[H]	BMP[H]	--	• No significant IU sources • Continue existing BMP and semi-annual self-certification for film processors • Certification indicates silver rich solutions are treated to required flow-based treatment efficiency or hauled for proper disposal (as described in the Code of Management Practices for Silver Dischargers)
Zinc	B [C]	0.0825 5 mg/L	24	24	CFL[F]	• Significant IU sources • Limit contributing CIUs to federal categorical limits • Use existing CFL for contributing noncategorical SIUs • Monitor non-categorical SIU dischargers to verify contributions • Screen new SIUs (application and initial sampling) and existing SIUs with changes

Table III.H-10 Notes:

A From City of San Diego Annual Local Limits Review for the PLWTP (see Table ES-4 of Appendix N) for calendar year 2020.

B Where implementation of the controlling criteria is recommended, it stands that all other criteria are protected. Thus, if the controlling criterion is the benchmark (B), all other criteria would be protected as well, such as NPDES limits, sludge quality concerns, process inhibition limitations, and/or health- and worker-safety requirements. The controlling criterion for sludge is expressed in terms of mg/kg. All other controlling criteria are expressed in terms of mg/L.

C B indicates the controlling criteria is the NPDES benchmark concentration at the projected five-year PLWTP flow.

D HW indicates a hazardous waste regulatory threshold.

E S indicates the controlling criteria is sludge quality (40 CFR 503).

F CFL indicates a Contributory Flow Limit.

G Total cyanide. Controlling criteria for amenable cyanide is health and safety threshold. Amenable cyanide is regulated through the local limit for total cyanide, but the cyanide local limit does not apply where a federal cyanide limit applies.

H BMP indicates Best Management Practices.

I NA indicated not applicable (no local limit).

Table III.H-11: Summary of Calendar Year 2020 Update of Local Pretreatment Limits [A]
Toxic Organic Pollutants of Concern (POCs)

Pollutant	Controlling Criteria [B]		Existing Local Limit (mg/L)	Recommended 2020 Local Limit		Comments and Proposed Actions
	Source	Value		Value (mg/L)	Type	
Acid Extractable Compounds						
2,4,6-trichloro phenol	B [C]	0.00780 mg/L	NA[E]	NA[E]	NA[E]	• Primarily occurs in some pesticide and wood preservative formulations • Only detected in 1 of 50 influent PLWTP samples • Not previously a POC since 2005 • Continue existing Toxic Organic Management BMP requirements and certifications • No local limit currently exists or is required
Phenol	B [C]	0.01159 mg/L	NA[E]	NA[E]	NA[E]	• Ubiquitous in personal care and household cleaning products • Total Toxic Organics (TTO) pretreatment standards control CIU dischargers; phenol rarely discharged at CIUs above 0.01 mg/L • Continue existing Toxic Organic Management BMP requirements and certifications • No local limit currently exists or is required
Base Neutral Compounds						
Bis (2-ethylhexyl) phthalate	B [C]	0.01304 mg/L	NA[E]	NA[E]	NA[E]	• Primarily from domestic sources • Continue existing Toxic Organic Management BMP requirements and certifications • No local limit currently exists or is required
Chlorinated Pesticides and PCBs						
DDT (total) [F,G] (o,p-DDD, p,p-DDD)	G [D]	0.035 µg/L	NA[E]	NA[E]	NA[E]	• Banned toxic organic without an individual limit • Only detected in 1 of 51 (o,p-DDD) or 53 (p,p-DDD) influent samples • Continue Household Hazardous Waste collection funding • Not previously a POC since 2014; no local limit required
HCH, total [H] (Lindane)	B [C]	0.11 µ/L	NA[E]	NA[E]	NA[E]	• Toxic organic without an individual limit • Only detected in 1 of 53 influent samples • Lindane banned in CA for lice and scabies but still allowed elsewhere • Continue Household Hazardous Waste collection funding • Not previously a POC since 2005; no local limit required
TCDD Equivalents	G [D]	8.0 E-10 µg/L	NA[E]	NA[E]	NA[E]	• No industrial sources identified • Detected in plant influent/effluent when EPA Method 1613 analysis was initiated in 2010, previously non-detected • Primarily combustion product of incinerators, wood stoves, gas engines • No local limit required

Table III.H-11 Notes:

A From City of San Diego Annual Local Limits Review for the PLWTP (see Table ES-4 of Appendix N) for calendar year 2020.
B Where implementation of the controlling criteria is recommended, it stands that all other criteria are protected. Thus, if the controlling criterion is the benchmark (B), all other criteria would be protected as well, such as NPDES limits, sludge quality concerns, process inhibition limitations, and/or health- and worker-safety requirements. The controlling criterion for sludge is expressed in terms of mg/kg. All other controlling criteria are expressed in terms of mg/L.
C B indicates the controlling criteria is the NPDES benchmark concentration at the projected five-year PLWTP flow.
D G indicates the controlling criteria is a water quality-based receiving water standard (Ocean Plan standard) implemented within Order No. R9-2017-0007 (NPDES CA0107409).

E NA indicated not applicable (no local limit).
F Detected isomers include o,p-DDD (2.4'-DDD) and p,p-DDD (4,4'-DDD) isomers.
G While DDT is banned, the o,p'-DDD isomer (also known as mitotane) is approved by the U.S. Food and Drug Administration (FDA) as a drug used for treatment of inoperable adrenal gland cancer and Cushing's syndrome.
H Detected isomer was gamma BHC (lindane).

Details on SIU compliance within the Metro System are presented within Appendix M (see Chapter 4 of Appendix M). Table III.H-12 summarizes SIU compliance during 2017-2020.

Special Provision VI.C.5.d.ii(a) of Order No. R9-2017-0007 requires the City to have no more than 15 percent of SIUs in SNC as defined within 40 CFR 403.8(f)(2)(vii). This SNC is not to include SIUs that have not received at least a second level of enforcement in accordance with the Enforcement Response Plan (ERP). As shown in Table III.H-12, compliance with the SNC requirement (e.g., SNC not to exceed 15 percent of SIUs) was achieved during each year of the effective period of Order No. R9-2017-0007.

During 2017-2020, roughly 80 percent of the regulated SIU discharge points were in full compliance (e.g., no pollutant violations) with all applicable discharge standards and requirements.

Table III.H-12:
Summary of SIU Compliance, 2017-2020 [A]

Compliance Category	Number of SIU Sewer Discharge Points [B]			
	2017	2018	2019	2020
Regulated SIU Discharge Points in Consistent Compliance during the year	96	102	101	100
Regulated SIU Discharge Points with Inconsistent Compliance during the year	13	10	14	11
Regulated SIU Discharge Points in Significant Non-Compliance [C] (SNC) during the year	6	11	12	18
Percent of SIU Discharge Points in SNC[C] during the year	5%	9%	9%	14%
Percent of SIU Discharge Points in Full Compliance during the year	83%	83%	80%	78%

Table III.H-12 Notes:
A See Chapter 4 (Table 4.2-1) of Appendix M.
B Some SIUs have multiple regulated discharge points.
C Significant noncompliance (SNC) as defined within 40 CFR 403.8(f)(2)(vii).

Enforcement of Pretreatment Requirements. The IWCP implements enforcement actions in accordance with the City's adopted ERP, available online at:

https://www.sandiego.gov/sites/default/files/legacy/mwwd/environment/iwcp/pdf/enf_resp_plan.pdf

As provided in its ERP, the City of San Diego Municipal Code, and interagency agreements with Metro System member agencies, the IWCP has a broad range of enforcement mechanisms available, including:

- Non-Routine Compliance Inspections. The IWCP may conduct special non-routine inspections to investigate noncompliance, determine recommended corrective actions, evaluate compliance with discharge permits, or to assess the progress of permittees operating under Compliance Orders.
- Notices of Violation (NOVs). IWCP issues NOVs to provide written notification to dischargers of specific violations of discharge limits or pretreatment requirements. The NOVs require the dischargers to take corrective actions.
- Supplemental Monitoring. As part of NOV conditions, the IWCP may require the discharger to conduct additional or supplemental self-monitoring or to submit written compliance documentation. Additionally, the IWCP may conduct its own monitoring to verify compliance.
- Cost Recovery. Violating dischargers are invoiced for fees to cover costs associated with issuing and administering NOVS and to cover costs of extra sampling, inspection or monitoring conducted by the IWCP to assess and verify compliance.
- Compliance or Penalty Orders. Compliance Orders are issued to permit violators for the purpose of imposing schedules, requiring installation of pretreatment facilities or equipment, or mandating other measures required to achieve or maintain permit compliance.
- Publication of Violators. The IWCP annually publishes a list of Facilities in SNC in accordance with 40 CFR 403.8 (as revised by the EPA October 14, 2005 streamlining rule). Appendix M identifies Metro System dischargers in SNC during 2020.[7]
- Permit Revocations and Suspensions. Discharge permits may be revoked or suspended in instances where dischargers are not cooperative or where serious violations are occurring that threaten system safety or compliance.
- Civil/Criminal Referral to Prosecuting Agencies. The IWCP may refer the matter to the City, District, or US Attorneys for investigation and possible action if evidence exists that a permittee has intentionally or negligently violated a provision of the Municipal Code, permit conditions or discharge limits.

Table III.H-13 summarizes IWCP enforcement actions during 2017-2020. As shown in the table, over 300 NOVs were issued during 2017, and over 440 NOVs were issued during 2020. The number of dischargers in SNC ranged from 6 in 2017 to 18 in 2020. Table III.H-14 summarizes financial penalties levied by the IWCP during 2017-2020.

7 IUs in SNC during 2020 are presented in Chapter 4, Table 4.4-1 of Appendix M.

**Table III.H-13:
IWCP Enforcement Action Summary, 2017-2020 [A]**

Enforcement Actions	Enforcement Action Summary							
	2017		2018		2019		2020	
	SIUs	Non-SIUs	SIUs	Non-SIUs	SIUs	Non-SIUs	SIUs	Non-SIUs
Notice of Violation (NOV)	152	163	193	192	228	147	221	225
Supplemental Monitoring	34	31	16	17	5	0	11	2
Compliance Order	0	0	0	0	0	0	0	0
Administrative Penalty Order	0	0	0	0	0	0	0	0
Permit revocation	0	0	0	0	0	0	0	0
Criminal/civil referral	0	0	0	0	0	0	0	0
Published for SNC [B]	6	NA	11	NA	12	NA	18	NA

Table III.H-13 Notes:
A Data from Chapter 4 (Table 4.7-1) of Appendix M.
B Significant noncompliance (SNC) as defined within 40 CFR 403.8(f)(2)(vii).

**Table III.H-14:
IWCP Enforcement Penalties, 2017-2020 [A]**

Enforcement Actions	Enforcement Penalties and Fees (dollars)							
	2017		2018		2019		2020	
	SIUs	Non-SIUs	SIUs	Non-SIUs	SIUs	Non-SIUs	SIUs	Non-SIUs
Notice of Violation (NOV) fees	12,120	12,750	15,670	14,300	16,875	10,500	18,074	16,225
Civil Penalties Assessed	0	0	0	0	0	0	0	0

Table III.H-14 Notes:
A Data from Chapter 4 (Table 4.5-1) of Appendix M.

III.H.5 c. If applicable pretreatment requirements do not exist for each toxic pollutant in the Publicly Owned Treatment Works (POTW) effluent introduced by industrial sources,

- **provide a description and schedule for your development and implementation of applicable pretreatment requirements [40 CFR 125.65(c)], or**
- **describe how you propose to demonstrate secondary equivalency for each of those toxic pollutants, including a schedule for compliance, by using a secondary treatment pilot plant. [40 CFR 125.65(d)]**

SUMMARY: The question is not applicable. The City of San Diego complies with applicable urban area pretreatment requirements and has implemented pretreatment requirements for each toxic pollutant that may affect effluent quality, sludge quality, treatment effectiveness (inhibition or pass through), and health and safety.

The City of San Diego has complied with the urban area pretreatment requirements. As set forth in 40 CFR 125.65(c), the City has established pretreatment requirements, where appropriate, for each constituent introduced to the Metro System by an industry. The resultant local limits were originally approved by EPA as part of the Urban Area Pretreatment Program. Metro System local limits have been evaluated and updated annually since the original EPA approval of the Urban Area Pretreatment Program, and each annual limits update has been submitted to and approved by EPA. Appendix N presents the 2020 local limits update.

For industries where a federal pretreatment standard has been established for a pollutant, the IWCP applies the federal standard. Where a federal pretreatment standard does not exist, the IWCP reviews industry sampling data to determine whether the industry discharges the pollutant at levels greater than POTW-specific background levels. Industries that discharge at greater than background levels are termed "contributors" of that pollutant, and the local limit (or the California Title 22 hazardous waste regulatory threshold, if more stringent) is applied in the industry's permit. Industries determined to be non-contributors are not regulated for the pollutant in their permit.

Regardless of contributory status, the IWCP monitors SIUs for the pollutants that are suspected to be in the discharge. This monitoring then allows the IWCP to re-evaluate the industry's contributory status at each annual inspection. If data reveals that an industry has become a "contributor" for a pollutant, the permit is modified to include local limits for that pollutant.

REFERENCES

City of San Diego. 2020. Monthly and quarterly influent and effluent monitoring reports electronically submitted to the Regional Board via CIWQS for calendar year 2020.

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Regional Water Quality Control Board, San Diego Region (Regional Board) and U.S. Environmental Protection Agency (EPA). 2017. *Order No. R9-2017-0007, NPDES CA0107409, Waste Discharge Requirements and National Pollutant Discharge Elimination System Permit for the City of San Diego E.W. Blom Point Loma Wastewater Treatment Plant Discharge to the Pacific Ocean through the PLOO, San Diego County.*