



Application For Renewal of NPDES CA0107409 and 301(h) Modified Secondary Treatment Requirements



POINT LOMA OCEAN OUTFALL

Volume I Executive Summary

January 2015



THE CITY OF SAN DIEGO PUBLIC UTILITIES DEPARTMENT

Application for Renewal of NPDES CA0107409
301(h) Modified Secondary Treatment Requirements for
Biochemical Oxygen Demand and Total Suspended Solids

POINT LOMA OCEAN OUTFALL &
POINT LOMA WASTEWATER TREATMENT PLANT

Submitted pursuant to
Sections 301(h) and 301(j)(5) of the Clean Water Act



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January 2015

***APPLICATION FOR RENEWAL OF NPDES CA0107409
301(h) MODIFIED SECONDARY TREATMENT REQUIREMENTS***

**Point Loma Ocean Outfall
Point Loma Wastewater Treatment Plant**

***VOLUME I
EXECUTIVE SUMMARY***



Volume I Summary: *Volume I is the first of a ten-volume submittal by the City of San Diego in application for renewal of NPDES CA0107409 and 301(h) modified secondary treatment requirements for the Point Loma Ocean Outfall wastewater discharge. The City requests renewal of existing modified secondary treatment requirements for total suspended solids and biochemical oxygen demand. Volume I presents an executive summary of the findings of the ten-volume 301(h) application. As documented within the application, the Point Loma Ocean Outfall discharge complies with all applicable regulations and requirements established pursuant to Sections 301(h) and 301(j)(5) of the Clean Water Act.*

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EXECUTIVE SUMMARY

Renewal of NPDES CA0107409

EXECUTIVE SUMMARY

**Request for Renewal of
NPDES CA0107409 and
Clean Water Act Section 301(h) & 301(j)(5)
Modified Discharge Requirements for the
Point Loma Wastewater Treatment Plant**



January 2015

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List of Abbreviations

BIP	balanced indigenous population
BOD	biochemical oxygen demand
CWA	Clean Water Act
DDW	State Water Resources Control Board Division of Drinking Water
EIR	Environmental Impact Report
EPA	United States Environmental Protection Agency
JPA	Joint Powers Authority
MER	mass emissions rate
MBC	Metro Biosolids Center
Metro System	San Diego Metropolitan Sewerage System
mgd	million gallons per day
mg/l	milligrams per liter
North City WRP	North City Water Reclamation Plant
NPDES	National Pollutant Discharge Elimination System
PLOO	Point Loma Ocean Outfall
Point Loma WWTP	Point Loma Wastewater Treatment Plant
Regional Board	California Regional Water Quality Control Board, San Diego Region
ROV	remotely operated (submersible) vehicle
SBOO	South Bay Ocean Outfall
South Bay WRP	South Bay Water Reclamation Plant
TSS	total suspended solids
ZID	zone of initial dilution

EXECUTIVE SUMMARY

PURPOSE OF SUBMITTAL

The San Diego Metropolitan Sewerage System (Metro System) provides wastewater service for the City of San Diego and 12 participating agencies. The E.W. Blom Point Loma Wastewater Treatment Plant (Point Loma WWTP) serves as the terminal Metro System treatment facility. The discharge of treated wastewater from the Point Loma WWTP to the Pacific Ocean via the Point Loma Ocean Outfall (PLOO) is currently regulated by a joint permit issued by the California Regional Water Quality Control Board, San Diego Region (Regional Board) and the U.S. Environmental Protection Agency (EPA). Regional Board Order No. R9-2009-0001 (EPA NPDES CA0107409) establishes modified secondary treatment requirements for the PLOO discharge in accordance with Sections 301(h) and 301(j)(5) of the Clean Water Act.

Order No. R9-2009-0001 was originally adopted by the Regional Board on June 10, 2009. EPA issued final approval of the joint NPDES permit on June 16, 2010 and the permit became effective on August 1, 2010. Order No. R9-2009-0001 expires on July 31, 2015 and the City is required to file a Report of Waste Discharge requesting renewal of the NPDES permit 180 days in advance of this expiration date (February 1, 2015).

The City of San Diego, as the operating agency of the Metro System, requests renewal of NPDES CA0107409 and renewal of modified secondary treatment standards for total suspended solids (TSS) and biochemical oxygen demand (BOD) established under section 301(h) and 301(j)(5) of the Clean Water Act (CWA).



The Point Loma Wastewater Treatment Plant is the terminal treatment facility serving a Metro System population of approximately 2.2 million.

BASIS OF SUBMITTAL

Renewal of Current NPDES Requirements. The City of San Diego's comprehensive effluent and receiving water monitoring program¹ has documented that the combination of enhanced source control, flow diversion to recycled water use, chemically enhanced primary treatment at the Point Loma WWTP, and a deep and efficient ocean outfall ensures that the PLOO discharge complies with all NPDES permit limits and all applicable state and federal water quality-based standards.²

In addition to implementing water quality-based standards to protect receiving waters, the Clean Water Act establishes a technology-based standard³ that requires secondary treatment for all municipal wastewater discharges to inland, estuarine, or



The City's comprehensive effluent and receiving water monitoring program demonstrates consistent compliance of the Point Loma discharge with all discharge permit limits and requirements.

marine receiving waters. Sections 301(h) and 301(j)(5) of the Clean Water Act, however, acknowledge that technology-based secondary treatment requirements may not be appropriate for all discharges and all receiving waters, and allow EPA to issue modified secondary treatment requirements for dischargers that (1) comply with applicable receiving water standards, (2) do not unreasonably impact beneficial uses, and (3) result in the maintenance of healthy, balanced indigenous populations of fish and benthic (bottom-dwelling) species outside the designated zone of initial dilution. After review of the City's three prior NPDES applications (1995, 2002, and 2007) for modified secondary treatment requirements, EPA determined in each instance that the PLOO discharge qualified for modified TSS and BOD requirements under Sections 301(h) and 301(j)(5) of the Clean Water Act.

Requested TSS and BOD Limits. This permit application requests renewal and continuation of the following TSS and BOD percent removal requirements established in Order No. R9-2009-0001 pursuant to requirements of Clean Water Act Sections 301(h) and 301(j)(5):

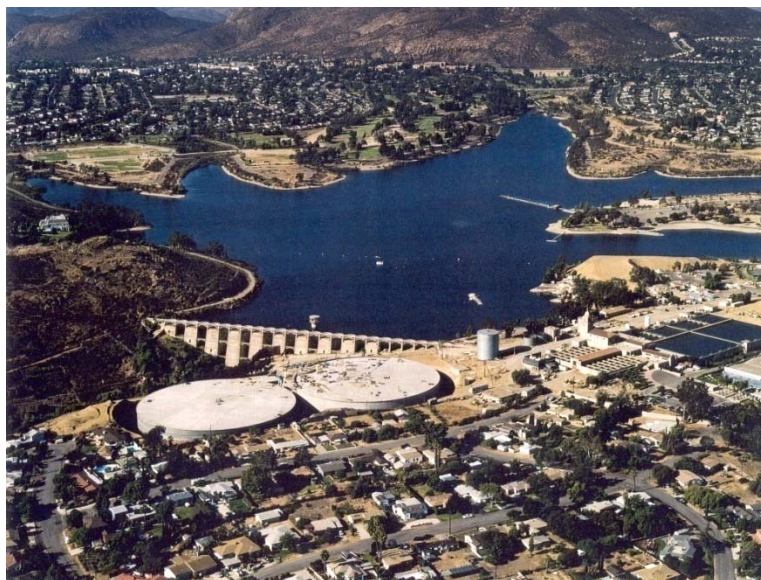
- monthly average system-wide removal of TSS of 80 percent, and
- annual average system-wide removal of BOD of 58 percent.

¹ Results from the City's comprehensive effluent monitoring program for the current NPDES permit period are summarized in City of San Diego (2011a-2014a). Results from the City's comprehensive ocean monitoring program are summarized in City of San Diego (2011b-2014b).

² A water quality based standard is a standard that is implemented to protect receiving water quality and ensure protection of beneficial uses, including human health and aquatic habitat.

³ A technology-based standard mandates implementation of a certain treatment technology, regardless of the conditions or quality of a given receiving water.

Commitment to Pure Water San Diego Program. In requesting renewal of 301(h) modified discharge limits for TSS and BOD, this NPDES application does not propose any increase (e.g. relaxation) of the NPDES effluent flow rate, concentration limits, performance goals, or mass emission limits established in Order No. R9-2009-0001.



The Pure Water San Diego program has a goal of producing up to 83 million gallons per day of purified water by December 31, 2035, which would significantly reduce the City's dependence on imported water.

To the contrary, this application is based on a new direction in water and wastewater facilities planning for the City of San Diego that proposes to systematically reduce future PLOO discharge flows and solids mass emissions through implementation the *Pure Water San Diego* program. *Pure Water San Diego* is a long-term (approximately 20 year) program that would 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 a joint water and wastewater facilities plan that envisions a significant investment in potable water reuse and ancillary facilities that will eventually produce up to 83 million gallons per day (mgd) of potable supply - an amount that equates to approximately one-third of the total City of San Diego potable water demand.

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, 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,
- sufficiently reduce influent flows and solids loads to the Point Loma WWTP so that ultimate PLOO TSS mass emissions are reduced to levels that would have occurred if the 240 mgd Point Loma WWTP were to achieve secondary treatment TSS concentration standards,
- support the City's application for renewed 301(h) modified TSS and BOD limits for the Point Loma WWTP, and

- 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 equivalent to secondary treatment for purposes of compliance with the CWA (secondary treatment equivalency).

To demonstrate the City's commitment to regulators and stakeholders for moving forward with *Pure Water San Diego* plans, this NPDES application proposes that the following enforceable provisions be incorporated into the renewed Point Loma WWTP 301(h) permit:

Reduction in PLOO Mass Emissions. The current Order No. R9-2009-0001 establishes requirements that limit PLOO TSS mass emissions to 13,598 metric tons per year in the final year of the five-year permit. As part of the proposed renewed 301(h) NPDES permit, it is proposed that allowable PLOO TSS mass emissions be reduced to 12,000 metric tons per year for years 1 through 4 of the renewed permit, and to 11,999 metric tons per year during year 5 of the renewed NPDES permit.

Enforceable Time Schedule Milestones. To further demonstrate the City's commitment to regulators and regional stakeholders to implement the *Pure Water San Diego* program and offload Point Loma WWTP inflows and solids loads, the City proposes that the renewed 301(h) NPDES permit incorporate an enforceable time schedule governing implementation of *Pure Water San Diego* environmental review and facilities design tasks. Table EX-1 (page EX-5) presents the enforceable time schedule tasks proposed for inclusion within the renewed five-year NPDES permit.

Long-Term Pure Water San Diego Goal. The long term *Pure Water San Diego* goal of the City and its regional partners is to achieve a targeted potable reuse production capacity of 83 mgd by December 31, 2035. This 83 mgd potable reuse production capacity represents the current maximum potable reuse capacity that is consistent with initial planning studies, stakeholder input, cost and benefit analyses, regional water demand analyses, and regulatory direction provided by the State Water Resources Control Board Division of Drinking Water (DDW).



Advanced treatment technology, redundant treatment processes, and real-time monitoring will be employed to ensure that purified water produced as part of the *Pure Water San Diego* program will comply with all applicable potable water standards and will be equal to or superior in quality to the City's current imported water supply.

**Table EX-1
Pure Water San Diego Potable Reuse Tasks, 2015 -2020¹**

Category	Task ¹	Implementation Date ^{1,2}
Pure Water San Diego Environmental Review	Issue Notice of Preparation for Program Environmental Impact Report (EIR)	January 31, 2015
	Publish Draft Program EIR for Public Review	January 31, 2017
	Certify Final Program EIR	January 31, 2018
North City Projects	Notice to Proceed-Final Design of 15 mgd purified water conveyance pipeline from the North City Water Reclamation Plant (North City WRP)	January 31, 2017
	Issue Notice to Proceed on final design of a 15 mgd Potable Reuse Purification Facility (advanced water treatment facility) for the North City WRP site	May 31, 2017
	Complete design of the 15 mgd purified water conveyance pipeline from the North City WRP	October 31, 2019
	Complete design of 15 mgd Potable Reuse Purification Facility (advanced water treatment facility)	January 31, 2020

- 1 Implementation tasks proposed for inclusion as an enforceable provision of NPDES CA0109409 to demonstrate the City's commitment to offloading Point Loma WWTP wastewater flows, increasing reuse of the City's wastewater, and reducing Point Loma WWTP flows and mass emissions discharged to the Pacific Ocean.
- 2 Task to be completed no later than the listed implementation dates.

Flows and loads to the Point Loma WWTP would be offloaded as each new purified water treatment plant and associated facilities become operational. Table EX-2 (page EX-6) summarizes projected step-wise reductions in PLOO TSS mass emissions that are targeted within the next 20 years. As shown in Table EX-2, the program goal is to cap PLOO mass emissions at 9,942 metric tons per year by year 2028 and beyond. This 9,942 metric tons per year TSS MER would be achieved with a combination of:

- Point Loma WWTP solids offloading resulting from upstream potable reuse and treatment facilities, and
- maintaining chemically enhanced primary treatment at the Point Loma WWTP (no conversion of the Point Loma WWTP to traditional secondary treatment).



A 15 million gallon day purification facility would be constructed at the City's North City Water Reclamation Plant as part of the first phase of the Pure Water San Diego program.

**Table EX-2
Proposed Permitted Point Loma WWTP TSS Mass Emissions**

Year	TSS MER Limit ¹ (metric tons per year)
2014	13,598 ²
2015 thru 2025	12,000 ³
2026 thru 2027	11,500 ^{4,5}
2028 forward	9,942 ^{4,5,6}

- 1 TSS mass emission rate (MER) for the Point Loma WWTP discharge to the Pacific Ocean via the PLOO.
- 2 Existing TSS MER limit for year 2014 established within Order No. R9-2009-0001.
- 3 TSS MER limit requested in this 301(h) application for renewal of NPDES CA0107409. The TSS MER limit would be 12,000 metric tons per year in years 1 through 4 of each five year NPDES cycle, and would be reduced to 11,999 metric tons per year in the final year of each renewed NPDES permit.
- 4 Compliance with proposed reduced TSS MER limit is to be achieved through future offloading the Point Loma WWTP by implementing upstream potable reuse projects as part of the *Pure Water San Diego* program.
- 5 Program 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 Point Loma WWTP. (Establishing the secondary equivalency status of the Point Loma WWTP will require administrative or legislative action.)
- 6 Secondary equivalency TSS MER limit capped forever going forward. This 9,942 metric tons per year MER is the same MER that would apply to a 240 mgd Point Loma WWTP discharge at a 30 milligrams per liter (mg/l) TSS concentration limit (secondary treatment concentration limit).



The Pure Water San Diego program will reduce future flows and solids mass emissions discharged to the ocean through the Point Loma Ocean Outfall.

Table EX-3 presents targeted *Pure Water San Diego* goals for potable reuse for the next 20 years. The goals expressed in Table EX-3 are in keeping with the healthy waters and sustainable local water supply elements of the *San Diego Water Board Practical Vision*, which was adopted by the Regional Board in 2013. The *San Diego Water Board Practical Vision* encourages and promotes the development of environmentally friendly and sustainable local water supplies such as indirect potable reuse.

**Table EX-3
Potable Reuse Implementation Goals**

Targeted Goal: Cumulative Potable Reuse Capacity	Target Implementation Date ¹
15 mgd	December 31, 2023 ³
30 mgd ²	December 31, 2027 ³
83 mgd ²	December 31, 2035 ³

- 1 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 that comprise the *Pure Water San Diego* program, and (3) continued approval of future 301(h) modified NPDES permits for the Point Loma WWTP or administrative or legislative approval of secondary equivalency status for the Point Loma WWTP.
- 2 Cumulative total purified water production capacity of potable reuse facilities.
- 3 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 1).

Secondary Equivalency Concept. As noted, Section 301(h) of the CWA allows an alternative approach to the national technology-based secondary treatment requirements, provided that the discharger can demonstrate compliance with requirements that ensure protection of ocean water quality in the absence of secondary treatment. Prior City of San Diego 301(h) applications have demonstrated compliance with all state and federal receiving water standards and all 301(h) and 301(j)(5) Clean Water Act requirements for the protection of the

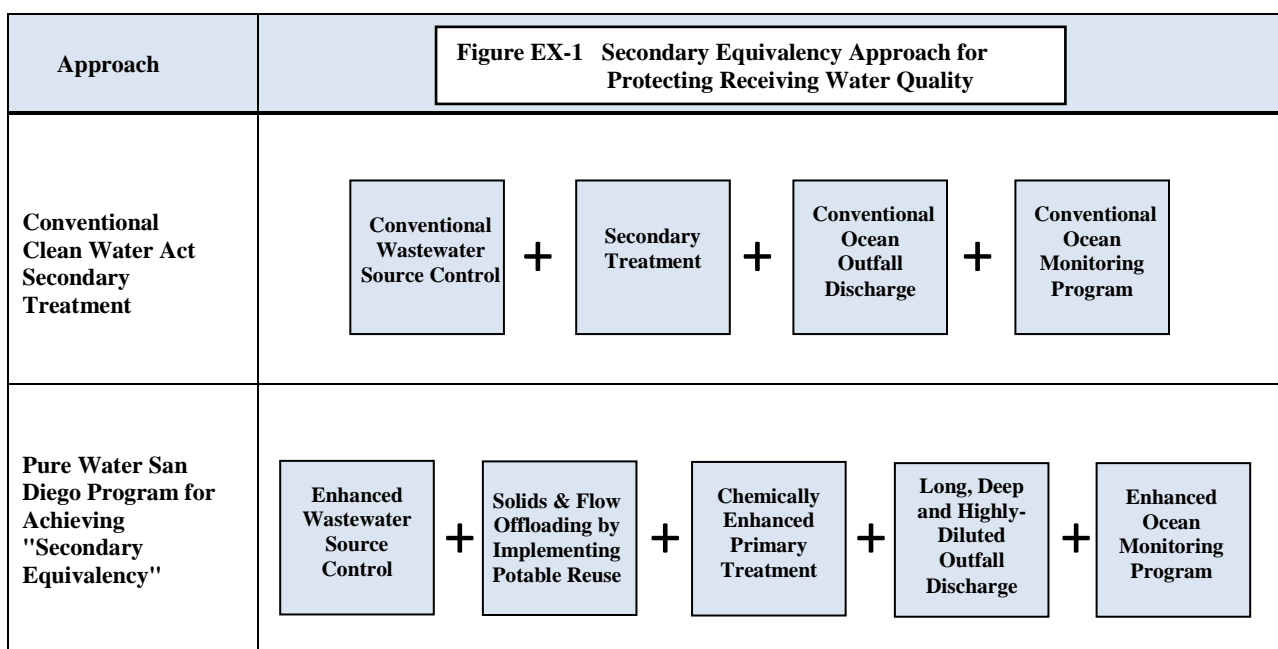


Enhanced source control, chemically enhanced treatment, recycled water use, and the long, deep Point Loma Ocean Outfall combine to provide a high level of protection to San Diego's ocean waters that is similar to that provided by a conventional discharge of secondary effluent.

ocean environment. As documented within this application, the current PLOO discharge (1) continues to comply with all applicable criteria for issuance of 301(h) and 301(j)(5) modified requirements for BOD and TSS, and (2) ensures that the Point Loma WWTP discharge conforms to receiving water standards that are applicable to all ocean dischargers, including maintaining a balanced indigenous population of fish and wildlife in receiving waters.

The *Pure Water San Diego* program will carry this approach farther by using potable reuse to reduce future Point Loma WWTP TSS emissions to less than or equal to the TSS mass emission that would occur if the Point Loma WWTP were to be operated at its 240 mgd capacity while achieving the secondary treatment TSS effluent concentration standard of 30 milligrams per liter (mg/l).

Figure EX-1 schematically presents the City's approach for ensuring that chemically enhanced primary treatment at the Point Loma WWTP, in combination with other *Pure Water San Diego* components, can achieve an equivalent degree of receiving water quality protection as provided by regulations applicable to conventional secondary treatment.



In concert with implementing the long-term *Pure Water San Diego* program, the City, Metro Wastewater JPA, and regional stakeholders have pledged to cooperate to pursue administrative and legislative efforts to achieve secondary equivalency status for the PLOO discharge.

METRO SYSTEM OVERVIEW

Treatment and Conveyance. The Metro System provides for the conveyance, treatment, reuse, and disposal of wastewater within a 450-square-mile service area for the City of San Diego and regional participating agencies. Metro System facilities include wastewater collection interceptors and pump stations, wastewater treatment and water recycling plants, sludge pipelines and solids handling facilities, and two land/ocean outfall systems.

Key Metro System facilities and boundaries of participating agencies are presented in Figure EX-2 (page EX-10). Figure EX-3 (page EX-11) presents a schematic of Metro System facilities and operations. As shown in Figures EX-2 and EX-3, primary Metro System facilities include:

- North City Water Reclamation Plant (North City WRP),
- Metro Biosolids Center (MBC),
- South Bay Water Reclamation Plant (South Bay WRP),
- South Bay Ocean Outfall (SBOO),
- Pump Station No. 1,
- Pump Station No. 2, and
- Point Loma WWTP and PLOO.

Each of these Metro System facilities plays a key role in Point Loma WWTP operations and NPDES permit compliance. To augment system performance, the City recently implemented an integrated chemical addition approach⁴ whereby chemical addition at both upstream collection facilities and treatment facilities is utilized to maximize odor control while at the same time enhancing solids removal performance at the Point Loma WWTP. The result of this program is that the Point Loma WWTP in 2014 achieved its best solids removal in its operating history. Brief descriptions of primary Metro System facilities are presented below.



The North City Water Reclamation Plant produces a high quality recycled water supply that complies with State of California standards for all irrigation uses.

North City WRP. The 30 mgd North City WRP develops recycled water for delivery to customers in the North City region. Excess North City WRP treated wastewater is returned to the sewer for transport to the Point Loma WWTP. Waste solids are directed to the MBC for digestion and dewatering.

Metro Biosolids Center. The MBC digests and dewateres waste biosolids from the North City WRP, and dewateres digested biosolids received from the Point Loma WWTP.

⁴ The proprietary PRI-SC technology (Peroxide Regenerated Iron Sulfide Control) involves adding ferrous chloride at upstream points in Metro System collection facilities for odor and sulfide control, and adding hydrogen peroxide at downstream points and at the Point Loma WWTP to regenerate the iron for use in controlling sulfides and enhancing solids removal at the Point Loma WWTP.



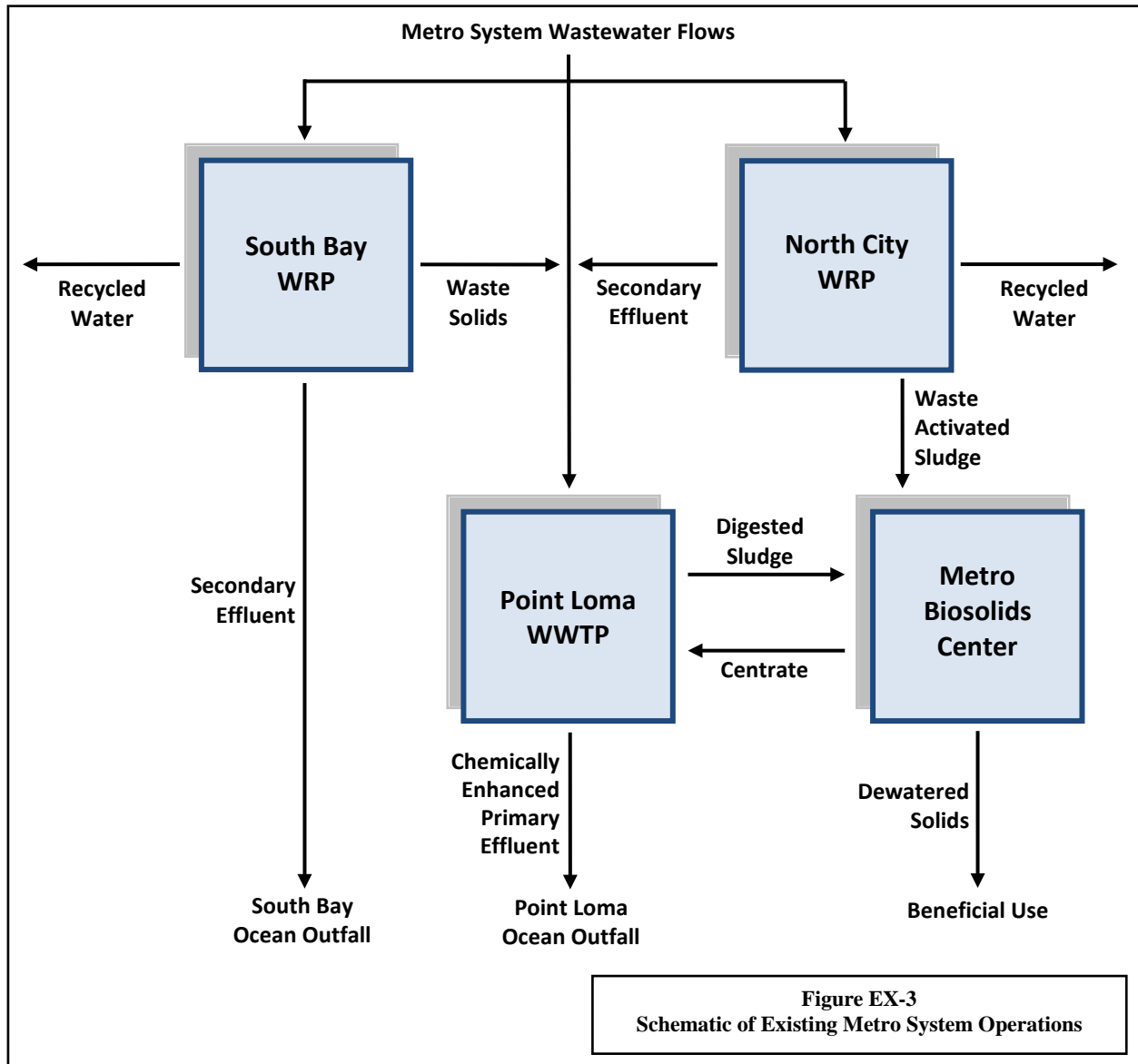


Figure EX-3
Schematic of Existing Metro System Operations

Pump Station 2. Virtually all inflow to the Point Loma WWTP is conveyed by Pump Station 2. Pump Station 2, located along Harbor Drive, has a maximum pumping capacity of 432 mgd. Chemical addition occurs at Pump Station 2 to enhance solids removal at the Point Loma WWTP.

Point Loma WWTP. The Point Loma WWTP is the terminal treatment facility within the Metro System. The Point Loma WWTP provides treatment through a 0.6 inch travelling screen, followed by aerated grit removal, chemically assisted sedimentation, final screening, and effluent disinfection using sodium hypochlorite.

Point Loma Ocean Outfall. The PLOO is one of the longest and deepest municipal wastewater outfalls in the world. The 23,472-foot-long outfall includes a Y-shaped diffuser with two 2,496-foot-long diffuser legs that each has 208 discharge ports engineered to achieve maximum dilution and mixing. Wastewater is discharged at a depth of approximately 310⁵ feet at a distance more than 4.5 miles offshore. The design of the PLOO helps to protect the ocean environment by (1) achieving a high degree of initial dilution upon discharge, (2) maintaining a submerged plume, (3) preventing the diluted discharge from impinging in and near the Point Loma kelp bed, and (4) preventing the accumulation of solids near the discharge zone. The outfall is computed as achieving a flux-averaged minimum month initial dilution of 204 to 1, and subsequent dilution and dispersion occurs as a result of ocean currents and oceanic mixing. The diluted PLOO discharge is typically confined below a depth of 180 feet. The design of the PLOO diffuser and prevailing ocean currents combine to minimize the potential for re-entrainment of the discharge plume.

Source Control. The City has implemented an EPA-approved Urban Area Pretreatment Program that provides enhanced regulation and control of industrial and non-industrial sources of toxic pollutants. To limit the concentrations of industrial contaminants introduced to the Metro System, the City issues discharge permits, performs compliance monitoring and inspections of industrial discharges, reviews monitoring information, and enforces the permit provisions and state and federal industrial waste pretreatment regulations. The City's Industrial Wastewater Control Program is administered by a staff of professionals that includes industrial waste specialists, technicians, laboratory personnel, and other support personnel.

As part of this comprehensive program, the City typically conducts more than 750 scheduled inspections of industrial facilities and over 1,500 unscheduled compliance sampling events each year. The City's laboratory typically annually conducts over 15,000 analyses of industrial discharge constituents, and annually reviews and evaluates results from an additional 3,000 discharger self-monitoring samples. The City's industrial source control program has been highly effective. Since inception of the program in 1982, concentrations of most metals in the Point Loma WWTP influent have been reduced by approximately a factor of ten. In addition, only a few common



The City's Industrial Waste Control Program regulates industrial discharges to reduce or eliminate the discharge of toxic constituents to the sewer system.

⁵ While this NPDES application describes the PLOO discharge depth as 310 feet, the actual discharge depth varies with tidal cycles. Due to the height of the diffuser pipe, the depths of the outfall diffuser ports range from 306 to 313 feet below mean lower low water. Maximum water depth in the vicinity of the diffuser is approximately 320 feet.

toxic organic compounds are detected in the Metro System wastewater, and these compounds (when detected) are typically at or near applicable analytical detection limits.

Monitoring. The City implements a comprehensive monitoring program to ensure compliance with applicable water quality standards and to assess how the discharge may affect beneficial uses. The program is implemented by a staff of technicians, biological specialists, chemists and laboratory personnel, and other support staff with an annual budget of approximately \$13.5 million. In addition to featuring influent and effluent monitoring, the monitoring program assesses receiving water quality, sediment chemistry, benthic species occurrence and distribution, and



With a professional staff of technicians, chemists, biologists, and support staff, the City of San Diego conducts the most comprehensive ocean outfall discharge monitoring program in the nation.

fish tissue monitoring at a wide array of locations both near the outfall discharge and at reference stations. The program operates two ocean research/monitoring vessels that include state-of-the-art equipment for the collection and analysis of deep-water monitoring samples.

ORGANIZATION OF APPLICATION

This application evaluates the effectiveness of the City of San Diego's source control program, treatment facilities, ocean discharge facilities, and monitoring program in protecting San Diego's ocean environment and ensuring compliance with applicable state and federal regulations. This application for modification of secondary treatment requirements has been prepared in accordance with Title 40, Part 125, Subpart G of the *Code of Federal Regulations*, as promulgated in the *Federal Register* by EPA on August 23, 1994. This application is also prepared in accordance with the *Amended Section 301(h) Technical Support Document* published by EPA in September 1994. This application consists of the following volumes:

Volume I - Executive Summary. The Executive Summary presents an overview of the key elements of the City's ocean discharge system and summarizes findings presented in the 301(h) renewal application.

Volume II - NPDES Application. Volume II presents an overview of the basis of the 301(h) application, applicable state and federal NPDES application forms, and an analysis of how the discharge complies with federal antidegradation regulations.

Volume III - Large Applicant Questionnaire. Volume III of the submittal package follows the format established in the Large Applicant Questionnaire within Appendix B of Title 40, Part 125, Subpart G of the *Code of Federal Regulations*. Text responses to individual questions are presented with supporting tables and graphics.

Volume IV through Volume X - Technical Appendices. Volumes IV through X of the application present 22 technical appendices (and additional sub-appendices) that support responses to questions of the Large Applicant Questionnaire.

PROTECTION OF THE OCEAN ENVIRONMENT

Comprehensive oceanography, marine biology, engineering, and other scientific studies have been performed to assess whether the Point Loma discharge adequately protects San Diego's ocean environment. These studies have also evaluated whether the discharge complies with *California Ocean Plan*⁶ water quality standards, requirements established within the *Code of Federal Regulations*, and requirements established within Sections 301(h) and 301(j)(5) of the Clean Water Act. The following sections summarize the results and conclusions of the comprehensive studies presented within this application to renew NPDES and 301(h) requirements for the PLOO discharge.

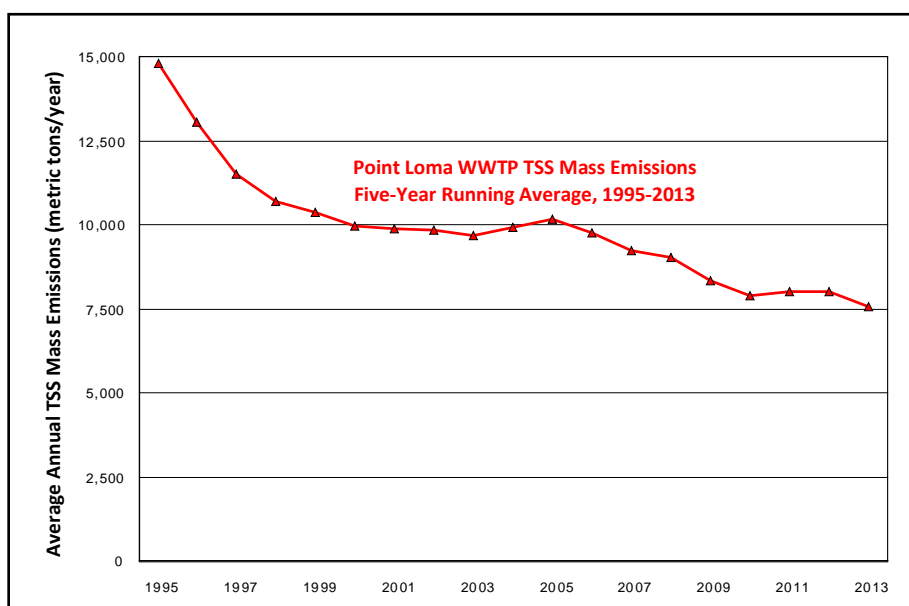
Compliance with State and Federal Standards and Criteria. The Point Loma effluent is routinely analyzed for several hundred physical/chemical, toxic inorganic, and toxic organic constituents. Analysis of data for the period subsequent to the adoption of Order No. R9-2009-0001⁷ demonstrates that the PLOO discharge achieved compliance with:

- all effluent concentration and mass emission standards established within Order No. R9-2009-0001,
- all effluent concentration and mass emission performance goals established within Order No. R9-2009-0001,
- all State of California receiving water quality standards established within the *California Ocean Plan*, and
- all EPA water quality criteria established for the protection of human health and the protection of aquatic habitat.

⁶ The *Water Quality Control Plan, Ocean Waters of California* (State Board, 2012) is hereinafter referred to as the *California Ocean Plan*.

⁷ Order No. R9-2009-0001 became effective on August 1, 2010. This NPDES application evaluated Point Loma WWTP influent and effluent data for the period 2010-2013 (the last complete calendar year of data available at the time of preparation of this report). Data for calendar year 2014 will be electronically provided to regulators when it is available in early 2015. To evaluate ocean conditions, receiving water and benthic data are assessed for the entire operating period (20+ years) of the extended PLOO.

TSS Mass Emissions. The PLOO effluent discharge has achieved 100 percent compliance with TSS mass emission limits established in Order No. R9-2009-0001. Additionally, average annual TSS mass emissions have been reduced during the period of modified 301(h) TSS and BOD requirements (1995 to present). Demonstrating this, Figure EX-4 (below) presents a five-year running average of PLOO TSS mass emissions during the period 1995-2013. As shown in Figure EX-4, the Point Loma WWTP ocean discharge has achieved significant reduction in TSS mass emissions since the original 301(h) permit was issued in 1995.



**Figure EX-4 Point Loma WWTP Effluent TSS Mass Emissions
Five-Year Running Average, 1995-2013**

Figure EX-5 (page EX-16) presents a breakdown of average annual PLOO TSS mass emissions during each of the three prior 301(h) permit periods, including:

- 1995, the year the initial 301(h) permit Order No. 95-106 was adopted,
- 1996-2002 (the effective period of Order No. 95-106), and
- 2003-2010 (the effective period of, Order No. R9-2002-0025), and
- 2010-2013 (the effective period of Order No. R9-2009-0001 through calendar year 2013).

As shown in Figure EX-5, TSS mass emissions have been reduced during each 301(h) modified NPDES permit. The City has achieved this system-wide reduction in TSS mass emissions through a combination of (1) solids removals at North City WRP and MBC, and (2) improvements in solids removals at the Point Loma WWTP.

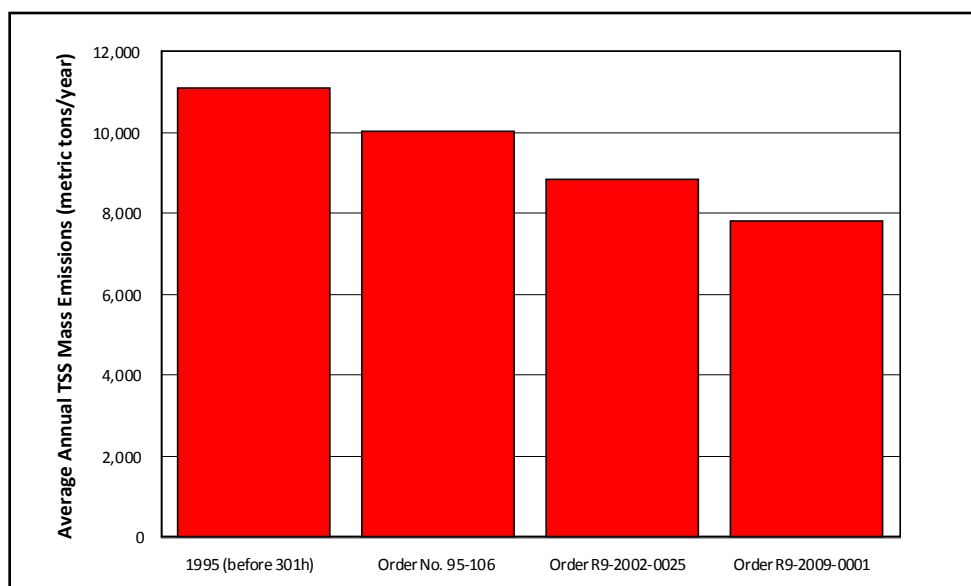


Figure EX-5 Reduction in Point Loma WWTP Effluent TSS Mass Emissions During the Period of 301(h) Modifications

Clean Water Act 301(j)(5) Requirements. The PLOO discharge has achieved 100 percent compliance with Clean Water Act 301(j)(5) requirements that require a minimum annual average BOD removal of 58 percent and a minimum monthly average TSS removal of 80 percent. Table EX-4 summarizes Point Loma WWTP BOD and TSS removal during 2010-2013.

**Table EX-4
System-Wide BOD and TSS Removal, 2010-2013**

Year	Annual Average Percent BOD Removal ^{1,2}	Annual Average Percent TSS Removal ¹	Monthly Average Percent TSS Removal ^{1,3}	
			Minimum Month	Maximum Month
2010 ⁴	66.3	88.3	83.1	90.6
2011	64.6	88.0	87.1	88.9
2102	64.6	89.9	87.8	91.4
2013 ⁵	65.3	90.7	86.6	93.0

1 TSS and BOD percent removal computed on a system-wide basis. Data are presented in PLOO annual monitoring reports submitted to the Regional Board for 2010-2013 (City of San Diego, 2011a, 2012a, 2013a, 2014a). Calendar year 2013 is the most recent year for which a complete 12 month data set was available at the time of preparation of this report. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when it becomes available in 2015.

2 Order No. R9-2009-0001 requires a minimum annual average BOD removal of 58 percent in accordance with requirements established within Section 301(j)(5) of the CWA.

3 Order No. R9-2009-0001 requires a minimum monthly average TSS removal of 80 percent, in accordance with requirements established within Section 301(j)(5) of the CWA.

4 Order No. R9-2009-0001 became effective on August 1, 2010. Data are presented for the entire 2010 calendar year.

5 Preliminary data for calendar year 2014 indicates that the Point Loma WWTP achieved improved TSS and BOD removal during calendar year 2014 compared to calendar year 2013.

Physical Oceanography. Comprehensive oceanographic studies were conducted to support design and construction of the PLOO, and the City continues to collect and analyze oceanographic data to assess local ocean currents, temperature and salinity profiles, and plume transport. The PLOO diffuser is sited at the edge of the mainland shelf. Beyond the outfall diffuser, the ocean bottom significantly increases in depth. The rapidly increasing depth allows for maximum dispersion of particles before contacting bottom sediments. Ocean currents off the Point Loma coast are generally longshore, but localized and variable cross-shore flow also occurs. Density stratification due to temperature and salinity is a key factor influencing vertical mixing within the ocean. Waters off the coast of Point Loma are density stratified for much of the year, with peak stratification occurring during the late summer. As a result of this density stratification, discharged Point Loma effluent is typically trapped in deep waters and is prevented from rising to the surface.



The City's ocean monitoring vessels are equipped to assess water quality throughout the entire water column at each of more than 40 kelp bed and offshore monitoring stations at depths of up to 320 feet.

Fate of Discharged Solids. Upon initial dilution, effluent suspended solids are mixed with marine particles entrained in the ambient receiving waters. Typical natural concentrations of suspended solids in Point Loma ocean waters range from approximately 3 mg/l to over 10 mg/l. The Point Loma outfall discharge adds approximately 0.1 mg/l to this background concentration in the immediate vicinity of the outfall discharge. This small increment typically represents only 1 or 2 percent of the ambient TSS in the immediate discharge zone, and most of this small increment is organic and subject to decay and biological uptake. Small particles not taken up by organisms are dispersed by ocean currents and quickly become unrecognizable above the ambient background concentration.

Sediment monitoring data and inspections of the PLOO discharge zone by remotely operated vehicles during the over 20 year operating history of the extended PLOO demonstrate that solids are not accumulating in ocean sediments. Sediment data collected since 1994 do not indicate any trends in sediment chemistry or deposition that would degrade marine life. The sediment data further demonstrate that toxic organic compounds in the sediments are typically less than the corresponding analytical detection limits in the immediate outfall area. Elevated concentrations of PCBs, DDT, and polyaromatic hydrocarbons have been detected in areas centered around a dredge disposal site south of the outfall and an area north of the outfall near the mouth of the San Diego River, but these elevated concentrations are not related to operation of the PLOO. Sediment concentrations of metals in and near the outfall discharge zone continue to be near

background concentrations. Further, sediment BOD concentrations near the outfall continue to be within the range typically seen along the coast of Point Loma.



More than 20 years of sediment chemistry monitoring and inspections of the outfall by remotely operated vehicles demonstrate that solids are not accumulating in sediments either near or beyond the outfall.

Dissolved Oxygen. Wastewater discharged through the Point Loma outfall contains biodegradable organic matter. The organic material exerts a demand on dissolved oxygen as the organic material is biologically and chemically broken down in the marine environment after discharge. To ensure protection of aquatic habitat, the *California Ocean Plan* requires that wastewater discharges not cause ambient dissolved oxygen concentrations to be depressed more than 10 percent. Under worst case conditions, the dissolved oxygen demand associated with the PLOO discharge is computed as depressing ambient dissolved oxygen concentrations by 0.05 mg/l. This computed 0.05 mg/l value represents a dissolved oxygen depression of approximately 1 percent under maximum stratification conditions, a value that complies with the *California Ocean Plan* standard by a significant margin.

Monitoring data collected during the past 20 years off the coast of Point Loma demonstrate that ambient dissolved oxygen concentrations follow general seasonal patterns. Maximum dissolved oxygen concentrations (in excess of 10 mg/l) can occur during late spring and summer months when solar incidence, water temperatures, and phytoplankton activity are highest. Lowest dissolved oxygen concentrations (slightly less than 3 mg/l at depth) can occur during the spring when cold, saline, deeper offshore water that contains lower natural dissolved oxygen concentrations upwells and moves toward shore. Monitoring



Observations and monitoring conducted as part of the City of San Diego ocean monitoring program demonstrate that the Point Loma discharge does not negatively impact beneficial uses, fishing, or recreation.

data collected to date demonstrate that present day receiving water dissolved oxygen concentrations and seasonal trends are consistent with pre-discharge data collected prior to the construction of the extended PLOO.

Beneficial Uses. Beneficial uses that occur off the coast of Point Loma include recreation, fishing, and the support of marine habitat. Key water-contact recreational activities include swimming, tidepooling, wading, snorkeling, surfing, diving, and sailboarding. Non-contact recreational activities include fishing, sailing, power boating, and whale watching.

Water contact recreational activities are primarily limited to the immediate shoreline or kelp bed. Extensive monitoring demonstrates that the PLOO complies with *California Ocean Plan* water contact recreation bacteriological standards in these areas, as well as in surrounding offshore areas. No water contact recreational activities have been observed outside the State-regulated three nautical mile limit, but monitoring data demonstrate that these offshore waters comply with federal recreational bacteriological criteria. No current federal, state, or local restrictions on recreational activities exist within the Point Loma outfall discharge area.

Sediments. Sediment conditions have been analyzed based on a total of 10 pre-discharge surveys (conducted prior to operation of the extended PLOO) and 59 post-discharge surveys (conducted after discharge from the extended PLOO was initiated). The sediment surveys involve sample collection at 12 primary and 10 secondary outfall and reference stations. The sediment sampling data demonstrate that sediment concentrations in the discharge area do not degrade marine life. Small increases in sulfide and BOD concentrations have occurred nearest the outfall diffusers, but these increases do not affect sediment quality to the point that it degrades resident marine biota.

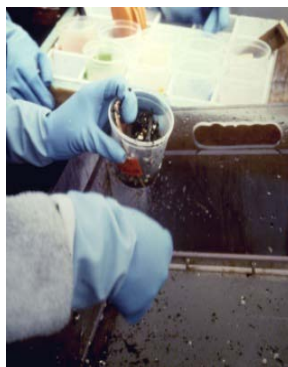


To ensure protection of San Diego's ocean environment, the City of San Diego monitoring program maintains two ocean monitoring vessels which operate offshore a combined total of approximately 200 days each year collecting water quality, sediment, benthic, and trawl samples. The 48-foot *Oceanus* is shown above.

Benthic Infauna. Point Loma benthic infauna communities were analyzed based on 10 pre-discharge and 59 post-discharge surveys that involved sample collection at 12 primary core stations and 10 secondary core stations. After over 20 years of discharge from the extended PLOO, monitoring results show that a balanced indigenous population is maintained beyond the

designated Zone of Initial Dilution (ZID). Key species parameters such as infaunal abundance, species diversity, Benthic Response Index, 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.

Benthic communities near the outfall continue to be dominated by ophiuroid-polychaete-based assemblages that are prevalent within the Southern California Bight. Although variable, infaunal communities off Point Loma have remained stable from year to year in terms of number of species, number of individuals, and dominance. Values for these parameters in the outfall area are similar to elsewhere in the Southern California Bight. While this overall stability occurs, several trends are evident from comparing pre-discharge and post-discharge conditions. First, there is a general increase in the total abundance and number of benthic infauna species since the discharge was initiated. The increase in species richness is 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, another pattern contrary to known pollution effects.



Biologists examine, identify, sort, and tabulate benthic species collected as part of the City's comprehensive ocean monitoring program.

Although some changes in benthic assemblages have appeared in the Point Loma receiving waters, these assemblages are still similar to those present prior to the discharge. The assemblages are also similar to natural indigenous communities within the Southern California Bight.

Demersal Fish and Megabenthic Invertebrates. Demersal fish and megabenthic invertebrate communities were analyzed based on 30 pre-discharge and 232 post-discharge otter trawls. Analyses of temporal and special patterns did not reveal any distinct effects of the outfall discharge on fish or invertebrate communities. The distribution of fish species and populations remained within the range of natural variability for the Southern California Bight, and no changes

in community structure were detected in the immediate outfall area that corresponded to the initiation of the wastewater discharge. Finally, the lack of physical abnormalities and indicators of disease such as fin rot, lesions and tumors suggest that fish populations have remained healthy off Point Loma.

Balanced Indigenous Population (BIP). 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 zone of initial dilution (ZID).



The City's comprehensive ocean monitoring program demonstrates that a balanced indigenous population of benthic organisms exists beyond the Point Loma Ocean Outfall zone of initial dilution. Common types of benthic invertebrates that are abundant throughout the outfall area and up and down the Point Loma coast include (from left to right) echinoderms, crustaceans, polychaetes, and mollusks.

Benthic species, demersal fish, and sediment chemistry samples collected during the current NPDES period continue to demonstrate that a BIP of benthic infaunal organisms and demersal fishes exists beyond the Point Loma outfall ZID. Communities near and beyond the ZID boundary and at reference sites continue to remain characteristic of undisturbed habitat, as demonstrated by trends in total abundance, diversity, species dominance, and species abundances. Further, remote vehicle television observations in the areas around and offshore of the Point Loma outfall have documented no significant sediment accumulation 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, benthic response index (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.

Endangered/Threatened Species. A number of threatened or endangered species may contact the waters off the coast of Point Loma, but only deep-diving species (e.g. marine mammals) have the potential for any short-term contact with the discharged wastewater. The PLOO discharge has not discernibly affected (nor is it projected to discernibly affect) any threatened or endangered species.



The Point Loma discharge does not adversely impact kelp, birds, fish or endangered or threatened species.

The PLOO discharge is also concluded as not adversely impacting kelp, birds, fish, and plankton. The discharge has demonstrated consistent compliance with *California Ocean Plan* standards and federal water quality criteria for the protection of aquatic habitat and marine life.

CONSISTENCY WITH STATE POLICIES

Recycled Water Policy. The 301(h) application submitted herein and the City of San Diego's commitment to implement the *Pure Water San Diego* program are in keeping with the State Water Resources Control Board Recycled Water Policy, which establishes goals and implementation policies for increasing statewide recycled water use.⁸ Implementation of the *Pure Water San Diego* program (see Table EX-3) would help achieve Recycled Water Policy goals by increasing regional recycled water use by 15 mgd by December 31, 2023, 30 mgd by December 31, 2027, and 83 mgd by December 31, 2035.

San Diego Water Board Practical Vision. The 301(h) application and the City of San Diego's commitment to implement the *Pure Water San Diego* program are also in keeping with *San Diego Water Board Practical Vision*, which outlines Regional Board water planning priorities.⁹ In accordance with the Practical Vision "sustainable water supply" element, the City's proposed reuse program reduces the region's dependence on imported water, improves mineral concentrations in local water supplies, maximizes reuse of local water resources, and maintains and promotes the quality and protection of ocean waters.

⁸ The State Water Resources Control Board Recycled Water Policy (State Board, 2009a) was established by the State Board with the adoption of Resolution 2009-011 (State Board, 2009b). The Recycled Water Policy establishes statewide recycled water goals, provides implementation direction to Regional Boards for achieving the goals, and mandates that the State Board and Regional Boards "exercise the authority provided to them by the Legislature to the fullest extent possible to encourage the use of recycled water, consistent with state and federal water quality laws."

⁹ The *San Diego Water Board Practical Vision* (Regional Board, 2013a) was endorsed by the Regional Board in 2013 with the adoption of Resolution No. R9-2013-0153 (Regional Board, 2013b). The *San Diego Water Board Practical Vision* includes the following elements: (1) strategizing for healthy waters, (2) monitoring and assessment, (3) recovery of streams, wetlands, and riparian areas, (4) proactive public outreach and communication, and (5) achieving a sustainable local water supply.

CONCLUSIONS

Requirements governing the modification of secondary treatment standards are established in Title 40, Section 125 of the *Code of Federal Regulations*. As summarized in Table EX-5 (page EX-25), the Point Loma discharge system conforms with each of these CWA 301(h) requirements. The attached application for renewal of NPDES CA0107409 demonstrates that maintaining the existing modified 301(h) requirements for TSS and BOD provide full protection of the ocean environment and beneficial uses. This NPDES renewal application documents that:

- The PLOO discharge achieves 100 percent compliance with concentration, percent removal, and mass emission effluent standards and performance goals established within Order No. R9-2009-0001 (NPDES CA017409).
- The PLOO discharge complies with all TSS mass emission requirements established within Order No. R9-2009-0001, and the PLOO discharge achieved a reduction in overall TSS mass emissions when compared to the prior NPDES permit period (Order No. R9-2002-0035).
- The PLOO discharge meets the statutory requirements of Sections 301(h) and 301(j)(5) of the Clean Water Act.
- During the current NPDES period, the PLOO discharge complied with applicable receiving water standards and federal water quality criteria for the protection of beneficial uses, including *California Ocean Plan* recreational body contact bacteriological standards that are applicable within State-regulated waters (within three nautical miles of the shore) and federal recreational body-contact criteria applicable outside the three nautical mile limit.
- The existing TSS and BOD concentration and percent removal limits established in the current Point Loma NPDES permit are consistent with maintaining the existing high quality of ocean waters off the coast of Point Loma.



The Point Loma Ocean Outfall discharge complies with State of California standards for dissolved oxygen and water clarity.

- The Point Loma outfall provides a high degree of initial dilution, effectively disperses the discharged wastes, and maintains the dilute waste field more than 100 feet below the ocean surface 99 percent of the time.



The Point Loma discharge meets all Clean Water Act Section 301(h) and 301(j)(5) criteria for renewal of modified secondary treatment requirements for TSS and BOD.

- The PLOO discharge does not result in the accumulation of solids in sediments either near or beyond the PLOO.
- Since the PLOO was placed in operation, no trends in sediment chemistry or deposition have been observed that would degrade marine life.
- A balanced indigenous population of fish, shellfish, and wildlife is maintained beyond the zone of initial dilution.
- The PLOO discharge does not create any discernible negative impacts on beneficial uses, fishing, habitats of special significance, recreation, or public water supplies.
- The PLOO discharge complies with *California Ocean Plan* receiving water requirements for dissolved oxygen and water clarity.
- The City of San Diego Industrial Waste Control Program has been effective in reducing and controlling the discharge of toxic constituents to the sewer system.
- The City continues efforts to reduce wastewater discharges to the ocean by expanding the use of non-potable recycled water produced at the 30 mgd North City WRP and the 15 mgd South Bay WRP.
- The City (in concert with the Metro Wastewater JPA and a diverse array of regional stakeholders) has committed to implementing the comprehensive *Pure Water San Diego* program. The *Pure Water San Diego* program is a 20-year joint water and wastewater facilities plan that would (1) implement a comprehensive potable reuse program using state-of-the-art advanced treatment technology that would achieve an ultimate goal of 83 mgd of potable reuse by December 31, 2035, and (2) sufficiently reduce influent flows and solids loads to the Point Loma WWTP so that ultimate PLOO TSS mass emissions are reduced to levels that would have occurred if the 240 mgd Point Loma WWTP were to achieve secondary treatment TSS concentration standards.

For these reasons, the Point Loma WWTP discharge qualifies for renewal of modified secondary treatment requirements for TSS and BOD in accordance with the requirements of and regulations established pursuant to Sections 301(h) and 301(j)(5) of the Clean Water Act.

**Table EX-5
Summary of Compliance with 301(h) Criteria**

301(h) Requirement	Compliance Demonstrated in City of San Diego 301(h) Application?
Discharge must comply with applicable state and federal water quality standards and criteria at and beyond the zone of initial dilution	Yes
Discharge must not impact public water supplies	Yes
A balanced indigenous population of fish and wildlife must exist beyond the ZID	Yes
Discharge must not contribute to destruction of areas of critical habitat	Yes
Discharge must not interfere with migratory pathways	Yes
Discharge must not result in accumulation of toxic pollutants which adversely affect biota within the ZID	Yes
Discharge must not contribute to stimulation of phytoplankton blooms	Yes
Discharge must not lead to restrictions on recreational activities	Yes
Discharge must have monitoring program to provide data to evaluate the impact of the discharge	Yes
Discharge must not adversely affect other point or non-point discharges	Yes
Discharge must have an approved pretreatment program	Yes
Discharger must submit a nonindustrial source control program	Yes

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