NORTH MARIN WATER DISTRICT

SEWER SYSTEM MANAGEMENT PLAN

NMWD Job# 8-4080-00
North Marin Water District – Oceana Marin Sewer
Updated March 2023

Waste Discharge I.D. No.: 1SSO10052

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LIST OF ACRONYMS

BMP	Best Management Practice
CCTV	Closed-Circuit Television
CDFW	California Department of Fish and Wildlife
CFR	Code of Federal Regulations
CIP	Capital Improvement Plan
CIWQS	California Integrated Water Quality System
DISTRICT	North Marin Water District
EHS	Environmental Health Services
FOG	Fats, Oils and Grease
GIS	Geographical Information System
GPM	Gallons per Minute
I/I or I&I	Inflow & Infiltration
LRO	Legally Responsible Official
MRP	Monitoring and Reporting Program
NASSCO	National Association of Sewer System Companies
NPDES	National Pollution Discharge Elimination System
OERP	Overflow Emergency Response Plan
OES	California Office of Emergency Services (Previously Cal-EMA)
PACP	Pipeline Assessment and Certification Program
PM	Preventive Maintenance
PPE	Personal Protective Equipment
SSMP	Sewer System Management Plan
SSO	Sanitary Sewer Overflow
SWRCB	State Water Resources Control Board
WDID	Waste Discharge ID Number
WDR	General Waste Discharge Requirements, also called the Statewide WDR

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LIST OF TERMS

Blockage – An object that partially or fully hinders flow through a sewer pipeline. The blockage can be caused by debris in the sewer, grease buildup, root intrusion, or a partial or full collapse of the pipeline. Also known as a stoppage.

California Integrated Water Quality System (CIWQS) – A computer system used by the State and Regional Water Quality Control Boards to track information about SSOs, among other information. CIWQS is the tool used for online submittal of SSO details, which are then made available to the public. Website: http://www.swrcb.ca.gov/ciwqs/

Enrollee – The legal public entity that owns a sanitary sewer system, as defined by the Statewide WDR. Also known as a sewer system agency or wastewater collection system agency.

FOG Control Program –Program implemented at the discretion of the agency, based on the identified causes of sewer overflows, to reduce the discharge of fats, oils and grease into the sewer system.

Geographic Information System (GIS) – A database linked with mapping that records sewer system information. The GIS database could include sewer features such as pipe location, diameter, material, condition, or last date cleaned or repaired. GIS maps also typically contain base information such as streets and parcels.

Infiltration – The seepage of groundwater into a sewer system, including from service connections. Seepage frequently occurs through defective or cracked pipes, pipe joints, connections or manhole walls and joints.

Inflow – Water discharged into a sewer system from such sources as roof leaders, cellars, yard and area drains, foundation drains, through holes in manhole covers, cross connections from the storm system or street wash waters. Inflow differs from infiltration in that it is a direct discharge into the sewer rather than a leak through defects in the sewer.

Lateral or Private Lateral – The privately-owned sewer pipeline that conveys wastewater from the premises of a user to the District's sewer system. The upper lateral extends from the building to property line (or easement line). The lower lateral extends from the property or easement line to the connection to the District-owned sewer main pipe.

Monitoring and Reporting Program (MRP) - The program used by the District to monitor, maintain records, report issues and complete needed public notifications.

Overflow Emergency Response Plan (OERP) – This document identifies measures that are needed to respond to sanitary sewer overflows in a way that maximizes the protection of public health and the environment.

Preventive Maintenance (PM) – Regularly scheduled servicing of machinery, infrastructure or other equipment using appropriate tools, tests, and lubricants.

Rehabilitation and Replacement Plan (also referred to as a Capital Improvement Plan) – Identifies and prioritizes system deficiencies and implements short-term and long-term rehabilitation actions to address each deficiency.

Sanitary Sewer Overflow (SSO) – Any overflow, spill, release, discharge or diversion of untreated or partially treated wastewater from a sanitary sewer system, including overflows or releases that reach waters of the United States, overflows or releases that *do not* reach water of the United States, and backups into buildings and/or private property caused by conditions within the publicly owned portion of the sewer system.

Sanitary Sewer System – Any system of pipes, pump (lift) stations, sewer lines, or other conveyances, upstream of the wastewater treatment plant ponds used to collect and convey wastewater to the wastewater treatment pond.

Satellite Collection System – The portion, if any, of a sanitary sewer system that is owned or operated by a different public agency or user.

Sewer System Management Plan (SSMP) – A series of written programs that address how a collection system owner/operator conducts daily business. Each SSMP is unique for an individual discharger. The plan includes provisions to provide proper and efficient management, operation, and maintenance of sanitary sewer systems, while taking into consideration risk management and cost benefit.

State Water Resources Control Board – Also called the State Board. This agency developed and passed the Statewide Waste Discharge Requirements for collection systems and maintains the SSO reporting web site. The North Coast Regional Water Quality Control Board has the oversight of the Oceana Marin Sewer System.

System Evaluation and Capacity Assurance Plan – A required component of an agency's SSMP that provides hydraulic capacity of key sanitary sewer system elements for dry weather peak flow conditions, as well as the appropriate design storm or wet weather event.

Statewide Waste Discharge Requirements – The Statewide General Waste Discharge Requirements for Sanitary Sewer Systems was adopted by the SWCRB in 2006 to provide a structure and guidance for SSMP development. Also known as Order No. 2006-0003-DWQ.

Wastewater Collection System – See Sanitary Sewer System.

EXECUTIVE SUMMARY

This Sewer System Management Plan (SSMP) has been prepared in compliance with requirements of the State Water Resources Control Board (SWRCB) Order No. 2006-0003-DWQ, and Amended Monitoring and Reporting Program (MRP), Order No. WQ 2013-0058-EXEC.

ES-1 Background

On May 2, 2006, the SWRCB issued a directive through Order No. 2006-0003-DWQ to require all public wastewater collection system agencies in California with greater than one mile of sewers to be regulated under General Waste Discharge Requirements (Statewide WDR). The SWRCB action also mandates the development of an SSMP and the reporting of SSOs using an electronic reporting system. The SWRCB amended the Statewide WDR Monitoring and Reporting Requirements through Order No. 2013-0058-EXEC, which became effective on September 9, 2013. The intent of this SSMP is to meet the requirements of the Statewide WDR.

The District's Waste Discharge ID Number (WDID) for the California Integrated Water Quality System (CIWQS) is 1SSO10052.

ES-2 District Service Area

The North Marin Water District ("NMWD" or "District") primarily serves the City of Novato and surrounding unincorporated areas in Marin County with potable water services, but is also responsible for providing wastewater services to the Oceana Marin Community. Oceana Marin, located in Marin County, was originally developed in the 1960's and has now been built into a 251-lot subdivision (approximately one square mile). It is located just north of the unincorporated community of Dillon Beach, with Bodega Bay to the west, as shown on Figure ES-1. The District provides wastewater collection services to approximately 400 residents residing in 229 dwellings. Sewage is conveyed to a wastewater treatment plant located at the top of the headlands, just east of Oceana Marin, where wastes are held and treated by aerobic decomposition.

The District's wastewater collection system includes approximately 5 miles of gravity sewer pipe and 0.75 miles of force main pipeline, as well as two lift stations. The District's system conveys approximately 15,000 gallons per day of average dry weather flow to its own wastewater treatment plant.

Figure ES-1. North Marin Water District and Oceana Marin Sewer Service Area

ES-3 SSMP Objectives

The objectives of the SSMP are to accomplish the following:

1. Establish goals that align the District's sewer collection system operation, management and capacity assurance activities in a manner that achieves the intended purpose of this SSMP
2. Comply with the Statewide WDR through provision of the following:
   - Elements I through XI, following the outline of the Statewide WDR, including a description of the regulatory requirements and a summary of existing and planned documents and plans related to each element

- Appendices that are amended over time to reflect changes in contact personnel, job descriptions, policies, procedures and programs

Table ES-1 identifies the objectives that must be addressed to comply with each SSMP element.

Table ES-1. SSMP Objectives

Element	Objective
I. Goals	• Properly manage, operate and maintain the collection system • Provide capacity to convey base and peak flows • Minimize the frequency and severity of SSOs • Mitigate the impact of SSOs
II. Organization	• Identify agency staff responsible for the SSMP • Identify chain of communication for responding to and reporting SSOs
III. Legal Authority	• Control I&I from the collection system and laterals • Require proper design and construction of sewers and connections • Require proper sewer installation, testing and inspection • Ability to impose source control requirements
IV. Operation and Maintenance Program	• Maintain up-to-date maps • Allocate adequate resources for system operation and maintenance • Prioritize preventative maintenance activities • Identify critical equipment and spare parts to minimize equipment and/or facility downtime • Provide staff training on a regular basis
V. Design & Construction Standards	• Identify minimum design and construction standards and specifications • Identify procedures and standards for inspecting and testing
VI. Overflow Emergency Response Plan (OERP)	• Provide SSO notification procedures • Develop and implement a plan to respond to SSOs • Develop procedures to report and notify SSOs • Develop procedures to prevent overflows from reaching surface waters, and to minimize or correct any adverse impact from SSOs
VII. FOG Control Program	• Develop a Fats, Oil and Grease (FOG) control plan, if needed
VIII. System Evaluation and Capacity Assurance	• Establish a process to access the current and future capacity requirements • If any capacity needs are identified, implement a Capital Improvement Plan to provide hydraulic capacity
IX. Monitoring, Measurement and Program Modifications	• Measure the effectiveness of each SSMP element • Monitor each SSMP element and make updates as necessary
X. SSMP Audits	• Conduct a bi-annual (every 2 years) audit that includes deficiencies and steps to correct them
XI. Communication Program	• Communicate with public (Customers) on SSMP development, implementation and performance.

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ELEMENT 1 - GOALS

The purpose of this section is to identify the goals that the District has established for its SSMP. These goals are intended to define a program that promotes continuous improvement in the District's existing wastewater collection system management and maintenance processes.

1.1 SSMP Requirements

Requirements for the Goals element of the SSMP are described in the SWRCB Statewide WDR as follows:

The District must provide a plan and schedule to properly manage, operate, and maintain all parts of its wastewater collection system in order to reduce and prevent SSOs, as well as to mitigate any SSOs that occur.

1.2 North Marin Water District SSMP Goals

The goals of the District's SSMP are to accomplish the following:

- To properly manage, operate, and maintain all parts of the wastewater collection system, so as to preserve and protect the public's investment in that system
- To provide adequate capacity to convey peak flows to the wastewater treatment plant without SSOs
- To minimize the frequency and duration of SSOs, including implementing regular, proactive maintenance of the system to remove issues that may cause sewer backups or SSOs
- To mitigate the impact of SSOs on public health and the environment
- To respond quickly and respectfully to public notifications of SSOs or other collection system problems
- To collect complete and accurate information regarding SSOs for reporting to the appropriate regulatory agencies
- To uphold the District's standards and specifications on newly constructed public and private sewers
- To provide District staff with the tools and training needed to perform their work effectively and achieve the District's goals

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ELEMENT 2 - ORGANIZATION

The purpose of this section is to identify District staff responsible for implementing this SSMP, responding to SSO events and meeting the SSO reporting requirements. This section also includes the designation of the Legally Responsible Official (LRO) or Authorized Representative to meet Statewide WDR requirements for completing and certifying spill reports.

2.1 SSMP Requirements

The requirements for the Organization element of the SSMP are described in the SWRCB Statewide WDR as follows:

The SSMP must identify:

- The name of the responsible or authorized representative
- The names and telephone numbers for management, administrative, and maintenance positions responsible for implementing specific measures in the SSMP program. Include lines of authority as shown in an organization chart or similar document with a narrative explanation
- The chain of communication for reporting SSOs, from receipt of a complaint or other information, including the person responsible for reporting SSOs to the State and Regional Water Board and other agencies if applicable (such as County Health Officer, County Environmental Health Agency, Regional Water Board, and/or State Office of Emergency Services (OES)

2.2 Organization Chart and SSMP Responsibilities

The District's organization chart as related to the SSMP is shown in Figure 2-1. Roles and responsibilities of key personnel involved in the wastewater collection system are as noted below.

Board of Directors: Adopts SSMP plan and policy. Approves budget to implement SSMP.

General Manager: Appointed by the Board of Directors; Responsible for the overall management of SSMP budget and performance.

Operations/Maintenance Superintendent: Serves as the Legally Responsible Official (LRO); initiates SSO reports; develops, plans, and implement the SSMP; monitors SSMP budget and performance; provides oversight on cleaning and television inspection activities; coordinates and reviews capital improvement program projects with the Assistant GM/Chief Engineer; ensures that SSO emergency response and subsequent investigations are appropriately documented for reporting purposes.

Construction/Maintenance Superintendent: Coordinates and oversees field personnel and their associated responsibilities. Reviews and provides input on SSO response activities.

Maintenance Supervisor: Directs contractor activities in cleaning and television inspection of the collection system.

Operations Supervisor and Operator in Charge: Assist the Maintenance Supervisor with directing contractor activities in cleaning and television inspection of the collection system. Help to manage SSMP budget and performance.

Assistant General Manager/Chief Engineer: Manages District's engineering records; works with Operations and Maintenance Superintendent to define and coordinate CIP projects. Manages District-wide systems engineering, project design, construction management and project inspection.

Maintenance Program Assistant: Assists Maintenance Supervisor with directing contractor activities in cleaning and inspection.

Engineering Secretary: assists Chief Engineer in managing District's Engineering records

Administration and Finance, Auditor-Controller: Addresses insurance claims related to public property damage caused by SSOs originating from the public sewer main.

Figure 2-1. SSMP Organization Chart

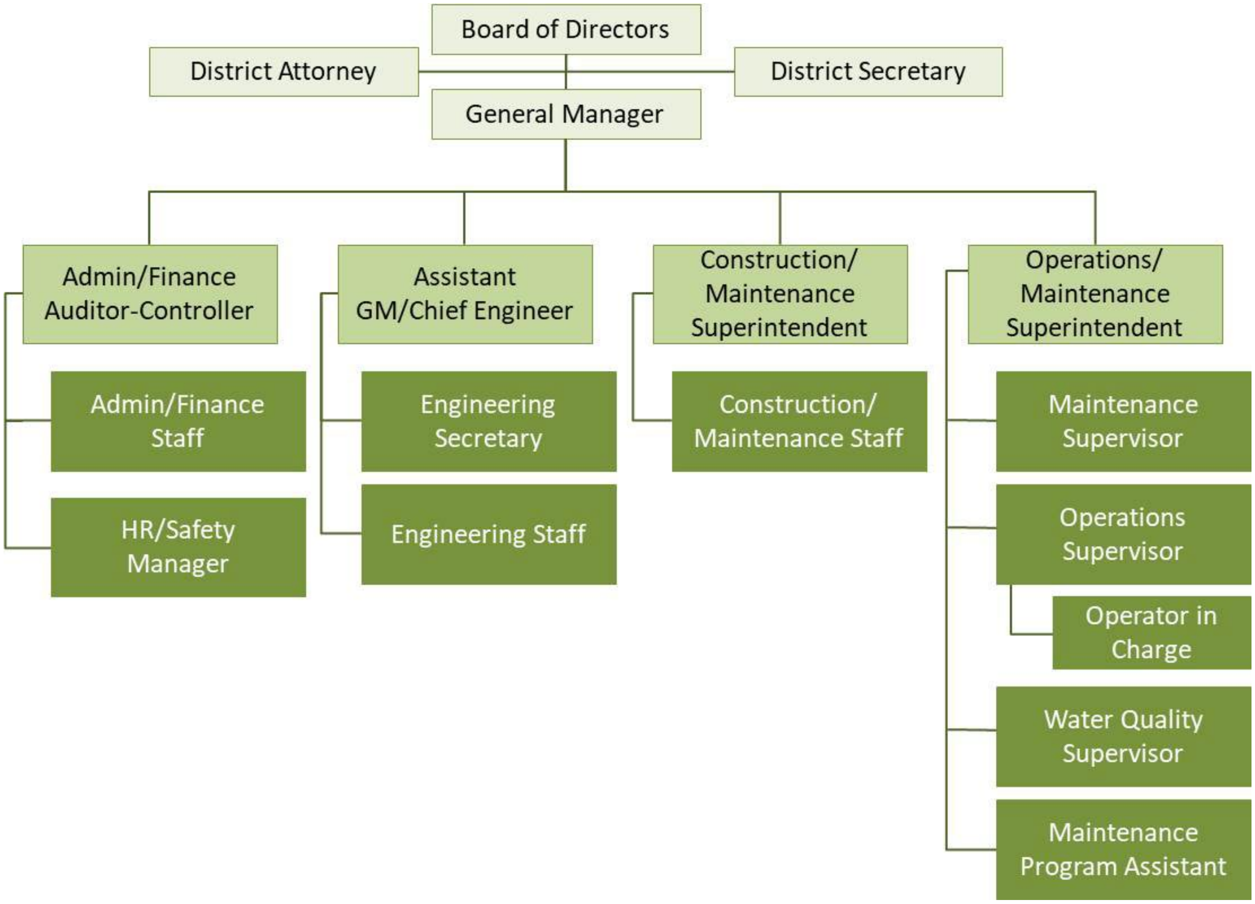


Table 2-1 on the following page summarizes the individuals who are responsible for each section of the SSMP.

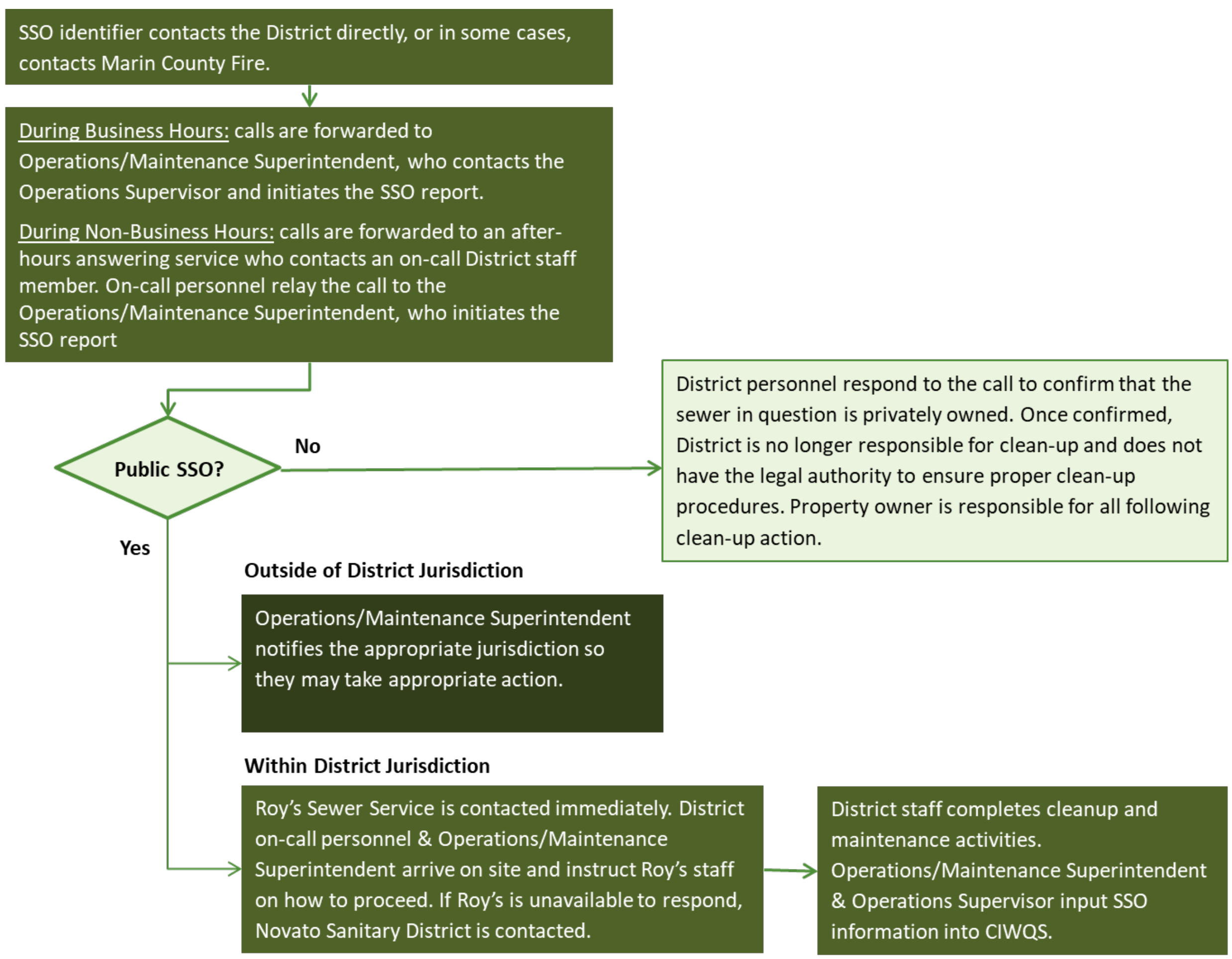
Table 2-1. SSMP Responsibilities

SSMP Element	Responsible Position
I. Goals	The General Manager leads staff in the implementation of the SSMP goals
II. Organization	The Board of Directors updates the organization structure. The General Manager with the help of Operations/Maintenance Superintendent manages SSMP implementation assignments, and amends SSO response and reporting chains of communication, as needed.
III. Legal Authority	The General Manager and District Attorney uphold the Municipal Code and drafts new ordinances as needed.
IV. Operations & Maintenance	The General Manager manages resources and budget, and with support from the Operations/Maintenance Superintendent. The Operations/Maintenance Superintendent oversees cleaning, prioritizes preventive maintenance (cleaning and pipe inspection), and trains District staff. The Chief Engineer maintains the system map.
V. Design and Construction Standards	The Chief Engineer reviews design and construction documents to ensure that all construction projects meet the adopted standards. Construction inspection is managed by District engineering staff.
VI. Overflow Emergency Response Plan	The Operations/Maintenance Superintendent, with help from operations and maintenance personnel, ensures that the OERP is up-to-date and followed when a spill occurs.
VII. FOG Control Program	The District has no commercial connections and does not require a FOG Control Program.
VIII. System Evaluation and Capacity Assurance	The District has no capacity constraints. The Operations/Maintenance Superintendent plans repairs to reduce I&I, in collaboration with the Chief Engineer.
IX. Monitoring, Measurement and Program Modifications	The General Manager and Operations/Maintenance Superintendent monitor implementation and assess success of the SSMP program elements with the assistance of staff.
X. SSMP Audits	The Operations/Maintenance Superintendent oversees biannual SSMP audits.
XI. Communication Plan	The Board of Directors, General Manager, Operations/Maintenance Superintendent, and staff communicate with the public and nearby agencies of the SSMP.

2.3 Chain of Communication for Reporting

Figure 2-2 shows a simplified Chain of Communication for reporting overflows.

Figure 2.2. Chain of Communication



Appendix A – Element 2 Documents

Appendix A includes the following documents related to this section. The information in these documents will change from time to time, and the documents in Appendix A may have been superseded. Please contact the Operations/Maintenance Superintendent for the most recent updates to the Appendix A documents.

- SSMP and OERP Contact List
- Mutual Assistance Agreement with Novato Sanitary District

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ELEMENT 3 - LEGAL AUTHORITY

This element of the SSMP discusses the District's Legal Authority and establishes wastewater discharge requirements for the users of the Oceana Marin sewer system.

3.1 SSMP Requirements

The District must demonstrate, through collection system use ordinances, service agreements, or other legally binding procedures, that it possesses the necessary legal authority to:

- Prevent illicit discharges into its wastewater collection system (examples may include infiltration and inflow (I&I), storm water, chemical dumping, unauthorized debris and cut roots, etc.)
- Require that sewers and connections be properly designed and constructed
- Ensure access for maintenance, inspection, or repairs for portions of the lateral owned or maintained by the Public Agency
- Limit the discharge of fats, oils, and grease and other debris that may cause blockages
- Enforce any violation of its sewer ordinances

3.2 Legal Authority to Enforce SSMP Requirements

The District has legal authority to enforce SSMP requirements through Regulations 100 through 107, and Regulation 109. Specific sections related to the WDR requirements are described below.

3.2.1 Authority to Prevent Illicit Discharges into the Wastewater System

Regulation 105 prohibits the connection of leaders from roofs or surface drains for rainwater runoff to sewer mains or side-sewers. This regulation prohibits flow from surface or subsurface drainage rainwater, storm water, or seepage water into sewer mains or side sewers; additionally, no water from yard fountains, ponds, lawn sprays, yard drainage, cooling water or other unpolluted commercial or industrial process water shall be permitted.

Regulation 105 also prohibits the discharge of certain materials into sewers, including:

a. Any gasoline, naphtha, fuel oil or other flammable or explosive liquid, solid or gas;

b. Garbage that hasn't been shredded to such a degree that all particles shall be carried freely under the flow conditionals normally prevailing in sewer mains;

c. Ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, woof, fat, oil, grease, or any other solid or viscous substance capable of causing obstruction to the flow in sewer mains or other interferences with the proper operation of the sewage facilities;

d. Water or wastes having a pH lower than 5.5 or higher than 9.0, or having any corrosive property capable of causing harm, damage, or hazard to structures, equipment, personnel, or operation of the sewage facilities;

e. Water or wastes containing a toxic or poisonous substance in sufficient quantity to injure or interfere with any sewage treatment process or constitute a hazard to humans or animals or create any hazard in the sewage treatment facilities;

f. Effluent from any industrial garbage grinder or disposal unit or any other water or wastes containing suspended solids of such character and quantity that requires unusual attention or expense for transport or treatment;

g. Mineral oils, greases or products of a petroleum oils, motor oils, cutting oils, or grease trap wastes either as grease or as emulsified grease;

h. Any noxious, malodorous or toxic liquids, gases, fumes, vapors or substances capable of creating a public nuisance or hazard to life or are sufficient to prevent District personnel from safely entering into the sewer facilities for maintenance and repair;

i. Septic tank sludge, chemical toilet wastes, waste to which chemicals have been added for odor control or preservation, or the contents of grease traps or sand interceptors;

j. Water or waste with a temperature greater than 150 degrees F;

Regulation 105 discusses the pre-treatment of wastes, stating that the Applicant or owner shall provide all necessary wastewater treatment as required to comply with this Regulation and shall achieve compliance with all federal categorical pretreatment standards within the time limitations as specified by the Federal Pretreatment Regulations. The Applicant or Owner shall provide such pretreatment of sewage, if deemed necessary by the District:

A. Reduce the biochemical oxygen demand to 300 parts per million and the suspended solids to 500 parts per million by weight;

B. Reduce objectionable characteristics or constituents to within the limits specified by the district and the Regional Water Quality Control Board

3.2.2 Authority to Require that Sewers and Connections are Properly Designed and Constructed

Regulation 103 requires construction of private sewer laterals to follow the NMWD Standard Drawings pertaining to Sewer Construction. Further, every building must be connected to the sewer main with its own lateral, except for buildings located on property owned by the same individual which may be served by the same lateral under specific conditions.

Regulation 103 allows an old building lateral to be used in connection with a new building only if an inspection is passed and the District determines that the lateral meets all current District requirements.

Regulation requires laterals to be tested under the following circumstances:

a. Remodeling or enlargement of the property served involving the installation of any plumbing fixture;

b. Change of use of the building served as residential, commercial or industrial;

c. Connection to repair or replacement of the side-sewer;

d. Request by the District.

Regulation 103 requires that all laterals allow for gravity flow to the existing sewer main, and prohibits occupancy until all of the requirements listed above are met.

Similarly, Regulation 104 discusses requirements for the construction of sewer mains. All work must be performed by a competent and experienced contractor licensed for underground construction and with experienced laborers, in accordance with the approved plans and specifications. Installed facilities receive inspection by the District.

Regulation 105 requires any type or business or establishment where grease or other objectionable materials may be discharged in unusual quantities into a public sewer system to have a grease trap or oil and sand interceptor of the size and design to be approved by the District.

3.2.3 Authority to Have Access for Maintenance, Inspection, or Repairs for Portions of the Lateral Owned or Maintained by the Public Agency

The District does not own any portion of the lateral. The property owner has full responsibility for the private lateral up to the connection with the sewer main.

3.2.4 Authority to Limit the Discharge of Fats, Oils, and Grease and Oher Debris that may Cause Blockages

The District has the authority to limit the discharge of FOG and other debris through Regulation 103, as discussed above.

3.2.5 Authority to Enforce any Violation of its Sewer Ordinances

Regulation 107 states:

“Any person found to be violating any provision of these regulations shall be served by the General Manager or other authorized person with written notice stating the nature of the violation and providing a reasonable time limit for satisfactory correction. Continued habitation of any building or continued operation of any facility in violation of the provisions of these regulations is hereby declared to be a public nuisance."

Regulation 109 provides additional detail as to how the District's Regulations apply specifically to the Oceana Marin Sewer Service Area.

Appendix B – Element 3 Documents

Appendix B includes the following documents related to this section. The information in these documents will change from time to time, and the documents in Appendix B may have been superseded. Please contact the Operation/Maintenance Superintendent for the most recent updates to the Appendix B documents.

- Regulation 100 – General Provisions
- Regulation 101 – Use of Sewer Main Required
- Regulation 102 – Private Sewage Disposal
- Regulation 103 – Side-Sewer Connections
- Regulation 104 – Sewage Facility Construction
- Regulation 105 – Use of Sewer Mains
- Regulation 106 – Application, Agreement, and Fees
- Regulation 107 – Enforcement
- Regulation 109 – Oceana Marin Sewer Service Rates and Charges

ELEMENT 4 - OPERATION AND MAINTENANCE PROGRAM

This section of the SSMP discusses the District's mapping, operations, preventive maintenance (PM), inspection, training and outreach activities.

The requirements and the District's plan for the Operations and Maintenance element of the SSMP are summarized in each category below. Since requirements for this SSMP element contain many categories, this summary is organized by category, with the respective SSMP goal described for each category as applicable.

The categories that are addressed in Element 4 include:

- Collection System Mapping
- Resources and Budget
- Prioritized Preventive Maintenance
- Scheduled Inspections, Condition Assessments and Replacement Planning
- Critical Equipment and Spare Parts
- Training

4.1 Collection System Mapping

4.1.1 SSMP Requirement

The District must maintain an up-to-date map of the sanitary sewer system, showing all gravity line segments, manholes, pumping facilities, pressure pipes, valves and applicable stormwater facilities.

4.1.2 Collection System Map Description

The District does not currently maintain its sewer collection system map electronically. The 2015 Master Plan presents information about the District's system on a single map in Figure 2. This Figure shows the service area parcels pipelines, cleanouts and cleanout IDs, and manholes and manhole IDs, and lift stations. The maps have not changed in many years, as the community is substantially built-out.

4.2 Resources and Budget

4.2.1 SSMP Requirement

The agency must establish sufficient funding to manage and maintain the sewer collection system.

4.2.2 Resources and Budget for Sewer System Management

The District prepares an annual budget, and funds improvements to the collection system as well as its potable water facilities. In FY2020/21, the District adopted a $28.5M budget for all the enterprise area facilities (Novato Water, West Marin Water and Oceana Marin Sewer), with $65,000 set aside for the Oceana Marin Sewer System Capital Improvement Projects for miscellaneous projects. These projects include manhole relining to reduce I&I and pump replacements. Additionally, the District develops a 5-year, Capital Improvement Projects Plan that projects a budget through 2026 for the District's sewer system. The Oceana Marin budget includes $40,000 annually for continued manhole relining, and $100,000 in FY2021/22 for pump replacements. The District's budget is included in Appendix C.

As related to the most recent Capital Improvements Project plan, as of the date of this SSMP, the District is approximately 40 percent complete on the I&I reduction project. In addition, Projects 1A and 1B are in design, and Projects 2A, 2B, and ST-3 are complete.

4.3 Prioritized Preventative Maintenance

4.3.1 SSMP Requirement

The District must describe routine preventive operation and maintenance activities by staff and contractors, including a system for scheduling regular maintenance and cleaning of the sanitary sewer system with more frequent cleaning and maintenance targeted at known problem areas. The PM program should have a system to document scheduled and conducted activities, such as work orders.

4.3.2 Prioritized Preventive Maintenance Activities

The District has administered its preventative maintenance program through Purchase Orders with Roy's Sewer Service. At times, when Roy's Sewer Service is not available, the District also has a cooperative agreement with Novato Sanitary District ("NSD"), and has also contracted with Roto Rooter (Petaluma/Novato). A copy of the NSD agreement is included in Appendix C. As a component of the mutual aid agreement, District staff meet twice a year to formally discuss and review any system equipment failures or accidental discharges. Necessary maintenance activities are planned based on this information.

The District cleans the sewer system approximately every five years. The District has compiled information on cleaning results in a Microsoft Excel spreadsheet, and new data is added to the matrix after every cleaning cycle. Using this information, the District identifies whether additional maintenance or cleaning is required outside of the 5-year cleaning schedule.

The District also maintains a hot spot cleaning list that includes areas with historical maintenance issues. Critical areas that experience higher rates of root growth are cleaned annually or biennially. The District monitors cleaning results from these lines, and updates cleaning records from the previous full year cleaning cycle, as well as recent CCTV records using the new information.

Beginning in 2021, the District plans to develop and use a Sewer Cleaning Matrix to measure the amount of material found in each pipe during cleaning operations based on the number of cleaning passes made and level of debris retrieved. A sample Sewer Cleaning Matrix is included in Appendix C.

4.4 Scheduled Inspections, Condition Assessment and Rehabilitation Plan

4.4.1 SSMP Requirement

The District must develop a rehabilitation and replacement plan to identify and prioritize system deficiencies and implement short-term and long-term rehabilitation actions to address each deficiency. The program should include regular visual and TV inspections of manholes and sewer pipes, and a system for ranking the condition of sewer pipes and scheduling rehabilitation. Rehabilitation and replacement should focus on sewer pipes that are at risk of collapse or prone to more frequent blockages due to pipe defects. Finally, the rehabilitation and replacement plan should include a capital improvement plan (CIP) that addresses proper management and protection of the infrastructure assets. The plan shall include a time schedule for implementing the short and long-term plans plus a schedule for developing the funds needed for the CIP.

4.4.2 CCTV Inspection Program

The District completes CCTV inspection of its entire system on a five-year schedule. The District has an ongoing contract agreement with Roy's Sewer Service to handle all CCTV inspections of the sewer system. Inspections utilize National Association of Sewer Services Companies (NASSCO) Pipeline Assessment Certification Program (PACP) standards for the coding and ranking of the defects. This data is uploaded to the District's sewer maintenance spreadsheet, and then used to help develop the CIP program, as well as inform the District on necessary or immediate maintenance or structural repairs.

4.5 Training

4.5.1 SSMP Requirement

The District must provide training on a regular basis for staff in sanitary sewer system operations, maintenance, and require contractors to be appropriately trained.

4.5.2 Training of District Staff and Contractors

The District conducts general operations and maintenance training on an annual basis for its employees. Training includes general safety training, and can also include on-the-job SSO response, volume estimation, and other collection system management training. District staff are trained on the Overflow Emergency Response Plan (OERP). The District's sewer maintenance contractors are responsible for training their staff in all maintenance, emergency response, and safety operations necessary to perform work.

The District maintains training records that include the date, time, place, content, name of trainer(s) and names of attendees.

4.6 Contingency Equipment and Replacement Inventories

4.6.1 SSMP Requirement

The District must provide equipment and replacement part inventories, including identification of critical replacement parts. This information is provided in Appendix C.

4.6.2 Contingency Equipment and Replacement Inventories

The District maintains contingency equipment and replacement inventories. The District's contractor responders also provide backup pumping equipment.

Appendix C – Operation and Maintenance Program Documents

Appendix C includes the following documents related to this section. The information in these documents will change from time to time, and the documents in Appendix C may have been superseded. Please contact the Operations/Maintenance Superintendent for the most recent updates to the Appendix C documents.

- North Marin Water District FY 2020/21 Adopted Operating and Capital Budgets
- North Marin Water District Sewer Cleaning Matrix
- List of Available Maintenance Equipment (District and Roy's Sewer Service).

ELEMENT 5 - DESIGN AND PERFORMANCE PROVISIONS

This section of the SSMP discusses the District's design and construction standards.

5.1 SSMP Requirement

The District must have design and construction standards and specifications for the installation of new sewer systems, lift stations and other appurtenances, and for the rehabilitation and repair of existing sewer systems.

5.2 Standards for Installation, Rehabilitation, Repair, and Testing

District Regulation 103 states, "Construction of side-sewers shall be in accordance with the NMWD Standard Drawings, Sewer." Further District Regulation 104 states, "All extensions of the District's sewage facility shall be designed by the District and constructed in accordance with the District's plans and specifications. The location, size, type, and design of all sewer extensions shall be sufficient to provide adequate sewage collection, pumping, treatment and disposal capacity for the entire area that can economically be served therefrom as conclusively determined by the District."

The District's Standard Drawings are a compilation of design guidelines, specifications, and standard drawings necessary for use in construction of public works improvements and site grading within the District. The District's Standards, which are included in Appendix D, address the following:

- Standard manhole frame and cover
- Manholes with and without a drop connection
- Cleanout and backwater prevention device
- Rodding and flushing inlets
- Side sewer details
- Saddle connections
- Overflow and backflow devices
- Sewer protection above and beyond utility crossings
- Grease and sand interceptors
- Concrete encasement
- Trench dams
- Trench details
- Air test leakage chart
- Redwood check dam

- Standard surface replacement

Appendix D – Design and Performance Provisions Documents

Appendix D includes the following documents related to this section. The information in these documents will change from time to time, and the documents in Appendix D may have been superseded. Please contact the Chief Engineer for the most recent updates to the Appendix D documents.

- North Marin Water District Standard Sewer Drawings

ELEMENT 6 – OVERFLOW EMERGENCY RESPONSE PLAN

This section of the SSMP serves as the District's Overflow Emergency Response Plan (OERP). The OERP provides guidelines for responding to, cleaning, containing, and reporting sanitary sewer overflows (SSOs) that occur within the District's collection system service area.

The requirements for Element 6 are as follows.

The District shall develop and implement an overflow emergency response plan that identifies measures to protect public health and the environment. At a minimum, this plan must include the following:

- Proper notification procedures so that the primary responders and regulatory agencies are informed of all SSOs in a timely manner;
- A program to ensure appropriate response to all overflows;
- Procedures to ensure prompt notification to appropriate regulatory agencies and other potentially affected entities (e.g. health agencies, regional water boards, water suppliers, etc.) of all SSOs that potentially affect public health or reach the waters of the State in accordance with the Statewide MRP. All SSOs shall be reported in accordance with this MRP, the California Water Code, other State Law, and other applicable Regional Water Board WDR or NPDES permit requirements. The SSMP should identify the officials who will receive immediate notification;
- Procedures to ensure that appropriate staff and contractor personnel are aware of and follow the emergency response plan and are appropriately trained;
- Procedures to address emergency operations, such as traffic and crowd control and other necessary response activities; and
- A program to ensure that all reasonable steps are taken to contain and prevent the discharge of untreated and partially treated wastewater to waters of the United States and minimize or correct any adverse impact on the environment resulting from the SSOs, including such accelerated or additional monitoring as may be necessary to determine the nature and impact of the discharge.

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NORTH MARIN
WATER DISTRICT

OVERFLOW EMERGENCY RESPONSE PLAN

(OERP)

North Marin Water District – Oceana Marin
March 2020

WDID No.: 1SSO10052

Prepared by

V.W. HOUSEN
& ASSOCIATES

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OERP CHAPTER 1 INTRODUCTION

OERP 1.1 SSMP Requirements

The SWRCB requirements for the OERP element of the SSMP are as follows.

The District shall develop and implement an overflow emergency response plan that identifies measures to protect public health and the environment. At a minimum, this plan must include the following:

- Proper notification procedures so that the primary responders and regulatory agencies are informed of all SSOs in a timely manner;
- A program to ensure appropriate response to all overflows;
- Procedures to ensure prompt notification to appropriate regulatory agencies and other potentially affected entities (e.g. health agencies, regional water boards, water suppliers, etc.) of all SSOs that potentially affect public health or reach the waters of the State in accordance with the Statewide MRP. All SSOs shall be reported in accordance with this MRP, the California Water Code, other State Law, and other applicable Regional Water Board WDR or NPDES permit requirements. The SSMP should identify the officials who will receive immediate notification;
- Procedures to ensure that appropriate staff and contractor personnel are aware of and follow the emergency response plan and are appropriately trained;
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- A program to ensure that all reasonable steps are taken to contain and prevent the discharge of untreated and partially treated wastewater to waters of the United States and minimize or correct any adverse impact on the environment resulting from the SSOs, including such accelerated or additional monitoring as may be necessary to determine the nature and impact of the discharge.

OERP 1.2 OERP Goals

The purpose of the OERP is to support an orderly and effective response to Sanitary Sewer Overflows (SSOs). The OERP provides guidelines for the District or its primary responders which include Roy's Sewer Service and the Novato Sanitary District, to follow in responding to, cleaning up, and reporting SSOs that may occur within the District's service area. The District's goals with respect to responding to SSOs are as follows:

- Respond quickly to minimize the volume of the SSO
- Eliminate the cause of the SSO

- Contain the spilled wastewater to the extent feasible
- Minimize public contact with the spilled wastewater
- Mitigate the impact of the SSO
- Meet regulatory reporting requirements

OERP CHAPTER 2 SANITARY SEWER OVERFLOW CATEGORIES

The responsibilities of the SSO Response Team depend on the volume and location of an incident. Three categories of SSOs are defined by the SWRCB:

OERP 2.1 Category 1 SSO

Category 1 SSOs include discharges of untreated or partially treated wastewater of any volume resulting from an enrollee's sanitary sewer system failure or flow condition that:

- Reach surface water and/or reach a drainage channel tributary to a surface water; or
- Reach a municipal separate storm sewer system and are not fully captured and returned to the sanitary sewer system or not otherwise captured and disposed of properly. Any volume of wastewater not recovered from the municipal separate storm sewer system is considered to have reached surface water unless the storm drain system discharges to a dedicated storm water or ground water infiltration basin (e.g., infiltration pit, percolation pond).

OERP 2.2 Category 2 SSO

Category 2 SSOs include discharges of untreated or partially treated wastewater of 1,000 gallons or greater resulting from an enrollee's sanitary sewer system failure or flow condition that do not reach surface water, a drainage channel, or a municipal separate storm sewer system unless the entire SSO discharged to the storm drain system is fully recovered and disposed of properly.

OERP 2.3 Category 3 SSO

Category 3 SSOs include all other discharges of untreated or partially treated wastewater resulting from an enrollee's sanitary sewer system failure or flow condition.

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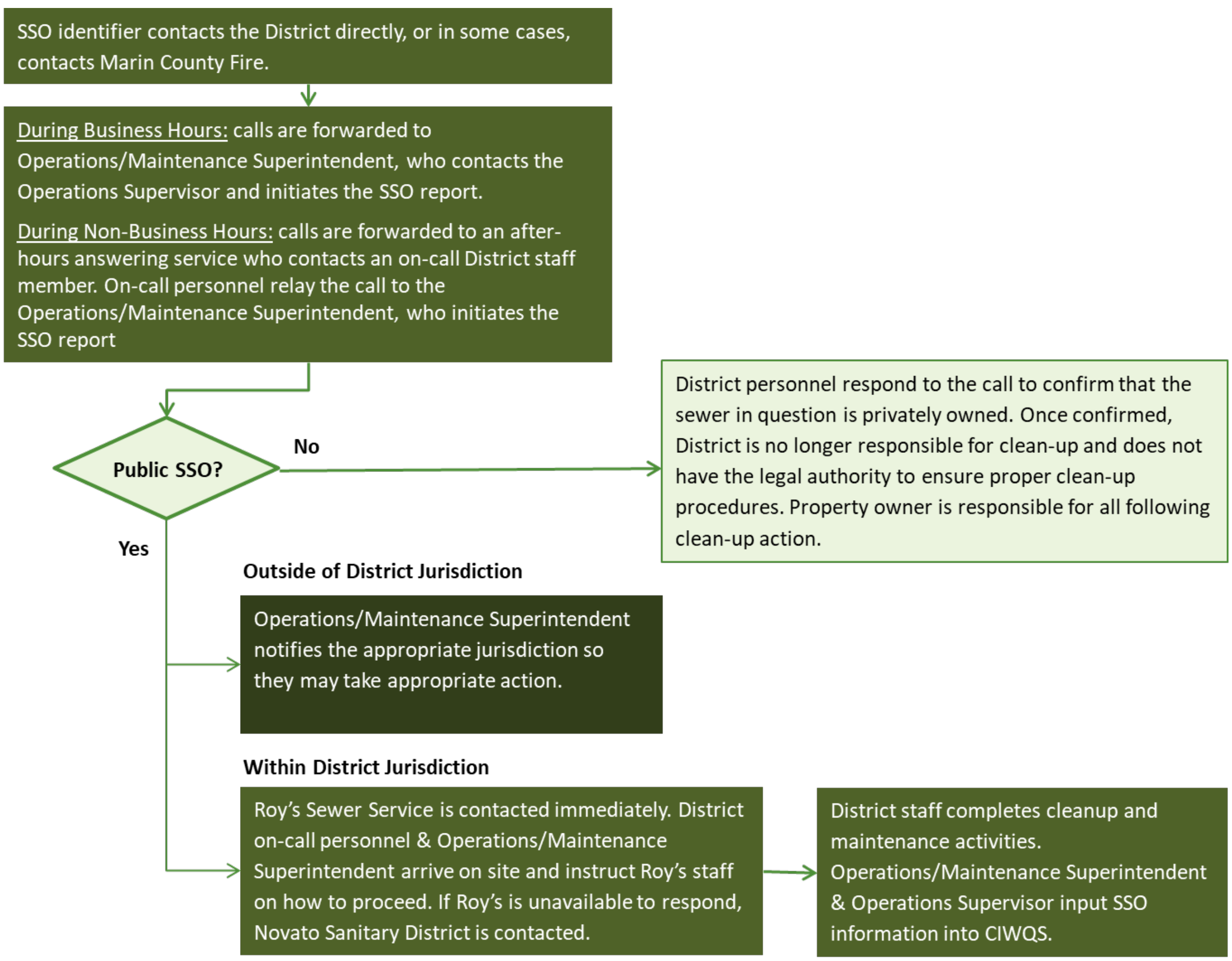
OERP CHAPTER 3 NOTIFICATION PROCEDURES

OERP 3.1 General

The District is most often notified by the public or field staff of an SSO. The public contacts the District telephone number, which is **(415) 897-4133, day or night.** SSOs may also be reported in person at the District Office, or via 9-1-1. If the call is made to 9-1-1, the receiving agency (likely the Marin Fire Department) notifies the District of the SSO to provide First Response.

Figure OERP 3-1 presents a flowchart showing the SSO chain of communication during business hours and non-business hours. This flowchart is also included in SSMP Element 2, Organization.

Figure OERP 3-1. Chain of Communication



OERP 3.2 Notification During Normal Working Hours

Normal working hours are from Monday through Friday from 8:00 a.m. to 5:00 p.m. excluding holidays. During this time, calls are received at the District Office front desk and forwarded to the Operations/Maintenance Superintendent. The first party to the SSO site is the First

Responder. The First Responder may be one or more of the Operations/Maintenance Superintendent, the Operations Supervisor, Operator in Charge, or their designee.

The Operations/Maintenance Superintendent deploys collection system maintenance staff led by the Operations Supervisor for SSO investigation and response. District staff investigate as to whether the SSO is from a public or private sewer blockage and also determine whether an outside contractor is needed for containment and to clear a blockage. Information collected at the site is also relayed by the Operations/Maintenance Superintendent to the District's General Manager.

If the SSO is from a private facility, the District is available to make recommendations to the property owner on how to proceed with clean-up. However, the District is not legally authorized to mandate private SSO response procedures.

If the SSO is from a District sewer blockage and an outside party is needed for containment and clearing of the blockage, Roy's Sewer Service is contacted. If Roy's staff is unavailable, depending on the urgency of the situation, Novato Sanitary District is called. District personnel, including the Operations/Maintenance Superintendent, will arrive on scene to accompany Roy's staff.

In the event of a blockage resulting in an overflow or spill, Roy's is asked to remove the blockage using their equipment. In the event of a sewer break, sewage is diverted around the break area (most likely by pumping from the upstream to the downstream manhole), and then the line is repaired by District staff or by a third party. All visible debris is collected and diverted back into the sewer system. Any spill remnants that cannot be directly put back into the sewer system are contained, decontaminated, and retrieved for disposal.

If the spill is a Category 1 SSO, the Operations/Maintenance Superintendent makes the initial (2-hour) notification to Cal OES.

OERP 3.3 Notification During Non-Business Hours

During non-business hours, notification is automatically forwarded from the District's main number to on-call personnel, who are available 24/7. If the call is made to 9-1-1, the receiving agency, which is often the Marin County Fire Department, redirects the call to the District's main number. The on-call personnel notifies the Operations/Maintenance Superintendent and assists the Operations/Maintenance Superintendent and Contract Operator staff as needed to provide First Response. Other responders may include the Operations Supervisor and/or the on-duty treatment plant lift station operator.

After the call is received by the District, SSO response and reporting proceed in the same manner as during normal working hours.

OERP CHAPTER 4 SANITARY SEWER OVERFLOW RESPONSE PROGRAM

OERP 4.1 Responsibilities & Priorities

The following District and Contract Operators are responsible for responding to SSOs:

- First Responder to SSOs: Operations/Maintenance Superintendent during normal work hours and outside of work hours. If the Operations/Maintenance Superintendent is not available, the Treatment & Distribution Supervisor, Maintenance Supervisor, or Operator in Charge may respond. Roy's Sewer Service will be contacted to assist if necessary. If Roy's Sewer Service is not available, Novato Sanitary District will be contacted.
- First Responder to Lift Station Failures: Operations/Maintenance Superintendent and Operations/Treatment Plant Supervisor as described above.
- Claims Processing: Auditor-Controller with legal support from District Counsel.

The contact information for those currently holding the positions named above are included in Appendix OERP-A at the end of this section.

The first responder's priorities are as follows:

- To follow safe work practices, including those related to traffic control, confined space, and employee and public safety
- To respond promptly with the appropriate equipment
- To evaluate the cause of spill and determine responsibility
- To restore the flow as soon as possible
- To contain the spill when feasible
- To minimize public access to and/or contact with the spilled sewage

OERP 4.2 Available Equipment

The District contracts with Roy's Sewer Service or an alternative Contract Operator to provide sufficient equipment for SSO response. Equipment provided by the Contract Operator includes the following:

- Combination Vacuum and Hydrojet truck
- Push cameras
- Hand-held GPS unit
- Trash pump and hoses
- Vacuum trailer
- Disposable cameras

- Spill berm & Spill mat
- Spill Shark (water based spill absorbent)
- 6 inch and 2 inch pumps

In addition, the Main Lift Station has a stationary stand-by generator that automatically starts with a power outage. The District also owns mobile stand-by generators that are available for SSO response.

OERP 4.3 Initial Response

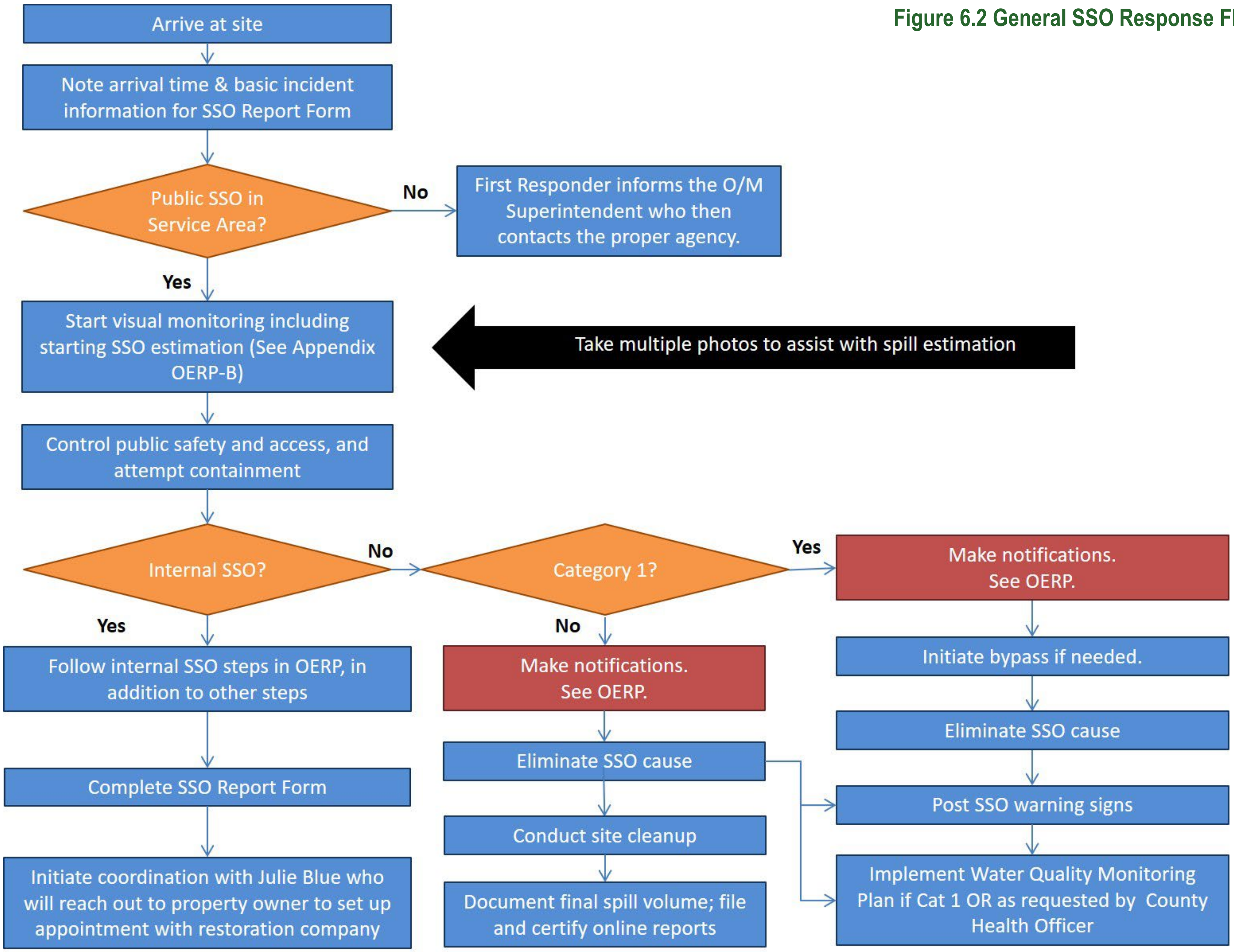
Figure 6-2 provides a general SSO response flowchart. The First Responder reports to the location within 90 minutes of the initial SSO report with the objective of minimizing and/or eliminating an overflow. The appropriate response measure varies based on the circumstances and nature of the SSO and the information provided by the caller. Actions related to external and internal SSOs are summarized below. Internal SSOs are overflows that affect private properties.

OERP 4.3.1 External SSO

External SSO is an overflow occurring in the public right of way. Upon arrival at the site, the First Responder should complete the following:

- Note arrival time at spill site, and include the time in the SSO Reporting Form (See Appendix OERP-A). Record basic incident information on site, and complete the form after finishing the response.
- Verify the existence of the SSO
- Field-verify the address and nearest cross street, and confirm that the SSO is part of the District's sewer/conveyance system
- Conduct visual monitoring to determine immediate actions, including determination if SSO reached surface waters or drainage culverts, and documentation of SSO volume using the methods included in Appendix OERP-B
- Notify Operations/Maintenance Superintendent or Transmission and Distribution Supervisor and relay preliminary observations
- If SSO is a Category 1 spill and is greater than or equal to 1000 gallons, the District Operations/Maintenance Superintendent will notify Cal OES and the County Health Department within 2 hours following identification of the SSO. Spill categories are defined in Section 6.2, above.

Figure 6.2 General SSO Response Flowchart



- Begin activities to contain, mitigate, and minimize impacts from the SSO, and restore flow.
- If the blockage cannot be cleared within a reasonable time, or sewer requires construction repairs to restore flow, then initiate containment and/or bypass pumping.
- Identify and clearly assess the affected area and extent of spill, including possible impacts on surface water. Where it is safe and practical, visually inspect surface water in the vicinity of the SSO & record observations on the SSO Report Form. Signs of receiving water impacts include clear signs of sewage (solids, grease, paper), abnormal color, fish kills, etc.
- The California Department of Fish and Wildlife (CDFW) should be notified in the event an SSO impacts any creeks, cullies, or natural waterways. CDFW will provide guidance associated with cleanup. Cleanup should proceed quickly, and any water used in the process should be dechlorinated prior to use.
- The Operations/Maintenance Superintendent notifies the General Manager if the spill appears to be large (over 1,000 gallons), in a sensitive area, may imminently and substantially endanger human health, results in fish kills, if there is doubt regarding the extent, impact, or how to proceed, or if additional help is needed for line cleaning or repair, containment, recovery, lab analysis, and/or site cleanup.
- Where safe and feasible, take necessary water quality samples at the point of discharge and at upstream and downstream locations. Use best judgment and consult with contract responders and/or the General Manager if uncertain. Water quality monitoring is not given precedence over stopping the SSO or protecting public health. However, if sufficient personnel are available, monitoring is conducted in parallel with these activities or with the cleanup effort.
- Comply with all safety precautions (traffic, confined space, etc.).
- Contact caller, if time permits. Identify SSO cause, including conducting closed-circuit television (CCTV) inspection as appropriate.
- Document all activities through photos and written documentation.

The First Responder should provide the completed SSO Reporting Form to the Operations/Maintenance Superintendent. The Operations/Maintenance Superintendent will enter the information in the CIWQS database as required to meet SWRCB deadlines.

OERP 4.3.2 Internal SSO

An internal SSO is an overflow occurring in a private property. Upon arrival at the location of a spill into a house or a building, the First Responder should evaluate and determine if the spill was caused by a blockage in the lateral or in the District-owned sewer main. If a blockage is found in a property owner's lateral, it should be clearly communicated that response and repair of private laterals is not the District's responsibility. The homeowner is responsible for clearing any blockage in the home's plumbing system or private lateral and for any resulting flood damage to the structure. The homeowner is also responsible for damage that happens because a lateral was not properly installed.

If a backup in the District's main line is found to have caused the SSO in a house or building, the First Responder should take steps to address the issue as described above. The First Responder should instruct the property owner to follow the following guidelines:

- Keep all family members and pets away from the affected area
- Place towels, rags, blankets, etc. between areas that have been affected and areas that have not been affected, and move any uncontaminated property away from the overflow area
- Move any uncontaminated property away from the overflow area. Do not remove any contaminated items.
- Turn off the HVAC system

The First Responder should follow the following steps to assist the homeowner:

- Gather information from the homeowner
- Initiate coordination wit to schedule cleaning by a restoration company
- Forward SSO Report Form and related documents to the Operations/Maintenance Superintendent and Auditor-Controller

OERP 4.3.3 Lift Station or Forcemain SSO

In the event of equipment failure resulting in a spill at a Lift Station, the protocol and response is similar to that of an SSO occurring in a pipe. Temporary repairs will be completed by District staff or an external contractor and operations must be restored quickly. In the event that both pump sets fail, the Operations Supervisor must locate an emergency pump to convey flow around the station until at least one of the original pumps is repaired. The force main lift station at the Tahiti Way site has a standby generator that will automatically start and provide back-up power. The North Street lift station will require a portable generator be connected to the lift station until power is restored, typical lead time is 4 hours for generator to be set up. All visible debris should be cleaned up within the vault and any spill outside of the vault will require decontamination and retrieval and disposal of solids.

In the event of structural failure in a force main resulting in a spill, the first action is to turn off the pump to prevent additional pressurized discharge. Following this step, similar protocol as above should be followed. The force main should be repaired as quickly as possible. If failure is too severe to allow an immediate repair, emergency measures should be taken. These measures could include, but are not limited to, installing an emergency diversion pumped loop connected below and above the break, or contracting with a septic tank pumping company to haul sewage from the lift station to the District's treatment ponds. A list of haulers and contractors that perform work for the District is listed below:

- City Sewer Service, Pt. Reyes Station: (415) 663-1926
- Roto Rooter, San Rafael: (415) 454-7281
- Roy's Sewer Service: (415) 892-5480
- Petaluma Septic Service: (707) 795-0621

The District is developing a separate lift station emergency response plan that will be included in Appendix OERP-B when complete.

OERP 4.4 Containment or Bypass

The First Responder should attempt to contain as much of the spilled sewage as possible using the following steps:

- Determine the immediate destination of the overflowing sewage
- Plug storm drains using available equipment and materials to contain the spill, where feasible. If spilled sewage has made contact with the storm drainage system, attempt to contain the spilled sewage by plugging downstream storm drainage facilities.
- Contain/direct the spilled sewage using dike/dam or sandbags
- Pump around the blockage/pipe failure/lift station or vacuum flow from upstream of the blockage and dispose of downstream of the blockage to prevent further overflow
- If an SSO reaches a water body, follow the requirements below for posting and SSO notification signage (see Appendix OERP-B for example signs). Also conduct water quality sampling as discussed above.

OERP 4.5 SSO Volume Estimation

Accurate SSO volume estimation and thorough documentation of the processes used to estimate spill volumes has a high priority in SSO response.

Use the methods outlined in the Appendix OERP-B to estimate the volume of the spilled sewage. Wherever possible, document the estimate using photos of the SSO site before and during the recovery operation. If possible, use at least two methods to confirm the accuracy of the estimated spill volume.

Some spills may occur in locations where the wastewater can seep into the ground or flow away from the spill location. In such conditions, consider when the spill was first detected and observations from bystanders in order to determine the total spill volume.

OERP 4.6 Impact to Waters of United States

If an SSO is confirmed to have entered waters of the United States[1], the General Manager and Operations/Maintenance Superintendent must be notified immediately. The response team would then proceed with the following additional activities:

- Determine the extent of the SSO by investigating downstream until there is no evidence of sewage or debris along the creek or water body
- Conduct Water Quality Sampling, following the process described below. If the SSO is 50,000 gallons or greater, collect water quality samples within 48 hours of becoming aware of the SSO
- Perform daily water quality sampling (or sampling per EHS) until compliance is achieved
- Immediately post contaminated water sign(s) and protect the water body from public access on all sides
- Photograph sign placement and evidence of the overflow in and around the water body to the farthest point reached by the sewage
- Determine if the water body is safe to enter. During the winter storm season, cleaning the water body may not be feasible due to high water flows
- If feasible, block the water body downstream of the affected area in a location that is safe to enter and is accessible to set up a pump or utilize other sewer cleaning equipment
- To the extent feasible, recover and return contaminated water to the collection system
- Perform follow-up sampling until the area shows no water quality impairment and the posted signs can be removed. The Inspection Superintendent ultimately determines when this happens and makes any follow up calls to affected agencies

OERP 4.6.1 Water Quality Sampling

[1] **40 CFR 230.3(s)** defines the term "waters of the United States." This term includes all lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, or natural ponds, or waters that could be used for recreational or other purposes.

For spills greater than 1,000 gallons, daily water quality sampling should be conducted as required by EHS. For spills greater than 50,000 gallons, water quality sampling and testing should be conducted within 48 hours and daily as required by EHS after initial SSO notification. . The purpose of testing is to determine the extent and impact of the SSO. The following guidelines must be followed:

- The First Responder should arrange for collection of samples. Samples should be collected as soon as possible after the discovery of the SSO event
- For spills less than 1,000 gallons, at a minimum, water quality samples should be collected at the discharge point, 100 feet upstream, and 100 feet downstream
- If a spill is more than 1,000 gallons, additional sites may require sampling, following the requirements of the County Environmental Health Services (EHS) department
- The water quality sampling procedures should follow EHS procedures as follows:
    - Keep the sterile collection bottle closed until it is to be filled. Do not contaminate inner surface of the lid or bottle rim.
    - Collect water sample just below the surface in knee deep water, approximately 3 feet deep (full arm's length), without rinsing. If needed, extend the sampling pole to the fullest length to reach deeper water depth. Minimize contact with bank or beach bed as water fouling may occur.
    - Remove cap and hold the bottle near its base and plunge it, neck downward, below the surface
    - Turn bottle until neck points slightly upward and mouth is directed toward the current. Fill bottle leaving about 1 inch of air to allow lab to mix by shaking. Collect a minimum of 100 mL. (If applicable, insert sterile collection bottle into the holder on the sample pole. Extend the sample pole and plunge bottle end into the water, bottle opening downward.)
    - Immediately place cap securely on bottle to avoid leaks and contamination
    - Dry the bottle
    - Label container with distinctive sample site name, date, and time collected
    - Complete the laboratory requisition slip with requested information (site, bottle number, collector, date and time of collection, type of sample, test requested, name and phone number of responsible person for reporting purposes, and deliverer name). Note any field observations that may have occurred during the sampling.
- Samples should be tested for fecal coliform, total coliform and enterococcus.

- Samples should be stored and shipped by placing the water sample bottle in a cooler with frozen blue ice. Water sample must be kept cool. Ice may be used but care must be taken so water samples are not contaminated or diluted by the ice.

Water samples are taken to District Laboratory, located at 999 Rush Creek Pl, Novato, CA 94945. The water samples must be brought to the laboratory within 8 hours of collection, before 3:00 p.m., for processing.

If an SSO occurs during the weekend, the First Responder shall coordinate with the laboratory on-call personnel to provide the water samples.

Records of monitoring information shall include the date, exact place, and time of sampling or measurements, the individual(s) who performed the sampling or measurements, the date(s) analyses were performed, the individual(s) who performed the analyses, the analytical technique or method used, and the results of such analyses.

OERP 4.6.2 Water Quality Monitoring Plan

A Water Quality Monitoring Plan must be implemented immediately upon discovery of any Category 1 SSO of 50,000 gallons or more in order to assess impacts from SSOs to surface waters. Water quality testing must be completed within 48 hours of the District becoming aware of the SSO.

The District's SSO Water Quality Monitoring Program is included in Appendix OERP-C, and includes the following:

- Protocols for water quality monitoring
- Account for spill travel time in the surface water and scenarios where monitoring may not be possible (e.g. safety, access restrictions, etc.)
- Requirement for water quality analyses for ammonia and bacterial indicators to be performed by an accredited or certified laboratory
- Requirement for monitoring instruments and devices used to implement the SSO Water Quality Monitoring Program to be properly maintained and calibrated, including any records to document maintenance and calibration, as necessary, to ensure their continued accuracy

OERP 4.6.3 SSO Technical Report

If 50,000 gallons or greater SSO reaches surface waters, an SSO Technical Report must be prepared and submitted to the CIWQS online SSO database within 45 calendar days of the SSO end date. A template for the SSO Technical Report is included in Appendix OERP-C. The SSO Technical Report must include, at a minimum, the following:

1. Causes and Circumstances of the SSOs

2. Complete and detailed explanation of how and when the SSO was discovered
3. Diagram showing the SSO failure point, appearance point(s), and final destination(s)
4. Detailed description of the causes(s) of the SSO
5. Copies of the original field crew records used to document the SSO
6. Historical maintenance records for the failure location
7. Response to SSO:
   a) Chronological narrative description of all actions taken to terminate the SSO
   b) Explanation of how the OERP was implemented to respond to and mitigate the SSO
   c) Final corrective action(s) completed and/or planned to be completed, including a schedule or actions not yet completed
8. Water Quality Monitoring:
   a) Description of all water quality sampling activities conducted including analytical results and evaluation of the results
   b) Detailed location map illustrating all water quality sampling points

The Operations/Maintenance Superintendent will enter the information in the CIWQS database and certify the SSO as the designated LRO. The Operations Supervisor will review the certified SSO report and advise of any potential changes that should be made to amend the certification.

OERP 4.7 SSO Notification Signage

Barriers shall be installed to prevent the public from having contact with the sewage. Signs should be posted to keep vehicles and pedestrians away from contact with spilled sewage. Signs should remain in place until removal of the signs is directed by the Operations/Maintenance Superintendent, as advised by EHS.

If a creek, stream and/or beach have been contaminated as a result of an SSO, notifications should be posted at visible access locations until the risk of contamination has subsided to acceptable background levels. The warning signs, once posted, should be checked every day to ensure that they are still in place. “Closed” signs should be posted at the outfall and a minimum of 100 feet upstream and 100 feet downstream of the discharge. If there is a large volume of sewage, more signs must be posted downstream.

Signs must remain posted until at least two consecutive days of sampling meet the Public Beach Sanitation and Ocean Water-Contact Sports standards that are described above. The removal of signs must be approved by EHS and the County Public Health Officer.

OERP 4.8 Recovery and Cleanup

The recovery and cleanup phase begins immediately after the flow has been restored and the SSO has been contained to the extent possible. Spilled sewage shall be vacuumed or pumped and returned to the greatest extent possible back into the sanitary sewer system.

The SSO recovery and cleanup procedures include volume estimation, sewage recovery, and cleanup and disinfection.

OERP 4.8.1 General

Clean up and disinfection procedures should be implemented to reduce the potential for human health issues and adverse environmental impacts that are associated with an SSO event. The procedures described are for dry weather conditions and should be modified as required for wet weather conditions. Clean up should proceed quickly in order to minimize negative impact. Any water that is used in the cleanup process should be de-chlorinated prior to use.

Where cleanup is beyond the capabilities of District staff, the O/M Superintendent should work with the Treatment and Distribution Supervisor to contact a cleanup contractor to complete the work.

Spills inside houses or buildings should be cleaned by a professional cleaning company. Claims by homeowners should be forwarded to the District's Auditor-Controller.

OERP 4.8.2 Guidelines for Cleanup

On **hard surface areas**, collect all signs of sewage solids and sewage-related material either by hand or with the use of rakes, brooms, and shovels. Take reasonable steps to contain and vacuum up the wastewater. Wash down the affected area with clean water and/or non-toxic biodegradable surface disinfectant until the water runs clear. Allow area to dry. Repeat the process if additional cleaning is required.

On **landscaped or unpaved areas**, collect all signs of sewage solids and sewage-related material either by hand or with the use of rakes, brooms, and shovels. Wash down the affected area with clean water until the water runs clear. Either contain or vacuum up the wash water so that none is released. Allow the area to dry. Repeat the process if additional cleaning is required. Outside contractors are hired to dispose larger volumes of contaminated soils.

Operators will use PPE such as gloves and glasses during cleanup operations.

If the SSO has reached the **storm drain system**, a combination sewer cleaning truck should be used to vacuum/pump out the catch basin and any other portion of the storm drain that may contain sewage. In the event that an overflow occurs at night, the location should be re-inspected as soon as possible the following day. The operator should look for any signs of sewage solids and sewage-related material that may warrant additional cleanup activities.

OERP CHAPTER 5 DOCUMENTATION AND REPORTING

OERP 5.1 Documentation

In accordance with the WDR, the District maintains the minimum records for each sanitary sewer overflow as listed below. Records are maintained at the District office:

- Documentation of response steps and/or remedial actions
- Photographic evidence as available to document the extent of the SSO, field crew response operations
- Site conditions after field crew SSO response operations have been completed
- The date, time, location, and direction of photographs taken will be documented
- Documentation of how any estimations of the volume of discharged and/or recovered overflow were calculated

The Statewide WDR requires that individual SSO records be maintained by the District for a minimum of five years from the date of the SSO. All records shall be made available for review upon SWRCB staff's request.

OERP 5.2 Responsibilities

The First Responder prepares the SSO Report Form and any needed work orders. The Operations/Maintenance Superintendent oversees preparation of a file for each individual SSO. In order to meet the WDR requirements for recordkeeping discussed above, the file includes the following information when available:

- Initial service call information
- SSO Report Form
- Copies of the certified CIWQS report forms including volume estimate
- CCTV inspection if completed
- Water quality sampling and test results, if applicable
- SSO Technical Report if prepared

In addition to the abovementioned records, the following additional records are also retained for all SSOs when available and as applicable:

- All original recordings for continuous monitoring instrumentation
- Service call records and complaint logs of calls received by the District for the previous five years
- Work orders, work completed, and any other maintenance records from the previous five years that are associated with SSOs

- Documentation of performance and implementation measures for the previous five years

OERP 5.3 Regulatory Reporting

Table 6-1 summarizes the regulatory reporting requirements that are also described in the paragraphs following the table.

OERP 5.3.1 Multiple Appearance Points – Single SSO

For reporting purposes, if one SSO event of whatever category results in multiple appearance points in a sewer system, a single SSO report is required in CIWQS which includes the GPS coordinates for the location of the SSO appearance point closest to the failure point, blockage or location of the flow condition that caused the SSO, and descriptions of the locations of all other discharge points associated with the single SSO event.

OERP 5.3.2 2-Hour Notification to Regulatory Agencies of SSOs

Cal OES is only to be notified of a Category 1 SSO greater than or equal to 1,000 gallons discharged to surface water or spilled in a location where it probably will be discharged to surface water. In addition the County Health Officer is to be contacted in this event. During regular business hours, the Health Officer can be reached at (415) 473-6907. During evenings/weekends, call the County Sheriff's Office at (415) 473-7250.

The District's Operations/Maintenance Superintendent & Operations Supervisor are responsible for reviewing field data for reporting to regulatory agencies. If it is determined that the criteria for OES notification was met, than the First Responder must notify OES of the event no later than two (2) hours after:

1. The District has knowledge of the SSO;
2. Notification is possible; and
3. Notification can be provided without substantially impeding cleanup or other emergency measures.

The OES State Warning Center phone number is (800) 852-7550.

The First Responder is responsible for obtaining an OES Control number. Following the initial notification to OES and until the SSO report is certified in the SWRCB online SSO Database, the LRO will provide updates (or provide direction for updates to be provided) to OES regarding substantial changes to estimated volume of untreated or partially treated sewage discharged and any substantial changes to known impact(s).

OERP 5.3.3 Detailed Reporting Requirements

Table OERP 5-1 provides detail on the District's regulatory reporting process, which is also described below.

SSO Reporting for Category 1 SSOs

- Cal OES and the County Health Officer shall receive notification of Category 1 SSOs greater than or equal to 1,000 gallons, as stated earlier in this Section.
- The District's Data Submitter, currently the Operations/Maintenance Superintendent, must then submit the initial draft report to the SWRCB's CIWQS Online SSO database @ http://ciwqs.waterboards.ca.gov/ciwqs within 3 business days of becoming aware of the SSO.
- Within 15 calendar days of the SSO end date, the LRO must review and certify the report in the CIWQS Online SSO database @ http://ciwqs.waterboards.ca.gov/ciwqs

SSO Reporting for Category 2 SSOs

- Within 3 business days of becoming aware if the SSO, the Data Submitter must submit the initial report to the SWRCB's CIWQS Online SSO database at

  http://ciwqs.waterboards.ca.gov/ciwqs.
- Within 15 calendar days of the SSO end date, the LRO must review and certify the report in the CIWQS Online SSO database @ http://ciwqs.waterboards.ca.gov/ciwqs.

SSO Reporting for Category 3 SSOs

- Within 30 calendar days of the end of the calendar month in which the SSO occurred, the LRO must submit and certify a report to the SWRCB's CIWQS Online SSO database @ http://ciwqs.waterboards.ca.gov/ciwqs.

No Spill Certification (Monthly)

Within 30 calendar days of the end of a calendar month that there are no SSO's, the LRO must submit and certify a "No Spill" certification to the CIWQS online SSO database.

CIWQS Not Available

In the event that the CIWQS online SSO database is not available, the LRO should e-mail all required information to the SWRCB SSO Reduction Program office at SanitarySEwer@Waterboards.CA.Gov in accordance with the time schedules identified above. In such an event, the District must also submit the appropriate reports using the CIWQS online SSO database when the database becomes available. A copy of all documents that certify the submittal in fulfillment of this section shall be retained in the SSO document file.

Amending SSO Reports

The LRO is responsible for amending SSO reports. Certified SSO reports may be updated by amending the report or adding an attachment to the SSO report within 120 calendar days after the SSO end date. After 120 days, the District must contact the State SSO Program to request to amend an SSO report along with a justification for why the additional information was not available prior to the end of the 120 days. The SWRCB SSO Permit/Reporting contact information is as follows:

SanitarySewer@Waterboards.CA.Gov

State Water Resources Control Board
Division of Water Quality
1001 I Street 15th Floor
Sacramento, CA 95814

Table OERP 5-1 Regulatory Reporting Requirements

Element	Category 1 Spill	Category 2 Spill	Category 3 Spill	No Spill	Method
DESCRIPTION	Discharges of untreated or partially treated wastewater of any volume resulting from an enrollee's sanitary sewer system failure or flow condition that 1) reach surface water and/or 2) reach a drainage channel tributary to a surface water or 3) Reach a municipal separate storm sewer system and are not fully captured and returned to the sanitary sewer system or not otherwise captured and disposed of properly. Any volume of wastewater not recovered from the municipal separate storm sewer system is considered to have reached surface water unless the storm drain system discharges to a dedicated storm water or ground water infiltration basin (e.g., infiltration pit, percolation pond).	Discharges of untreated or partially treated wastewater of 1,000 gallons or greater resulting from an enrollee's sanitary sewer system failure or flow condition that do not reach surface water, a drainage channel, or a municipal separate storm sewer system unless the entire SSO discharged to the storm drain system is fully recovered and disposed of properly.	All other discharges of untreated or partially treated wastewater resulting from an enrollee's sanitary sewer system failure or flow condition.	No spills in a full calendar month.	
NOTIFICATION	Within two hours of becoming aware of any Category 1 SSO greater than or equal to 1,000 gallons discharged to surface water or spilled in a location where it probably will be discharged to surface water, notify the California Office of Emergency Services (OES) and obtain a notification control number including the County Health Officer.				Call Cal OES at: **(800) 852-7550. Obtain OES Control Number** **Contact** County Health Officer **(415) 499-7237** During evenings/weekends, call the County Sheriff's Office at **(650) 216-SMSO (7676)** Additional Notification as Needed – California DFW: **(707)-944-5523**
CIWQS REPORTING	Submit draft report within **three business days** of becoming aware of the SSO.	Submit draft report within **3 business days** of becoming aware of the SSO.	Submit and certify report **within 30 calendar days** of the end of month in which SSO the occurred.	"No Spill" Certification: Certify that no SSOs occurred **within 30 calendar days** of the end of the month or, if reporting quarterly, the quarter in which no SSOs occurred.	Enter data into the CIWQS Online SSO Database (http://ciwqs.waterboards.ca.gov/), certified by the Legally Responsible Official(s). All information required by CIWQS must be captured in the SSO report.
	Certify spill within **15 calendar days** of the SSO end date.	Certify spill within **15 calendar days** of the SSO end date.		Collection System Questionnaire: Update and certify **every 12 months**	
	If volume is greater than 50,000 gallons, submit SSO Technical Report **within 45 calendar days** after end date of SSO.				LRO to upload Technical Report into CIWQS.
	Certified SSO reports may be updated by amending the report or adding an attachment to the SSO report within 120 calendar days after the SSO end date. After 120 days, the State SSO Program Manager must be contacted to request to amend an SSO report along with a justification for why the additional information was not available prior to the end of the 120 days.				
	In the event that CIWQS is not available, the LRO or their designee will fax all required information to the SWRCB office in accordance with the time schedules identified above. In such event, the O/M Superintendent will submit the appropriate reports using CIWQS as soon as practical.				
WATER QUALITY MONITORING	If spill volume is 1,000 gallons or greater, conduct daily water quality sampling as required by EHS.				LRO to upload WQ report into CIWQS.
	If spill volume is greater than 50,000 gallons, conduct water quality sampling within 48 hours and daily as required by EHS after initial SSO notification.				
RECORD KEEPING	See OERP for list of records that are required.				Self-maintained records must be retained for five years, and shall be available during inspections or upon request.

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OERP CHAPTER 6 COMMUNICATIONS WITH THE PUBLIC

A sewer backup is a stressful event and may include interactions with an irate resident property owner. Professional presentation is important, as a homeowner will likely become unhappy if it is perceived that response staff are indifferent, uncaring, unresponsive, and/or incompetent.

OERP 6.1 General Communications

Effective management of a sewage backup situation is critical to avoid the potential for a costly, prolonged process with the property owner. The property owner should feel assured that the District is responsive and that their best interest is the District's top priority.

How you communicate, whether on the phone, in writing, or in person, is how you will be perceived. Good communication with the homeowner results in greater confidence in the District's ability to address the problem satisfactorily, and a greater chance that the property owner will be cooperative as the District completes response and follow-up activities. When interacting with an affected homeowner, consider the following:

- The homeowner needs ample time to explain the situation. Show interest in what the homeowner has to say. It does not matter if you have heard the story before or already understand the problem.
- As soon as possible, let the homeowner know that you will determine if the source of the sewer backup is in the sewer main and, if it is, will have it corrected as quickly as you can
- State that you understand their concern and then explain what can be done to address the issue, either by the District if applicable, or an outside contractor
- Do not admit fault. The determination of fault is handled by management staff. If it is determined that the District is at fault, the property owner has the right to file a claim for any reasonable repairs or losses resulting from the incident.
- Keep the homeowner informed on what is being done and will be done to correct the problem
- Keep focused on getting the job done in a very professional manner. Small talk and blame are not appropriate during the response activities.

OERP 6.2 Public Notification of Spills that Do Not Reach Public Waters

For spills that are contained and do not release unrecovered sewage into a storm drain, stream or a surface water body, notification to the public shall be accomplished through the use of signs at the location of the spill.

OERP 6.3 Public Notification of Spills that Reach Waters of the United States

If sewage reaches a Waters of the United States, EHS will determine if a field investigation of the discharge site and potentially affected areas is required. If possible, verify the extent of the contamination in the field before the water body closure decision is made.

Creeks, streams and beaches that have been contaminated as a result of an SSO should be posted at visible access locations until the risk of contamination has subsided to acceptable background levels. The warning signs, once posted, should be checked every day to ensure that they are still in place. “Closed” signs shall be posted at the outfall and a minimum of 100 feet upstream and 100 feet downstream of the discharge. If there is a large volume of sewage, more signs must be posted downstream.

Signs must remain posted until at least two consecutive days of samplings meet the Public Beach Sanitation and Ocean Water-Contact Sports standards, or as otherwise determined by EHS. EHS has the authority to close and re-open the beaches and water bodies for public water contact. The water bodies affected are determined by the following parameters and best professional judgment:

- The volume of sewage discharged
- Parameters affecting flow of sewage to the water bodies
- Direction of current
- Tides
- Past experience in the area; and/or
- Any other pertinent information.

OERP CHAPTER 7 TRAINING

OERP 7.1 Initial and Annual Refresher Training

All personnel and contractor employees who may have a role in responding to, reporting and/or mitigating a sewer system overflow should receive training on the contents of the District's OERP. All new employees should receive training before they are placed in a position where they may have to respond. Current employees should receive annual refresher training on this plan and the procedures to be followed.

The District also provides the SSMP and OERP to Roy's Sewer Service, who is required to conduct its own training.

Affected employees receive annual training on the following topics by knowledgeable trainers:

- Overflow Emergency Response Plan
- Lift Station Emergency Response Plan when Available
- SSO Volume Estimation Techniques

OERP 7.2 SSO Response Drills

Periodic training drills will be held to ensure that employees are up to date on these procedures, equipment is in working order, and the required materials are readily available. The training drills will cover scenarios typically observed during sewer related emergencies (e.g. mainline blockage, mainline failure, force main failure, lift station failure, and lateral blockage).

OERP 7.3 SSO Training Record Keeping

Records will be kept of all training that is provided in support of this plan. The records for all scheduled training courses and for each overflow emergency response training event will include date, time, place, content, name of trainer(s), and names of attendees.

OERP APPENDICES

Appendix OERP-A

- SSO Report Form
- SSMP and First Responder Contact List

Appendix OERP-B

- Lift Station Emergency Response Plan (when completed)
- SSO Volume Estimation Methods
- Example SSO Notification Sign(s)

Appendix OERP-C

- Water Quality Monitoring Program
- Template for SSO Technical Report

Appendix OERP-A

SSO Report Form

SSMP and First Responder Contact List

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SSMP AND SSO RESPONSE
CONTACT NAMES AND NUMBERS

DISTRICT MAIN NUMBER: (415) 897-4133

NAME	TITLE	PHONE NO.
Drew McIntyre	General Manager	(415) 897-4133
Robert Clark	Operations/Maintenance Superintendent	(415) 761-8931
Tony Williams	Chief Engineer	(415) 897-4133
Dan Garrett	Water Distribution & Treatment Plant Operator	(415) 786-6429
Julie Blue	Auditor-Controller	(415) 897-4133
	Roy's Sewer Service	(415) 892-5480
	District Laboratory	(415) 897-4133
	Marin County Fire	9-1-1
	Office of Emergency Services (OES)	(800) 852-7550
	County Health Officer	(415) 473-6907
	County Sheriff's Office	(415) 473-7250
	SWRCB (CIWQS Questions)	866-79-CIWQS (24977)

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North Marin Water District
Oceana Marin
SSO Response Form

Caller Summary

SSO ADDRESS: ______________________________

Cross Street: ______________________________

CALLER NAME: ______________________________

CALLER CONTACT #: ______________________________

DATE OF INITIAL CALL: ______________________________

TIME OF INITIAL CALL: ______________________________

EST. TIME SSO STARTED: ______________________________

Work Summary

REC'VD BY CREW (DATE/TIME): ______________ am pm

ARRIVAL TIME: ______________________________ am pm

EMPLOYEES: ______________________________

VEHICLES: ______________________________

MATERIALS: ______________________________

Condition Encountered (Describe):

Customer Cleanout was (circle):

OVERFLOWING FULL EMPTY NON-EXISTENT

Actions Taken (circle): JET VAC CCTV

HAND ROD SNAKE OTHER ___________

Order of Steps Taken:

1. ____________________ 2. ____________________

3. ____________________ 4. ____________________

Contained Spill (circle) ALL PORTION NONE

- RESTORED FLOW? Y N N/A
- SITE CLEANED UP? Y N N/A
- SITE DISINFECTED? Y N N/A
- HEALTH WARNINGS POSTED? Y N N/A
- BEACHES POSTED? Y N N/A
- BARRICADES PLACED? Y N N/A
- PHOTOS TAKEN? Y N N/A

SSO Details

SSO DURATION (hrs/min): ______________________________

EST. SSO RATE (gal per min): ______________________________

EST. SSO VOLUME (gal): ______________________________

EST. VOL RECOVERED (gal): ______________________________

EST. VOL NOT RECOVERED (gal): ______________________________

FEET CLEANED __________ MAIN __________ LATERAL

RAIN: Y N If yes, size of rain event: __________

PROPERTY TYPE: PUBLIC PRIVATE

SPILL APPEARANCE POINT:

- ☐ Inside Bldg/Struc (location) ________________
- ☐ Lateral cleanout
- ☐ Mainline Cleanout # (list all) ________________
- ☐ Manhole # (list all) ________________
- ☐ Other ________________

PROBLEM FOUND IN : LATERAL MAINLINE

Pipe Diameter (inches): ______________________________

Pipe Material: ______________________________

Estimated Age: ______________________________

Problem (Circle):

BLOCKAGE →
- Animal Carcass
- Construction Debris
- Debris/Grit
- Detergent
- Grease/FOG
- Roots
- Solids
- Other ___________

BROKEN
CROSS-BORE
CAPACITY DEFICIENCY (DRY)
CAPACITY DEFICIENCY (WET)
UNKNOWN
FURTHER DETAILS:

____

____

____

Final Destination (Circle):

STORM DRAIN
INSIDE BUILDING/STRUCTURE
UNPAVED SURFACE
STREET/CURB/GUTTER
WATERS OF THE US
OTHER: ______________________________

If Storm Drain, Was Storm Plugged D/S & Vacuumed

Y N N/A

If Waters of the US: EST. VOL (gal) ______________

Samples Collected: Y N NA

North Marin Water District
Oceana Marin
SSO Response Form

<table>
<tr><th colspan="2">SSO – REQUIRED NOTIFICATIONS</th></tr>
<tr><td>

IF MORE THAN 1,000 GAL REACHED OR ARE LIKELY TO REACH SURFACE WATERS

CALL OES WITHIN 2 HOURS: 800-852-7550

Notify CAL OES as soon as notification can be provided without substantially impeding cleanup or other emergency measures, but no later than 2 hours after becoming aware of spill

WRITE DOWN CAL OES #: ____________________

** CALL CAL OEL BACK if the information you initially provide them (SSO volume, waterway being impacted, tec.) significantly changes from the time of the initial phone call.*

</td><td>

<u>Initial Phone Call:</u>
PERSON CALLING: ____________________
DATE: ____________________
TIME: ____________________
SPOKE TO: ____________________

Updates Made To CAL OES (If Relevant):
PERSON CALLING: ____________________
DATE: ____________________
TIME: ____________________
SPOKE TO: ____________________
DESCRIBE UPDATES: ____________________
____
____
____

</td></tr>
</table>

SAMPLING AND PUBLIC POSTINGS FOR SPILLS ENTERING WATERWAY

<u>Receiving Waters Were</u>: ☐ NOTICEABLY IMPACTED ☐ NOT NOTICEABLY IMPACTED

<u>Name of Waterway Where Sewage Entered:</u> ____________________

<u>Waterway Was a:</u> ☐ CREEK ☐ CHANNEL ☐ OCEAN ☐ OTHER

<u>Waterway Was:</u> ☐ DRY ☐ PONDED ☐ TRICKLING ☐ FLOWING ☐ GUSHING

<u>Locations Where Signs Posted:</u> ____________________

<u>Samples Taken By</u>: ____________________ **<u>Date & Time</u>:** ____________________

<u>Samples Taken</u>: _________ ft. U/S and _________ ft. D/S of where sewage entered the water.

<u>Conditions That May Have Influenced Sample Results</u>: ____________________

RESAMPLING

<u>Sample Dates</u>: ____________________

<u>Date of "Clear" Sample and Signs Removed</u>: ____________________

SSO FOLLOW-UP

<u>Dates of Last Maintenance (Cleaning) and CCTV Inspection</u>: ____________________

<u>Planned Actions Resulting from SSO</u>: HOT SPOT REPAIR REPLACE OTHER ____________________

____

Appendix OERP-B

Lift Station Emergency Response Plan

SSO Volume Estimation Methods

Example SSO Notification Sign(s)

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Placeholder for Lift Station Emergency Response Plan

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Methods for Estimating Spill Volume

A variety of approaches exist for estimating the volume of a sanitary sewer spill. This Appendix documents the three methods that are most often employed. The person preparing the estimate should use the method most appropriate to the sewer overflow in question and use the best information available.

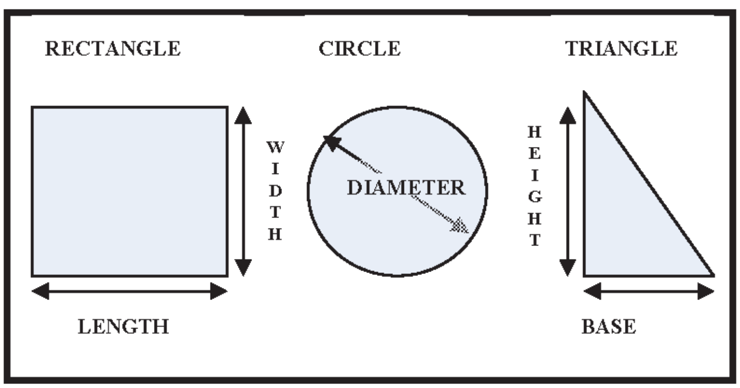
Method 1: Eyeball Estimate

The volume of small spills can be estimated using an "eyeball estimate". To use this method imagine the amount of water that would spill from a bucket or a barrel. A bucket contains 5 gallons and a barrel contains 50 gallons. If the spill is larger than 50 gallons, try to break the standing water into barrels and then multiply by 50 gallons. This method is useful for contained spills up to approximately 200 gallons.

Method 2: Measured Volume

The volume of most small spills that have been contained can be estimated using this method. The shape, dimensions, and the depth of the contained wastewater are needed. The shape and dimensions are used to calculate the area of the spills and the depth is used to calculate the volume.

Common Shapes and Dimensions



Step 1	Sketch the shape of the contained sewage (see figure above).
Step 2	Measure or pace off the dimensions.
Step 3	Measure the depth at several locations and select an average.
Step 4	Convert the dimensions, including depth, to feet.
Step 5	Calculate the area in square feet using the following formulas: Rectangle: Area = length (feet) x width (feet) Circle: Area = diameter (feet) x diameter (feet) x 0.785 Triangle: Area = base (feet) x height (feet) x 0.5
Step 6	Multiply the area (square feet) times the depth (in feet) to obtain the volume in cubic feet.
Step 7	Multiply the volume in cubic feet by 7.5 to convert it to gallons

Method 3: Duration and Flowrate

Calculating the volume of larger spills, where it is difficult or impossible to measure the area and depth, requires a different approach. In this method, separate estimates are made of the duration of the spill and the flowrate. The methods of estimating duration and flowrate are:

Duration

The duration is the elapsed time from the time the spill started to the time that the flow was restored.

Start Time: The start time is sometimes difficult to establish. Here are some approaches:

1. Local residents can be used to establish start time. Inquire as to their observations.

   Spills that occur in rights-of-way are usually observed and reported promptly. Spills that occur out of the public view can go on longer. Sometimes observations like odors or sounds (e.g. water running in a normally dry creek bed) can be used to estimate the start time.

2. Changes in flow on a downstream flowmeter can be used to establish the start time.

   Typically the daily flow peaks are "cut off" or flattened by the loss of flow. This can be identified by comparing hourly flow data during the spill event with flow data from prior days. This method will likely only be effective with consistent weather.

3. Conditions at the spill site change over time and can be used to establish the start time. Initially there will be limited deposits of toilet paper and other sewage solids. After a few days to a week, the sewage solids form a light-colored residue. After a few weeks to a month, the sewage solids turn dark. The quantity of toilet paper and other materials of sewage origin increase over time. These observations can be used to estimate the start time in the absence of other information. Taking photographs to document the observations can be helpful if questions arise later in the process. This method is valid for spills that have been occurring for a long time and may be used in conjunction with either of the above methods.

4. It is important to remember that spills may not be continuous. Blockages are not usually complete (some flow continues). In this case the spill would occur during the peak flow periods (typically 10:00 to 12:00 and 13:00 to 16:00 each day). Spills that occur due to peak flows in excess of capacity will occur only during, and for a short period after, heavy rainfall.

End Time: The end time is usually much easier to establish. Field crews on-site observe the "blow down" that occurs when the blockage has been removed. The "blow down" can also be observed in downstream flowmeters.

Flow Rate

The flowrate is the average flow that left the sewer system during the time of the spill.

There are three common ways to estimate the flowrate:

1. **The San Diego Manhole Flowrate Chart**: This chart, included as at the end of this appendix, shows sewage flowing from manhole covers at a variety of flowrates. The observations of the field crew can be used to select the appropriate flowrate from the chart. If possible, photographs are useful in documenting basis for the flowrate estimate.

2. **Flowmeter:** Changes in flows in downstream flowmeters can be used to estimate the flowrate during the spill.

3. **Counting Connections:** Once the location of the spill is known, the number of upstream connections can be determined from the sewer maps. Multiply the number of connections by 200 to 250 gallons per day per connection or 8 to 10 gallons per hour per connection.

For example: 22 upstream connections * 9 gallons per hour per connection

= 198 gallons per hour / 60 minutes per hour

= 3.3 gallons per minute

Spill Volume

Once duration and flowrate have been estimated, the volume of the spill is the product of duration (hours or days) and the flowrate (gallons per hour or gallons per day).

For example: Spill start time = 11:00

Spill end time = 14:00

Spill duration = 3 hours

3.3 gallons per minute x 3 hours x 60 minutes per hour

= 594 gallons

City of San Diego
Metropolitan Wastewater Department

Reference Sheet for Estimating Sewer Spills from Overflowing Sewer Manholes

All estimates are calculated in gallons per minute (gpm)

Wastewater Collection Division
(619) 654-4160

5 gpm

25 gpm

50 gpm

100 gpm

150 gpm

200 gpm

225 gpm

250 gpm

275 gpm

All photos were taken during a demonstration using metered water from a hydrant in cooperation with the City of San Diego's Water Department.

rev. 4/99

WARNING!
SEWAGE OVERFLOW
AVOID WATER CONTACT

PRECAUCION!
AGUA DE DESPERDICIO
MANTENGASE FUERA DEL AGUA

NORTH MARIN
WATER DISTRICT

NORTH MARIN WATER DISTRICT
OCEANA MARIN SEWER
(415) 897-4133

Appendix OERP-C

Water Quality Monitoring Plan

SSO Technical Report Template

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ON LETTERHEAD

Date

State Water Resources Control Board
1001 I Street
Sacramento, CA 95814

Subject: Technical Report for Sanitary Sewer Overflow Greater than 50,000 Gallons
Event ID: XXXXXX

This submittal comprises the Sanitary Sewer Overflow ("SSO") Technical Report ("Report") that is required by State Water Resources Control Board ("SWRCB") Order No.WQ 2013-0058-EXEC ("Order"). The Order requires each enrollee to submit an SSO Technical Report in the California Integrated Water Quality System ("CIWQS") online SSO database within 45 calendar days of the SSO end date for any SSO in which 50,000 gallons or greater are spilled to surface waters.

This Report comprises the following sections:

1. Causes and Circumstances of the SSO
2. Agency's Response to SSO
3. Water Quality Monitoring

1.0 CAUSES AND CIRCUMSTANCES OF THE SSO

A. Description of how and when the SSO was discovered.

B. Figure 1 shows the SSO failure point, appearance point(s), and final destination(s).

C. Methodology and data used to calculate the volume of the SSO and any SSO volume recovered.

D. Detailed description of the cause(s) of the SSO.

E. Copies of original field crew records used to document the SSO are included at the end of this Report.

F. The Order requests historical maintenance records for the failure location. The associated pipe segment cleaning and CCTV history is provided in Table 1.

Table 1. Maintenance Results for Pipe Segment XXXXX-XXXX

Date	Action: Clean or CCTV	Summary of Findings

2.0 RESPONSE TO SSO

A. The following presents a chronology of all actions taken to terminate the SSO.

B. The actions described in 2A, above, followed the agency's Sewer System Management Plan ("SSMP") Overflow Emergency Response Plan. Specifically, the activities related to initial response, reporting, notifications and posting, and corrective measures were followed. North Marin Water District ("District") completed water quality sampling within 48 hours after the end of the SSO, and submitted these samples for bacteriological and ammonia testing as required by the Order.

C. Final corrective action(s) completed and/or planned to be completed, including a schedule for actions not yet completed are described below.

2.0 WATER QUALITY MONITORING

A. Water quality sampling activities conducted, including analytical results and evaluation of the result, are as follows.

B. Figure 2 shows a location map showing water quality sampling points.

If you have further questions or would like additional information about this Technical Report, please contact me by phone at (415) 761-8931 or by email at rclark@nmwd.com.

Sincerely,

Robert Clark
Operations/Maintenance Superintendent

NORTH MARIN WATER DISTRICT
OCEANA MARIN SEWER
WATER QUALITY MONITORING PROGRAM

INTRODUCTION

This Water Quality Monitoring Program provides the agency's response activities and standard operating procedures to be utilized in the OERP, in the event a sanitary sewer overflow (SSO) exceeds 50,000 gallons. This program is reviewed periodically and may be updated as necessary.

State Water Resources Control Board Order No. WQ 2013-0058-EXEC, **Amending Monitoring And Reporting Program For Statewide General Waste Discharge Requirements For Sanitary Sewer Systems** (Effective September 9, 2013), requires the following:

SSO WDR Section D. Water Quality Monitoring Requirements

To comply with subsection D.7(v) of the SSS WDRs, the enrollee shall develop and implement an SSO Water Quality Monitoring Program to assess impacts from SSOs to surface waters in which 50,000 gallons or greater are spilled to surface waters. The SSO Water Quality Monitoring Program, shall, at a minimum:

1. Contain protocols for water quality monitoring.
2. Account for spill travel time in the surface water and scenarios where monitoring may not be possible (e.g. safety, access restrictions, etc.).
3. Require water quality analyses for ammonia and bacterial indicators to be performed by an accredited or certified laboratory.
4. Require monitoring instruments and devices used to implement the SSO Water Quality Monitoring Program to be properly maintained and calibrated, including any records to document maintenance and calibration, as necessary, to ensure their continued accuracy.
5. Within 48 hours of the enrollee becoming aware of the SSO, require water quality sampling for, at a minimum, the following constituents:
    i. Ammonia
    ii. Appropriate Bacterial indicator(s) per the applicable Basin Plan water quality objective or Regional Board direction which may include total and fecal coliform, enterococcus, and e-coli.

Additionally, for spills greater than 50,000 gallons, an SSO Technical Report is required and must be submitted within 45 calendar days from the SSO end date. The SSO Technical Report requirements are described in Element VI of the OERP.

SAFETY

Be aware of safety issues and do not subject personnel to unsafe conditions in order to comply with this Water Quality Monitoring Plan. Scenarios where monitoring may not be possible may include, but are not limited to, heavy rain/storm events where access points have been compromised, flooding around low level areas, or fast-moving water. Employ the buddy system as required to maximize employee safety when sample collection is required.

ESTIMATION OF SPILL TRAVEL TIME

The follow methods are recommended to estimate spill travel time and direction:

- Method-1; use a velocity probe if available to determine the rate of flow in the surface water or
- Method-2; take visual ft/sec measurement from above, based on floating debris, to estimate the number of feet the debris has traveled in seconds.

Either method will provide a means to estimate the distance traveled and identify where the SSO may be headed within the waterway.

WATER QUALITY SAMPLING PROCEDURES

- In the event an SSO reaches a surface water or (flowing) drainage channel tributary, take samples for spills less than 50,000 gallons as appropriate and within 48 hours for spills greater than 50,000 gallons. The purpose of water quality sampling is to determine the nature and extent of the impact of the SSO.
- When sampling an SSO, take a minimum of three separate sample sets as conditions allow. Water quality sampling should not be given precedence over stopping the spill or protection of public health. One sample shall be located 500’ upstream of the discharge location. The second sample shall be taken at the discharge location. A third sample shall be taken 1000’ downstream of the discharge location.
- Sample for Total and Fecal Coliform, eColi, and Ammonia as a minimum. Conduct additional sampling for pH if practical.
- Additional follow-up samples are recommended to confirm the extent that the impact reverts back to baseline levels. Follow-up samples may be used to determine if posting of warning signs should be discontinued (if signs were posted).
- Collaboration with the County Health Department should continue until closure is obtained.
- Do not forget to take into account Spill Travel Time.

WATER QUALITY SAMPLING EQUIPMENT

The following list describes equipment that should be stocked and readily available for each water quality sampling event.

- Personnel protective equipment including latex/nitrile gloves and eye protection
- 3 – 100 mL sterile plastic containers for coliform analysis.
- 3 – 500 mL Poly containers preserved with H2SO4 for Ammonia analysis.
- 3 – sterile funnels
- 1 – Sample Collection Container
- Cooler with ice packs
- Chain of Custody forms

Ensure that there are adequate quantities of sample containers-kits if there are more than three sample locations.

WATER QUALITY SAMPLING PROCEDURE

1. Put on all required protective equipment including latex/nitrile gloves and eye protection
2. Use the 100 mL sterile container for coliform and 500mL poly container for ammonia. Ammonia sample requires preservation with H_2SO_4 .
3. Collect three sets of samples for each incident:
    a. 500 feet upstream
    b. At the SSO entry point
    c. 1000 feet downstream
4. Collect all grab samples approximately 3’ - 6” below the surface (or if shallower, as close as possible to this depth) to avoid sampling debris or scum from the surface.
5. Collect the sample in a safe manner in the middle of the flow, against the direction of water flow.
6. Rinse the sample collection container.
7. Collect sample in sample collection container and photo-document the locations.
8. Transfer sample from sample collection container to individual sample bottle(s).
9. Leave approximately one inch of head space in individual sample bottles. Do not overfill.
10. Once the lid is opened for the individual sample bottle, do not touch the inside surface of the bottle or lid.
11. For the sample bottles that contain a preservative, take care to keep the preservation material in the container.
12. Immediately place all sample bottles on ice.

13. Complete Chain of Custody form and take samples to contracted environmental laboratory as described in the OERP.

Following are allowable hold times for the sample bottles:

- Ammonia - 28 days (preserved and cooled)
- Bacterial Indicator (enterococcus or fecal/total coliform) - 8 hours (preserved and cooled)
- pH Field Test - Immediate

ELEMENT 7 - FOG CONTROL PROGRAM

The intent of this section of the SSMP is to evaluate the extent and nature of SSOs related to Fats, Oils and Grease (FOG), to determine the need for a FOG Control Program, and to outline the elements of the District FOG control program.

The service area zoning only permits residential developments; there are no commercial properties served by the District. As such, the District does not require a FOG control program.

7.1 SWRCB SSMP Requirements

The District shall evaluate its service area to determine whether a FOG control program is needed. If the District determines that a FOG program is not needed, justification must be provided for why it is not needed. If FOG is found to be a problem, the District must prepare and implement a FOG source control program to reduce the amount of these substances discharged to the sanitary sewer system. The FOG source control program shall include the following as appropriate:

- An implementation plan and schedule for a public education outreach program that promotes proper disposal of FOG
- A plan and schedule for the disposal of FOG generated within the sanitary sewer system service area. This may include a list of acceptable disposal facilities and/or additional facilities needed to adequately dispose of FOG generated within a sanitary sewer system service area.
- The legal authority to prohibit discharges to the system and identify measures to prevent SSOs and blockages caused by FOG
- Requirements to install grease removal devices (such as traps or interceptors), design standards for the grease removal devices, maintenance requirements, BMP requirements, record keeping and reporting requirements
- Authority to inspect grease producing facilities, enforce requirements, and determine whether the District has sufficient staff to inspect and enforce the FOG ordinance
- An identification of sewer system sections subject to FOG blockages and the establishment of a cleaning maintenance schedule for each section
- Development and implementation of source control measures, for all sources of FOG discharged to the sewer system, for each sewer system section identified as subject to blockages

7.2. Goals for the FOG Program

As discussed earlier in this section, the District does not have any commercial establishments. Goals will be established if this should change, and a FOG program is required.

7.3 Legal Authority to Prohibit SSOs and Blockages Caused by Fog Discharge

The District's authority to regulate the discharge of FOG is provided by Regulation 105. Specification, Regulation 105.b (3) states:

- Except as herein provided no person shall discharge or cause to be discharged any of the following described water or wastes to any sewer main or side-sewer… (3) any ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, **fat, oil, grease**, or any other solid or viscous substance capable of causing obstruction to the flow in sewer mains or other interferences with the proper operation of the sewage facilities.

Appendix F – FOG Control Program Documents

There are no Appendix documents to accompany Section 7. However, Appendix F is included as a placeholder for future documents.

ELEMENT 8 - SYSTEM EVALUATION AND CAPACITY ASSURANCE PLAN

This section of the SSMP discusses the District's activities related to capacity management.

8.1 SSMP Requirements

The District must establish a short- and long-term capital improvement plan (CIP) to address identified hydraulic deficiencies including prioritization, alternatives analysis, and schedules. The CIP may include increases in pipe size, I&I reduction programs, increases and redundancy in pumping capacity, and storage facilities. The CIP shall include an implementation schedule and shall identify sources of funding. The District shall develop a schedule of completion dates for all portions of the CIP. This schedule shall be reviewed and updated at least every two years.

8.2 System Evaluation and Capacity Assurance Plan

The District has not had any capacity-related SSOs over the past five years, according to the California Integrated Water Quality System Project (CIWQS). The District recently completed the 2015 Oceana Marin Master Plan Update, in which dry and wet weather flow volumes are discussed. Flows over a 5+ year time period were reviewed. During this period, average annual flow ranged from 5.1 million gallons ("MG") to 7.3 MG, with an overall average annual flow of 6.2 MG. Based on the number of connections, the master plan estimates a dry weather annual baseflow of 5.8 MG. Therefore, across the 5.5 years of flow that were reviewed, wet weather inflow and infiltration contributed approximately 400,000 gallons to the system per year on average. Although this I&I can be conveyed by the system without sewer system overflows, the District continues to work toward reducing inflow and infiltration further through pipeline repairs.

The District's system has experienced no known capacity-related issues, and the District has no known plans for current or future expansion. Having less than 300 connections, the gravity sewer pipelines are sized to facilitate maintenance, and as a result, are oversized for the expected flow. Therefore, there is no immediate need to measure system flows or developing a computerized hydraulic model.

8.3 Capital Improvement Program Budget and Schedule

The District does have capacity-related system constraints, and therefore has not identified capacity-related projects in the CIP. However, the District continues to repair pipeline defects as identified through the pipeline CCTV inspection program and discussed in Section 4. By repairing these defects, the District also addresses locations that may admit inflow and infiltration.

Appendix G – System Evaluation and Capacity Assurance Plan Documents

- 2015 Oceana Marin Master Plan Update

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ELEMENT 9 - MONITORING, MEASUREMENT AND PROGRAM MODIFICATIONS

This section of the SSMP discusses the District's Monitoring, Measurement, and Program Modifications.

9.1 SSMP Requirements

The requirements for the Monitoring, Measurement, and Program Modifications element of the SSMP are summarized below.

The District shall:

- Maintain relevant information that can be used to establish and prioritize appropriate SSMP activities
- Monitor the implementation and, where appropriate, measure the effectiveness of each element of the SSMP
- Assess the success of the preventative maintenance program
- Update program elements, as appropriate, based on monitoring or performance evaluations
- Identify and illustrate SSO trends, including SSO frequency, location, and volume

9.2 Utility Metrics to Measure Progress and Prioritize Activities

The District maintains complaint and blockage records, and due to the small number of assets in the Oceana Marin sewer system, records preventive maintenance activities in using Microsoft Excel. This information is used to establish and prioritize appropriate SSMP activities.

The District has established the preventive maintenance sewer metrics that are shown in Table 9-1 for use in monitoring, measuring and adjusting sewer maintenance activities. These metrics will may be adjusted from time to time, and will be reviewed as part of the SSMP audit.

Table 9-1. Success Factors and Metrics

Sewer Maintenance Success Factor	Metric
Pipes Cleaned	Miles
Pipe Inspected (CCTV)	Miles
Hot Spots Cleaned	Number by Underlying Cause (Roots, Debris, FOG, Structural)
SSOs	Number by Underlying Cause
Response Time	Minutes per SSO after Notification
LIft Station Overflows	Number by Cause
Pipe Replaced	Miles/Year

9.3 SSO Trends

General SSO trends are provided in Table 9-2 and Figure 9-1. All data was obtained from the California Integrated Water Quality System (CIWQS) public reports.

Table 9-2. SSOs by Cause

Cause of SSO	2018	2019	2020	2021	2019
Debris	0	0	0	0	1
Roots	0	0	0	0	0
Grease	0	0	0	0	0
Capacity	0	0	0	0	0
Others (Structural, Lift Station Failure)	0	0	0	1	0
Total	**0**	**0**	**0**	**1**	**1**

Table 9-3. SSO Volume Trends

Parameters	Year				
	2018	2019	2020	2021	2022
Number of dry weather SSOs	0	0	0	1	1
Number of wet weather SSOs (capacity-related)	0	0	0	0	0
Total number of SSOs	0	0	0	0	0
Number of SSOs < 100 gallons	0	0	0	0	0
Number of SSOs 100 to 999 gallons	0	0	0	0	1
Number of SSOs 1,000 to 9,999 gallons	0	0	0	1	0
Number of SSOs > 10,000 gallons	0	0	0	0	0
Total volume of SSOs (gallons)	0	0	0	3,359	500
Total volume recovered and returned to collection system (gallons)	0	0	0	0	0
Net volume of SSOs (total minus recovered, gal)	0	0	0	3,359	500
Percent volume recovered (100 x Total volume recovered / Total volume of SSOs)	0	0	0	0	0
Volume Reaching Water	0	0	0	0	0

Appendix H – Monitoring, Measurement and Program Modification Documents

There are no Appendix documents to accompany Section IX. However, this Appendix H is included as a placeholder for future documents.

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ELEMENT 10 - SSMP PROGRAM AUDITS

This section of the SSMP discusses plans for required self-audits of the SSMP.

10.1 SWRCB Requirements

The requirements for the SSMP Audits element of the SSMP are summarized below:

The District shall conduct periodic internal audits. At a minimum, these audits must occur every two years and a report must be prepared and kept on file. This audit shall focus on evaluating the effectiveness of the SSMP and the District's compliance with the SSMP requirements, including identification of any deficiencies in the SSMP and steps to correct them.

10.2 Audit Procedures, Roles and Responsibilities

The District will prepare a biannual SSMP audit, and will retain the audit on file in accordance with the Statewide WDR requirements. The most recent audit was completed in 2020, and changes identified in the audit were included in the 2020 update to the SSMP. The audit form and 2020 audit are included in Appendix I.

10.3 SSMP Program Modification/Update Process

If the biannual audit identifies significant changes to be made to the SSMP, then the SSMP will be updated by June 30 of the same year in which the audit was submitted. However, it is anticipated that the main SSMP document will remain generally unchanged, and that a comprehensive SSMP update will be completed every five years, as required by the WDR.

Changes made to the SSMP are documented in the Change Log located in Appendix I.

Appendix I – SSMP Program Audit Documents

Appendix I includes the following documents related to this section. The information in these documents will change from time to time, and the documents in Appendix I may have been superseded. Please contact the Operations/Maintenance Superintendent the most recent updates to the Appendix I documents.

- SSMP Change Log
- SSMP Audit Forms
- SSMP Blank Audit Form

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ELEMENT 11 - COMMUNICATION PLAN

This section of the SSMP discusses the District communication plan. This section fulfills the Communication Plan requirements for the SWRCB element.

11.1 SWRCB SSMP Requirements

The requirements for the Communication Plan element of the SSMP are summarized below:

The District shall communicate on a regular basis with the public on the development, implementation, and performance of its SSMP. The communication system shall provide the public the opportunity to provide input as the program is developed and implemented. The agency shall also create a plan of communication with systems that are tributary and/or satellite to the sanitary sewer system.

11.2 Communication Plan

The District uses its publicly noticed Board meetings to discuss SSMP elements, performance, and updates. The SSMP is also included on the NMWD website to provide public access to the document.

Appendix J – Communication Plan Documents

There are no Appendix documents to accompany Section XI. However, this Appendix J is included as a placeholder for future documents.

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Appendix A

Element 2 (Organization) Supporting Documents

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SSMP AND SSO RESPONSE
CONTACT NAMES AND NUMBERS

DISTRICT MAIN NUMBER: (415) 897-4133

NAME	TITLE	PHONE NO.
Drew McIntyre	General Manager	(415) 897-4133
Robert Clark	Operations/Maintenance Superintendent	(415) 761-8931
Tony Williams	Chief Engineer	(415) 897-4133
Dan Garrett	Water Distribution & Treatment Plant Operator	(415) 786-6429
Julie Blue	Auditor-Controller	(415) 897-4133
	Roy's Sewer Service	(415) 892-5480
	District Laboratory	(415) 897-4133
	Marin County Fire	9-1-1
	Office of Emergency Services (OES)	(800) 852-7550
	County Health Officer	(415) 473-6907
	County Sheriff's Office	(415) 473-7250
	SWRCB (CIWQS Questions)	866-79-CIWQS (24977)

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Mutual Aid and Assistance Agreement
Between
North Marin Water District and Novato Sanitary District

This agreement is made and entered into by the North Marin Water District and Novato Sanitary District ("Districts") to provide mutual aid and assistance to each other in times of need and to provide reimbursement for equipment, supplies and personnel made available under this agreement.

In consideration of the mutual covenants and agreements hereinafter set forth, the Districts agree to provide mutual aid and assistance to each another in times of need. Each District has the absolute discretion to decline to provide any requested assistance, and the execution of this agreement shall not create any duty to respond on the part of either District.

The General Manager of either District may request aid and assistance (Requesting District) from the General Manager of the other District (Responding District). Requests for assistance can be made orally or in writing. When made orally, the request for personnel, equipment and supplies shall also be prepared in writing and submitted to the other General Manager as soon a practicable.

When either District receives a request for aid or assistance, the General Manager of the Responding District will evaluate the request and shall inform, as soon as possible, the Requesting District about the type of available resources, if any, and the approximate arrival time of such assistance.

Employees provided under this agreement will be under the direction and control of the Requesting District. The Requesting District's designated supervisor(s) must keep accurate records of time expended and work performed by personnel during the period of assistance. The Responding District's General Manager retains the right to withdraw some or all of its resources at any time for any reason in the Responding District's sole discretion.

Cost Reimbursement
Personnel: The Responding District will make such employees as are willing to participate available to the Requesting District at the Requesting District's expense, defined as being equal to the Responding District's full cost, i.e., equal to the employee's applicable salary or hourly wage plus fringe benefits and overhead. The Requesting District shall be responsible for all direct and indirect labor costs.

Equipment: Use of equipment, such as construction equipment, vehicles, tools, pumps and generators, shall be at the Responding District's current equipment rate and subject to the following conditions: The Requesting District shall reimburse the Responding District for use of equipment including, but not limited to, all fuel, lubrication, maintenance, transportation, and loading/unloading of loaned equipment. All equipment shall be returned to the Responding District as soon as is practicable and reasonable under the circumstances.

(a) At the option of the Responding District, equipment may be provided with an operator;
(b) Equipment shall be returned to the Responding District within 24 hours after receipt of an oral or written request for return;
(c) In the event equipment is damaged while being dispatched to Requesting District, or while in the custody and use of Requesting District, Requesting District shall reimburse the Responding District for the reasonable cost of repairing said damaged equipment. If

the equipment can not be repaired, the Requesting District shall reimburse the Responding District for the cost of replacing such equipment with equipment that is of at least equal capability as determined by the Responding District. If the Responding District must lease a piece of equipment while the Requesting District equipment is being repaired or replaced, the Requesting District shall reimburse the Responding District for such lease cost.

Materials and supplies: The Requesting District shall reimburse the Responding District in kind or at actual replacement cost, plus handling charges, for use of expendable or non-returnable supplies. Other supplies and reusable items that are returned to the Responding District in a clean, damage-free condition shall not be charged to the Requesting District and no rental fee shall be charged; otherwise, they shall be treated as expendable supplies. Supplies that are returned to the Responding District with damage must be treated as expendable supplies for purposes of cost reimbursement.

Payment Period: The Responding District shall provide an itemized invoice to the Requesting District for the expense incurred in providing assistance under this agreement not later than the 10th of the month following the month wherein assistance is provided. The Requesting District agrees to reimburse the Responding District within 15 days from receipt of an invoice.

Records: Authorized representatives of each District shall have access to the other's books, documents, notes, reports, papers and records for the purpose of reviewing the accuracy of the invoice(s) rendered.

Indemnity: Each District shall assume the defense of, fully indemnify, and hold harmless the other District, its Directors, officers and employees, from all claims, loss, damage, injury and liability of every kind, nature and description, directly or indirectly arising from assistance provided hereunder, including, but not limited to, negligent or wrongful use of equipment, supplies or personnel provided, or faulty workmanship or other negligent acts, errors or omission.

Workers' Compensation: Each District is responsible for providing worker's compensation benefits and administering worker's compensation for its employees.

Effective Date: This agreement shall take effect upon execution.

Termination: Either District may terminate this agreement by providing written notice to the other. Termination does not absolve the Requesting District's duty to reimburse the Responding District for assistance rendered, which duty shall survive such termination.

Modification: Modification to this agreement must be in writing.

Severability: If any provision of this agreement is declared by a court of competent jurisdiction to be invalid, the validity of the remaining terms and provisions shall not be affected.

Chris DeGabriele 1/28/2010	Beverly B James 1/28/2010
Chris DeGabriele Date	Beverly James Date
North Marin Water District	Novato Sanitary District

Appendix B

Element 3 (Legal Authority) Supporting Documents

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NORTH MARIN WATER DISTRICT

REGULATION 100

GENERAL PROVISIONS

a. Intent and Purpose

It is the intent and purpose of the Board of Directors of the North Marin Water District to protect the public health and safety through enforcement of these regulations in the design, construction and use of sewage facilities within the jurisdiction of the District.

b. Authority

These regulations are adopted pursuant to provisions of Section 31100 and following, of the Water Code of the State of California.

c. Definitions

As used in this Part D of the Regulations of North Marin Water District, the following terms have the meaning stated below.

(1) Applicant

Shall mean the owner of the premises to be served by the sewer proposed to be installed or connected, or the owner's authorized agent.

(2) Application

Shall mean an application for sewer service which shall be on a form provided by the District for that purpose, and which shall describe the work proposed to be done, the location, ownership, occupancy, and use of the premises proposed to be served, the characteristics of the waste proposed to be introduced into the District's sewage facility, and be accompanied by such plans and specifications and further information as may be determined by the District to be necessary.

(3) Agreement

Shall mean an agreement between the Applicant and the District that establishes by the terms and conditions under which any sewage facilities shall be installed, replaced or extended.

(4) Board of Directors

Shall mean the Board of Directors of the North Marin Water District.

(5) BOD (Biochemical Oxygen Demand)

Shall mean the quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedure in 5 days at 20E centigrade expressed in milligrams per liter.

(6) Building

Shall mean any structure containing any facility generating sewage requiring disposal into the District's sewage facility.

(7) County

Shall mean the County of Marin.

(8) District

Shall mean the North Marin Water District.

(9) Improvement District

Improvement District shall mean a specific portion of land within the boundaries of the District designated by the District as being an area in which the District will provide sewer service and to which certain debt obligations are assigned.

(10) Infiltration

Shall mean groundwater entering sewers through defective joints, and broken or cracked pipe and manholes.

(11) Sewer Main

Shall mean a public sewer into which storm, surface and ground waters are not intentionally admitted and which lies within a public street or easement readily accessible to the District.

(12) Private Disposal System

Shall mean any system of treatment devices or facilities (excluding chemical toilets) that store, convey, treat or dispose sewage which is discharged anywhere other than into a public sewer system.

(13) Regulations, Sewer Regulations, These Regulations

Shall mean the regulations of the District in this Part D.

(14) Sewage

Shall mean any liquid waste containing matter in suspension or solution.

(15) Sewage Facility

Shall mean all facilities for collecting, pumping, treating and disposing of sewage or for conveying treated sewage to points of reuse.

(16) Sewer

Shall mean a pipe or conduit for carrying sewage.

(17) Side-Sewer

Shall mean the sewer line connecting the building sewer and the sewer main.

d. Agreement, Inspection and Fees

(1) No sewer main or side-sewer shall be installed, replaced, or extended within the District until a sewer service agreement is signed by both the Applicant and the District, all fees, charges and estimated construction costs required under Regulations 106 and 109 are paid, and all necessary right-of-ways are granted to the District.

(2) No connection with or use of any sewer main or side-sewer shall be made until the sewer main and side-sewer has been inspected and approved by the District.

e. Land Use Approval Established

An application for service to unimproved land shall not be processed to completion by the District unless the Applicant presents to the District a document from the County of Marin verifying that:

(1) A valid building permit has been issued; or

(2) A preliminary division of land has been approved; or

(3) A tentative subdivision map has been approved; or

(4) A planned unit development precise development plan has been approved; or

(5) A conditional use permit has been approved.

Unimproved land means land on which no improvements exist or land which although improved to a degree is being further improved and said further improvement is the cause for augmented sewer service and requires one or more of the above listed land use approvals.

f. Validity

If any provision of these regulations or the application thereof to any person or circumstance is held invalid the remainder of the regulation and the application of such provisions to other persons or circumstances shall not be affected thereby.

NORTH MARIN WATER DISTRICT

REGULATION 101

USE OF SEWER MAIN REQUIRED

a. Disposal of Wastes

The discharge of any sewage, commercial or industrial wastes or other polluted waters to any stream or water courses located within an Improvement District is prohibited.

b. Unlawful Disposal

Except as herein provided, construction of any privy, privy vault, septic tank, cesspool, or seepage pit facility intended to be used for the disposal of sewage within an Improvement District is prohibited.

c. Occupancy Prohibited

No building within an Improvement District shall be occupied until the owner of the premises has complied with the provisions of these regulations.

d. Connection to Sewer Main Required

The owner of any building on land in an Improvement District which is within four hundred (400) feet of a District sewer main shall at his or her expense connect said building directly to the sewer main in accordance with the provisions of this regulation within ninety (90) days after notification by the District. The District may waive this requirement upon finding that such connection is not necessary to protect the public health and welfare.

NORTH MARIN WATER DISTRICT

REGULATION 102

PRIVATE SEWAGE DISPOSAL

a. Public Sewer Not Available

Where a District sewer is not available to serve a building in an Improvement District, the building sewer shall be connected to a private sewage disposal system complying with provisions of the Marin County Code.

b. Replaced Private Disposal Systems

Where a property previously served by a private sewage disposal system is annexed into an Improvement District and is then served by a District sewer, the disposition of the private sewage disposal system replaced shall be in accordance with the Marin County Code.

NORTH MARIN WATER DISTRICT

REGULATION 103

SIDE-SEWER CONNECTIONS

a. Agreement Required

In accordance with Section d. of Regulation 100 no person shall construct a side-sewer or make a connection with any sewer main or side sewer without first entering into an agreement with the District and, except to the extent expressly prohibited by Governmental Code section 65852.2, paying all fees, charges and estimated construction costs as required under Regulations 106, and 109.

b. When Extension of Sewer Main Required

Extension of a District sewer main shall be constructed to serve new consumers whose lands do not have direct access to or do not abut a street or easement containing an adequate sewer main. Property with direct access to a street or easement containing an adequate sewer main, but which does not have a major frontage on the street or easement, will be served at such street or easement provided that such property and adjacent properties cannot be further subdivided or developed.

c. Construction Requirements

(1) Construction of side-sewers shall be in accordance with the NMWD Standard Drawings, Sewer.

(2) No person shall uncover or otherwise alter or disturb a side-sewer without first receiving the consent of the District.

d. Separate Side-Sewers

Each separate building shall be connected to the sewer main with a separate side-sewer except that one or more buildings located on property owned by the same person may be served by the same side-sewer if the District is expressly required by Government Code section 65852.2 to allow an accessory dwelling unit to be served by the same side sewer as the primary dwelling, or if the District determines that it is unlikely that the property can or will be subdivided in the future. However, if for any reason the property is subsequently subdivided, each building under separate ownership shall be provided by the owner with a separate side-sewer and sewer main extension as required by the District. Continued use of such common side-sewer is prohibited.

e. Old Building Side-Sewers

An old building side-sewer may be used in connection with a new building only if, after inspection, the District determines that the side-sewer meets all current District requirements.

f. Maintenance of Side-Sewers

The maintenance of each side-sewer shall be the responsibility of the owner of the property served thereby. The cost of testing, inspecting, maintaining, repairing, replacing and relocating a side-sewer shall be borne by the owner of the property served thereby. The owner shall keep the side-sewer free of infiltration.

g. Testing of Side-Sewers

Side-sewers may be tested under the supervision of the District in each of the following circumstances:

(1) on remodeling or enlargement of the property served involving the installation of any

plumbing fixture,

(2) on change of use of the building served as residential, commercial or industrial,

(3) on connection to repair or replacement of the side-sewer, and

(4) on request of the District.

h. Sewers Too Low

In all buildings in which any building sewer is too low to permit gravity flow to the existing sewer main or side-sewer, the District will require that all other methods of obtaining gravity flow must be examined. Any new construction that is required in order to achieve gravity flow will be at the property owner's expense.

The District will determine if gravity flow sewer service to the property is not feasible. In this case, the sewage carried by such building sewer shall be lifted by a private pump system subject to District approval and discharged to the sewer main or side-sewer as determined by the District and at the expense of the owner. The Applicant shall enter into a recordable agreement running with the land to be served agreeing to accept such service and releasing the District from any liability and from all responsibility to provide gravity service and agreeing to maintain in good condition and repair without cost to the District the private pump system including:

(1) collection basin

(2) sewage pump or grinder pump as required

(3) cleanouts appropriately located to remedy pipe blockages

(4) check valve to prevent sewage in the District's sewer system from draining into the owner's private system.

NORTH MARIN WATER DISTRICT

REGULATION 104

SEWAGE FACILITY CONSTRUCTION

a. Facility Size and Design

All extensions of the District's sewage facility shall be designed by the District and constructed in accordance with the District's plans and specifications. The location, size, type and design of all such extensions shall be sufficient to provide adequate sewage collection, pumping, treatment and disposal capacity for the entire area that can economically be served therefrom as conclusively determined by the District.

b. Construction by District

Subject to the rights of the Applicant as herein set forth, the District will construct extension of its sewage facilities. Such work will be commenced only after the Applicant has entered into a sewer service agreement, advanced the total estimated cost of all facilities, paid all charges as required by Regulations 106 and 109 and provided easements as required by Section e. hereof.

c. Construction by Applicant

(1) Right of Applicant to Construct

The Applicant may elect to construct extensions to the District's sewage facilities, with materials furnished by the District, provided, however, the District reserves the right to construct, with its own personnel or by private contract, any of the following:

(a) Sewer mains, pumping plants, storage and treatment facilities and disposal facilities.

(b) Extensions involving complicated connections to, or interference with, the District's existing facilities as solely determined by the District.

(2) Conditions

Construction by the Applicant shall be subject to each of the following conditions:

(a) Prior to commencement of construction the Applicant shall enter into a sewer service agreement, advance all fees, costs of materials to be furnished and work to be performed by the District, pay all charges as required by Regulations 106, 108 and 109 and furnish the District with a performance bond satisfactory to the District in an amount equal to 100% of the estimated cost of the construction by the Applicant.

(b) All work shall be performed by a competent and experienced contractor licensed for underground construction and with experienced laborers.

(c) All work shall be performed in a good, workmanlike and safe manner and in accordance with the plans and specifications of the District, under its inspection and to the satisfaction of its Chief Engineer. Risk of loss or damage to materials or use and installation of faulty materials shall be borne by the Applicant until the facilities constructed are accepted by the District.

(d) All facilities shall be maintained by the contractor that installed the same for one year, or such longer period as shall be specified by the District, following the acceptance thereof by the District.

d. All Work to be Inspected

All sewer mains, side-sewers and other sewage facility work shall be inspected by the District to ensure compliance with all requirements of the District. No sewer or side-sewer shall be covered at any point until it has been inspected and passed for acceptance. No sewer or side-sewer shall be connected to the District's sewer mains until the work described in the plans and specifications, with any corrections or modifications made with the consent of the District, is completed, inspected and approved by the District.

e. Land, Easement and Rights-of-Way

(1) Requirement of District Ownership

All extensions of the District's sewage facility shall at all times be the property of, and be controlled by, the District. District sewage facilities shall be located only in dedicated and accepted public streets, or within dedicated utility easements or within satisfactory easements granted to the District.

(2) Time and Cost of Acquisition

No facilities will be constructed until all rights-of-way, easements and facility sites as required by and satisfactory to the District shall have been conveyed to the District without cost to the District. In the event such rights-of-way, easements or lands are not conveyed by the Applicant, the Applicant shall pay the District its entire cost of acquisition thereof, including appraisers' fees, escrow charges, title insurance premiums and legal expenses.

f. Street Excavation Permit

Any contractor intending to excavate in a public or private street for the purpose of installing sewers or making sewer connections must obtain all necessary permits and authorizations from the City or County having jurisdiction.

g. Liability

The District and its officers, agents and employees shall not be liable for injury or death to any person or damage to any property arising out of the performance of any work by any Applicant. The Applicant shall indemnify the District, its officers, agents and employees for all damages, costs, expenses, fees and interest thereby incurred.

h. Determination of Construction Costs

The District shall determine its actual cost of all extensions. Costs shall include labor, materials, overhead, engineering, legal and administrative expenses allocable to such work. The District's determination of costs shall be conclusive.

If, at any time prior to completion of the extension, the District increases its estimate of said cost, the Applicant will pay the amount of the increase within 30 days after billing. If the District's actual costs of the extension exceed the estimated amounts paid, the Applicant will pay the difference within 30 days after the billing and prior to commencement of service. If the estimated amounts paid exceed the actual costs, the District will refund the excess promptly, without interest.

NORTH MARIN WATER DISTRICT

REGULATION 105

USE OF SEWER MAINS

a. <u>Drainage Prohibited</u>

No leaders from roofs or surface drains for rainwater runoff shall be connected to any sewer main or side-sewer. No surface or subsurface drainage, rainwater, storm water, seepage water, water from yard fountains, ponds, lawn sprays, yard drainage, cooling water or other unpolluted commercial or industrial process water shall be permitted to enter any sewer main or side-sewer by any device or method.

b. <u>Types of Waste Prohibited</u>

Except as herein provided no person shall discharge or cause to be discharged any of the following described water or wastes to any sewer main or side-sewer:

(1) Any gasoline, naphtha, fuel oil or other flammable or explosive liquid, solid or gas;

(2) any garbage that has not been shredded to such degree that all particles shall be carried freely under the flow conditions normally prevailing in sewer mains;

(3) any ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, fat, oil, grease, or any other solid or viscous substance capable of causing obstruction to the flow in sewer mains or other interferences with the proper operation of the sewage facilities;

(4) any water or wastes having a pH lower than 5.5 or higher than 9.0 or having any corrosive property capable of causing harm, damage or hazard to structures, equipment, personnel, or operation of the sewage facilities;

(5) any water or wastes containing a toxic or poisonous substance in sufficient quantity to injure or interfere with any sewage treatment process, constitute a hazard to humans or animals or create any hazard in the sewage treatment facilities;

(6) effluent from any industrial garbage grinder or disposal unit or any other water or wastes containing suspended solids of such character and quantity that requires unusual attention or expense for transport and treatment;

(7) mineral oils, greases or products of a petroleum origin, petroleum oils, motor oils, cutting oils, or grease trap wastes either as grease or as emulsified grease;

(8) any noxious, malodorous, or toxic liquids, gases, fumes, vapors or substances capable of creating a public nuisance or hazard to life or are sufficient to prevent District personnel from safely entering into the sewer facilities for maintenance and repair;

(9) any septic tank sludge, chemical toilet wastes, waste to which chemicals have been added for odor control or preservation, or the contents of grease traps or sand interceptors;

(10) any water or waste with a temperature greater than 150^{o} F.

c. Pre-Treatment of Wastes

Applicant or owner shall provide necessary wastewater treatment as required to comply with this Regulation and shall achieve compliance with all federal categorical pretreatment standards within the time limitations as specified by the Federal Pretreatment Regulations. Where necessary in the opinion of the District the Applicant or Owner shall provide at his expense such pretreatment of sewage as may be necessary to:

(1) Reduce the biochemical oxygen demand to 300 parts per million and the suspended solids to 500 parts per million by weight;

(2) Reduce objectionable characteristics or constituents to within the limits specified by the District and the Regional Water Quality Control Board.

Plans, specifications and other pertinent information relating to the proposed pre-treatment facilities shall be submitted for approval to the District and to the San Francisco Bay Regional Water Quality Control Board and no construction of such facility shall be commenced until said approvals are obtained in writing. The review of such plans and operating procedures will in no way relieve the owner from the responsibility of modifying the facility as necessary to produce an effluent acceptable to the District under the provisions of this Regulation. Any subsequent changes in the pretreatment facilities or method of operation shall be reported to and be acceptable to the District prior to the owner's initiation of the changes.

d. Maintenance of Pre-Treatment Facilities

Where pre-treatment facilities are provided for any waters or wastes they shall be maintained continuously in satisfactory and effective operating condition by the owner at his expense.

e. Monitoring Facilities

The District may require to be provided and operated at the owner's expense, monitoring facilities to allow inspection, sampling, and flow measurements of the building sewer and/or internal drainage systems. The monitoring facility should normally be situated on the owner's premises.

There shall be ample room in or near such sampling manhole or facility to allow accurate sampling and preparation of samples for analysis. The facility, sampling, and measuring equipment shall be maintained at all times in a safe and proper operating condition at the expense of the owner.

f. Grease Traps and Oil and Sand Interceptors

Any type of business or establishment where grease or other objectionable materials may be discharged in unusual quantities into a public sewer system shall have a grease trap or oil and sand interceptor of a size and design to be approved by the Chief Engineer. Grease traps will be required at restaurants and other commercial and/or non-residential food preparation establishments. Oil and sand interceptors will be required at gas stations and auto repair establishments with floor drains located in service areas, auto or vehicle washing facilities, et cetera.

Oil and sand interceptors shall be situated on the owner's premises and shall be so located as to be readily and easily accessible for cleaning and inspection. Buildings remodeled for use requiring interceptors shall be subject to these regulations.

Waste discharges from fixtures and equipment in the above-mentioned types of establishments which may contain grease, oil, sand or other objectionable materials, including, but not limited to, scullery sinks, pot and pan sinks, dishwashers, food waste disposals, soup kettles, and floor drains located in areas where such objectionable materials may exist, may be drained into the sanitary waste through grease traps and oil and sand interceptors where approved by the Chief Engineer; provided, however, that toilets, urinals, washbasins and other fixtures containing fecal materials shall not flow through the grease trap or interceptor.

Grease traps and oil and sand interceptors shall be maintained by the owner in efficient operating condition by periodic removal of the accumulated grease, oil or sand. The use of chemicals to dissolve grease or oil is specifically prohibited. No such accumulated grease, oil or sand shall be introduced into any drainage piping or public or private sewer.

g. <u>Inspection and Sampling</u>

The District may inspect the facilities of any owner to ascertain whether the purpose of this Regulation is being met and all District requirements are being complied with. Persons or occupants of premises where wastewater is created or discharged shall allow the District or their representative ready access at all reasonable times to all parts of the premises for the purposes of inspection, sampling, records examination, records copying or in the performance of any of their duties. The District, Regional Water Quality Control Board and EPA shall have the right to set up on the owner's property such devices as are necessary to conduct sampling inspection, compliance monitoring and/or metering operations.

h. <u>Swimming Pools</u>

It shall be unlawful for any person to discharge contents of a swimming pool into a sanitary sewer at a rate of flow greater than 50 gallons per minute and only for the purpose of emptying the pool or backwashing the pool filter. Each swimming pool discharging to a sanitary sewer shall be equipped with an approved air gap to preclude any possibility of a backflow of sewage into the swimming pool or piping system.

i. <u>Conservation of Water to Accomplish Flow Reduction</u>

Each customer of the District is urged to install devices that will minimize the flow to the District's sewage facilities. Plumbing fixtures installed shall meet all requirements of state law. Replacement fixtures shall meet the requirements of Section j.(2) hereof.

j. <u>Flow Reduction Devices and Restrictions for New Development</u>

(1) Sewer service will not be furnished to any Applicant unless the flow reduction devices hereinafter described are installed:

(2) All interior plumbing in new buildings shall meet the following requirements:

(i) Toilets and associated flush valves shall be rated at not more than 1.0 gallon of water per flush, or be a dual flush model approved by the District.

(ii) Urinals and associated flush valves shall be rated at not more than 1.0 gallon of water per flush.

(iii) Showerheads shall have a rated flow of 2.0 gallons of water per minute or less.

(iv) Kitchen and lavatory faucets shall have aerators or laminar flow devices together with flow control inserts, valves, devices, or orifices that restrict flow to a maximum of 1.5 gallons of water per minute.

(v) Laundry facility washing machines shall be front loading / horizontal axis models with an Energy Star rating and a modified water factor of 5.5 or less.

(vi) Dishwashers shall be high efficiency models with an Energy Star rating that use no more than 5 gallons per cycle.

\\server\Administration\REGULATIONS\Part D\REG 105 draft 2006.doc

NORTH MARIN WATER DISTRICT

REGULATION 106

APPLICATION, AGREEMENT, AND FEES

a. Application for Service

Upon receipt of an application for sewer service the District will review it and prepare a written estimate and preliminary plan for providing sewer service. If the District determines, in its sole discretion, that the plans, specifications and other information submitted as part of the application are complete and satisfactory and in compliance with pertinent District regulations, and that there exists adequate downstream collection, treatment, and disposal capacity for the proposed service, including possible reuse, then the District shall issue a letter notifying the Applicant that the work necessary to provide the proposed service may proceed subject to the Applicant entering into an agreement with the District and paying all estimated engineering costs, construction costs, fees and charges required under this Regulation and Regulation 109.

b. Cost of Preliminary Engineering Work

The costs of preliminary engineering and planning associated with Section a. hereof shall be included as part of the cost of providing service except that in the event the District determines that the proposed service will be delayed or abandoned said costs shall become due and payable upon presentation of a bill for same to the Applicant. Should the District determine that the cost of preparing an estimate and accomplishing other engineering and planning work can reasonably be expected to exceed $100, the Applicant shall be required to execute and advance funds for same at the time of application.

c. Estimate is Not a Commitment to Provide Service

Preparation of an estimate or any other preliminary engineering and planning work undertaken by the District in connection with the Applicant's proposed project is not to be interpreted by the Applicant as a commitment or agreement by the District, partial or otherwise, to provide sewer service. Said commitment will be made only when the District executes a sewer service agreement. The commitment of the District to provide sewer service shall be limited to the number of connections to be installed pursuant to and in accordance with the terms of the sewer service agreement.

d. Sewer Service Agreement

After the preparation of a preliminary cost estimate and plans pursuant to Section a. hereof and at the time that the Applicant desires to secure a commitment of sewer service and proceed with construction, the District shall prepare a sewer service agreement for approval and authorization by the Board of Directors.

The Applicant's execution of a sewer service agreement and payment of all engineering and construction costs, fees and charges pursuant to these regulations shall bind the Applicant and any successors thereto to comply with all provisions of all pertinent District regulations, and with the plans and specifications and other information as part of the agreement, together with such corrections and modifications as may be required or permitted by the District.

e. Small Sewer Service Agreements

When the estimated cost of the work to be performed by the District is less than $5,000 (exclusive of charges referred to in Section g. hereof and Regulation 109), the General Manager of the District is authorized to enter into a sewer service agreement with the Applicant.

f. Inspection Fee

A fee of $300.00 shall be paid as a condition of performing a sewer inspection.

g. Charge for Annexation to Improvement Districts

No property shall be annexed to an Improvement District unless an annexation fee is paid. The annexation fee shall be equal to the total of the following:

(1) The total revenue from tax on land (not improvements) that the District would have received had the property to be annexed been within the Improvement District from the date of its formation, plus an amount equal to the interest revenue the District would have received on said tax revenue,

(2) the total revenue from the annual $10.00 per parcel sewer service availability assessment charge identified in Regulation 109 that the District would have received had the property been a buildable parcel within the current Improvement District as determined by the District plus an amount equal to the interest revenue the District would have received on said availability charge,

(3) current Local Agency Formation Commission and/or State Board of Equalization fees for annexation, and

(4) estimated cost of District staff time and expenses incurred to process the annexation application. The full cost of any annexation feasibility studies including preparation of environmental documents shall be borne by the person or entity requesting sewer service. Before commencing such studies said person or entity shall advance the District's estimated cost of such studies. If, after pursuing such studies, the District determines additional funds are needed to cover estimated costs, said person or entity shall advance said additional estimated required funds. Upon completing said studies any costs incurred by the District which were not covered by an advance(s) shall be paid by said person or entity upon presentation of an invoice therefore. Any unexpended funds held by the District resulting from an advance(s) shall be refunded to said person or entity, and

(5) the allocated portion of estimated capital costs to expand the downstream collection, treatment and disposal capacity of the sewage facility to serve the property as determined solely by the District, and

(6) the in-lieu contribution to the collection system allocated to the property proposed for annexation and based upon the present value of the portion of any assessment bond issues allocated and used to construct the existing sewage facility.

For annexations where Regulation 106 g. (5) applies, the Sewage Facility Connection Charge in accordance with Regulations 108 b. and 109 b. shall be waived.

NORTH MARIN WATER DISTRICT

REGULATION 107

ENFORCEMENT

a. Violation

Any person found to be violating any provision of these regulations shall be served by the General Manager or other authorized person with written notice stating the nature of the violation and providing a reasonable time limit for satisfactory correction thereof. The violating party shall within the period of time stated in such notice permanently cease the violation.

b. Public Nuisance

Continued habitation of any building or continued operation of any facility in violation of the provisions of these regulations is hereby declared to be a public nuisance. The District may cause proceedings to be brought for the abatement of the nuisance during the period of such violation.

c. Liability for Violation

Any person violating any of the provisions of this regulation shall become liable to and shall indemnify the District for any expense, loss or damage occasioned by the District by reason of such violation.

Costs associated with the discovery and correction of an illegal connection to the District's sewer system are the responsibility of the property owner to which the illegal connection was made. The property owner shall reimburse the District for its said costs including:

(1) all District costs to investigate the illegal connection, and

(2) all District costs as described in Regulation 106 and 109, to correct the connection including back charges for sewer service equal to the monthly service rate multiplied by the number of months the District determines the illegal connection was in use.

NORTH MARIN WATER DISTRICT

REGULATION 109

OCEANA MARIN SEWER SERVICE - RATES AND CHARGES

a. Applicability

This regulation applies to sewer service within Improvement Districts No. OM-1 and OM-3 of North Marin Water District which are herein referred to as Oceana Marin.

b. Sewage Facilities Connection Charge

A sewage facilities connection charge of $30,000 for each single family dwelling unit shall be paid prior to the commencement of sewer service. A sewage facilities connection charge in the amount of 50% of the sewage facilities connection charge then applicable to a single family dwelling unit shall be paid prior to the commencement of sewer service to accessory dwelling units, except to the extent specifically prohibited by Government Code 65852.2. For connection of service to structures projected to generate flows in excess of that generated by a typical single family home in Oceana Marin, the District shall calculate the number of equivalent dwelling units and resulting connection charge. In no event shall the connection charge be less than the amounts noted above. All revenues derived by the District from said sewage facilities connection charge shall be used only for the construction and reconstruction (including, without limitation, enlargement, modification and replacement) and operation and maintenance of the sewage facilities serving said lots or for other purposes authorized by Section 5474.9 of the Health & Safety Code, but shall not be used for acquisition or construction of new local street sewer or laterals. With the exception of property annexed after April 17, 1973, said charge for single family dwelling units shall not be payable for any lot in Units 3 or 4 of Oceana Marin Subdivision heretofore or hereafter connected to said facilities by reason of the substantial payment for said facilities heretofore made by the owners of said lots.

c. Sewer Service Rate

For Fiscal Year2020-21, a sewer service rate of $1,176 per equivalent unit per year shall be paid by the owner of the land served. Accessory dwelling units shall be assessed a sewer service rate equal to 50% of the equivalent single family residential unit sewer service rate then in effect. In the case of new construction, said rate shall commence when connection is made to the District sewage facility or upon connection of the accessory dwelling unit sewer plumbing to the existing side sewer serving the primary single family dwelling. Upon written notice by the owner in the event a structure is demolished by fire or otherwise removed from the land, an appropriate adjustment shall be made taking into account the reduced use but excluding any adjustment for infiltration inflow. An appropriate portion of the charges collected during the period that no structure existed shall be refunded. The refund period, however, shall not be greater than one year and shall be measured from the date that the District receives written notice from the owner.

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Appendix C

Element 4 (Operations and Maintenance Program) Supporting Documents

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Budgets

Novato & West Marin Service Areas

Adopted June 28, 2022

Fiscal Year 2022/23

NORTH MARIN WATER DISTRICT
NMWD.COM
999 RUSH CREEK PLACE
NOVATO, CALIFORNIA 94945

INTRODUCTION

This document contains the fiscal year 2022/23 budgets for North Marin Water District's various enterprise service districts located in Marin County. These are:

Potable Water Service:
- Novato
- West Marin (Point Reyes Station, Inverness Park, Olema, Bear Valley, Silver Hills & Paradise Ranch Estates)

Recycled Water Treatment, Transmission and Distribution:
- Novato

Sewage Collection, Treatment & Reuse/Disposal:
- Oceana Marin

Accompanying the operating budgets are capital improvement project expenditures for the fiscal year. Questions regarding these budgets may be directed to Julie Blue, Auditor-Controller, at jblue@nmwd.com or 415-761-8950.

MISSION STATEMENT

Our mission is to meet the expectations of our customers in providing potable and recycled water and sewer services that are reliable, high-quality, environmentally responsible, and reasonably priced.

VISION STATEMENT

We strive to optimize the value of services we provide to our customers and continually seek new ways to enhance efficiency and promote worker and customer engagement and satisfaction.

NMWD VALUES

- Accountability – We work transparently and in full view of customers and take responsibility for our work.
- Integrity – Customers can count on quality and fair service from our staff and the District.
- Teamwork – We work cooperatively to accomplish our goals.
- Honesty – We always seek the truth in what we do.
- Respect – We value our customers and co-workers.

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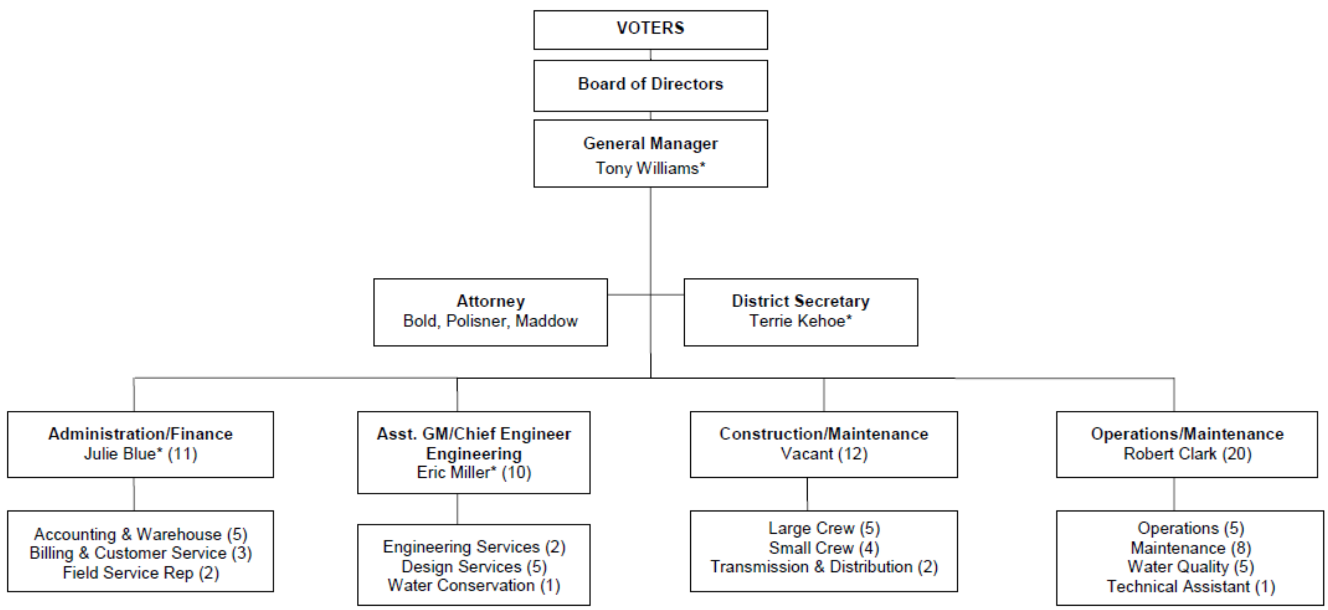
ORGANIZATION FACT SHEET
July 2022

Organization:

5 Directors elected By-District (Division) for 4-year terms
Stephen Petterle (Division 4), President
Rick Fraites (Division 5), Vice-President
James Grossi (Division 1)
Jack Baker (Division 2)
Michael Joly (Division 3)

1 General Manager, Tony Williams (serves at the pleasure of the Board of Directors)
4 Departments
55 Employees (regular full-time-equivalent authorized)



*Also serves as District officer

Authority:

Formed by voter approval in April 1948 pursuant to provisions of the County Water District Law (refer Water Code - Division 12). A "voter-run" district.

Territory:

100 square miles (see attached map)

Distribution System Expansion Policy:

"Pay-as-you-go." Connection fees for typical single family units vary for each improvement district and are based on the policy that new growth pays the incremental cost to expand the utility plant allocable to said service.


North Marin Water District Boundary Map
Marin County
North Marin Water District Service Boundary
Sonoma-Marin County Line
Oceana Marin
Petaluma
Sonoma
Stafford Lake
Novato
Paradise Ranch Estates
Pt. Reyes Station
Inverness Park
Olema
San Pablo Bay
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NORTH MARIN WATER DISTRICT

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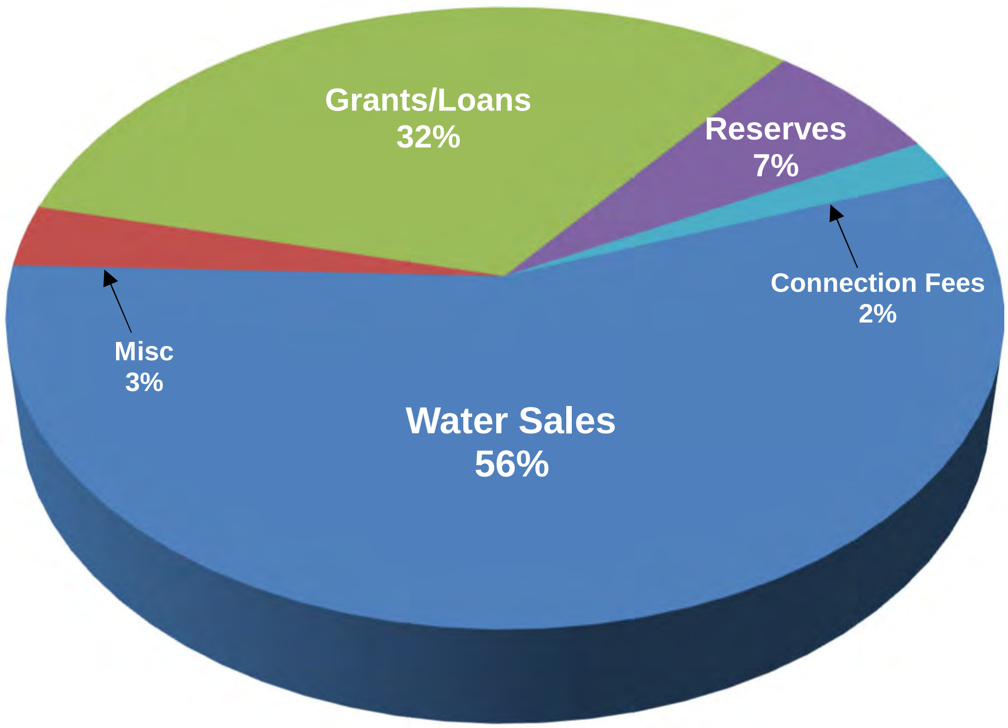
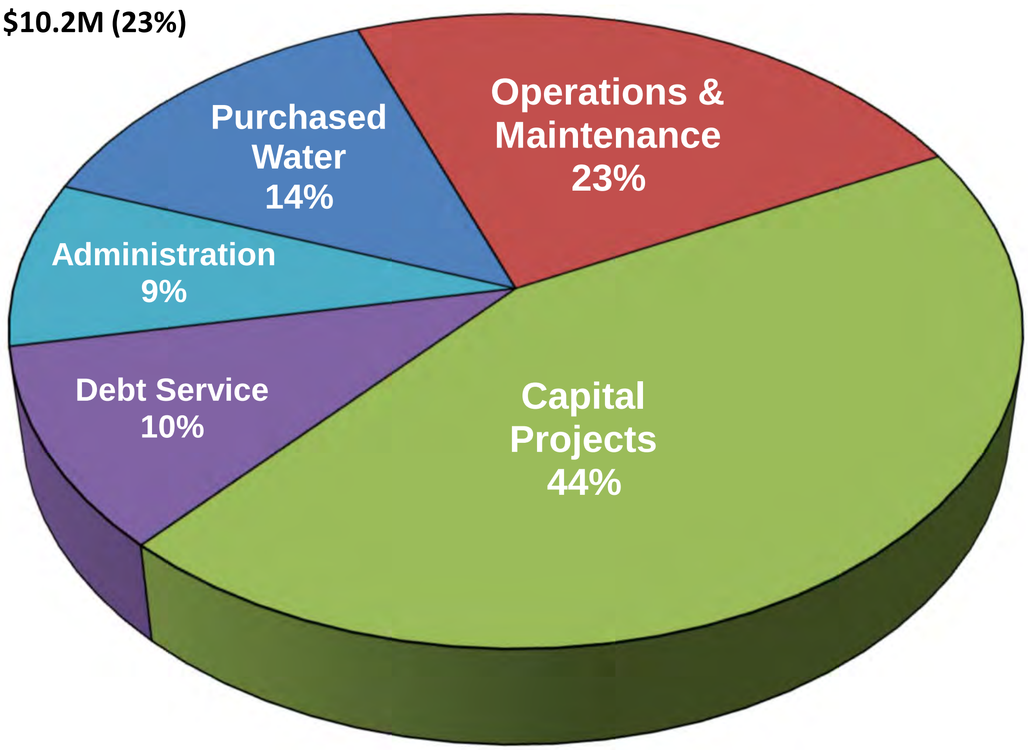
NORTH MARIN WATER DISTRICT

FISCAL YEAR 2022/23 WATER AND SEWER BUDGETS

NORTH MARIN WATER DISTRICT
FY22/23 DRAFT BUDGET - ALL SERVICE AREAS COMBINED
SOURCES = $44,089,000



Labor = $10.2M (23%)



USES = $44,089,000

Excludes Depreciation Expense & Developer Funded Costs

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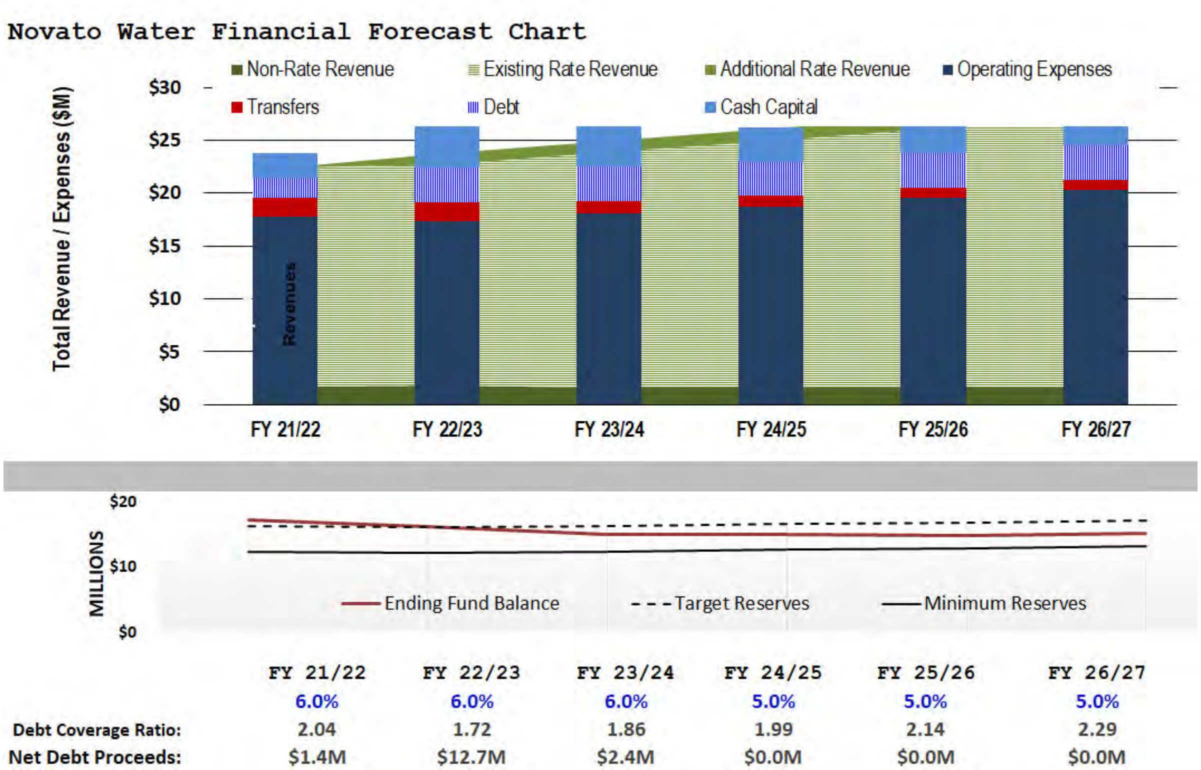
Summary

The $44.1 million consolidated budget projects operating revenue of $25.6 million and a net operating income of $2.5 million. The FY 22/23 budget incorporates $4.5 million in internally funded capital improvement projects and $5.7 million in water purchases. After payment of $4.6 million in debt service, the consolidated budget projects a decrease in cash for the fiscal year of $2.9 million.

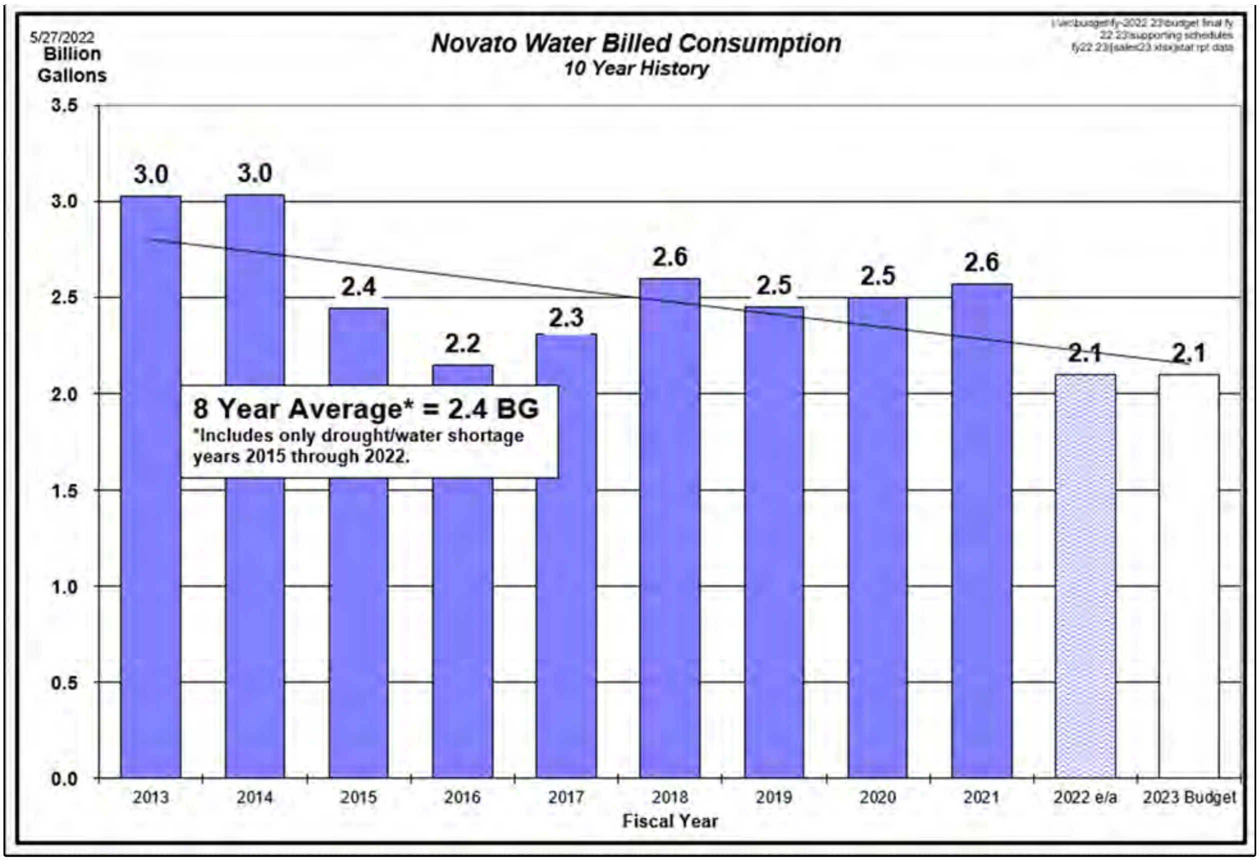
Novato Water

The Novato Potable Water System budget projects a $3 million cash decrease over the fiscal year. A 6% rate increase in both the commodity and service charge, effective July 1, 2022, was approved by the Board of Directors at a public hearing on June 28, 2022. Total budget outlay, which includes $3.9 million in internally funded capital improvement projects, is projected at $26.9 million which is $2M higher than the FY 21/22 budget. The below chart shows that the Novato Water financial plan will maintain sufficient cash reserves aiming towards the designated targets and remaining above the minimum level, as established during the 2020 Novato and Recycled Water Rate Study.



Operating Revenue

Water Sales - Water sales volume is budgeted at 2.1 billion gallons (BG) which is a 12.5% decrease from the FY 21/22 budget. The decrease is primarily driven by the continuation of mandatory water conservation orders due to ongoing drought conditions and is equivalent to the estimated sales for FY 21/22. The 6% rate increase, effective July 1, 2022 is projected to increase revenues by $1 million but is highly dependent on water sales volume. The following chart shows a 10-year history of billed consumption for the Novato Potable Water System. The FY 22/23 Budget also includes a drought surcharge of 5%, assuming drought conditions (Stage 2 water shortage) to continue throughout the fiscal year.



Other Revenue – Connection Fee revenue is budgeted at $872,000. Connection Fee revenue of $890,000 for 31 Equivalent Dwelling Units (EDUs) is estimated to be collected in FY 21/22. The annual average connections have been 61 EDUs (FY 17/18 through FY 21/22). Included in the projections is annual Connection Fee revenue equivalent to 30.5 EDUs or about half of the actual five-year average.

The wheeling charge to Marin Municipal Water District is budgeted at $142,000. This is based on the average revenue collected in the past three years. In addition, MMWD will pay the annual fixed AEEP capital contribution of $205,000 in accord with the terms of the 2014 Interconnection Agreement. Miscellaneous Revenue of $216,000, from various sources, includes rental income, backflow charges, and account turn on charges.

Operating Expenditures

Operating expenses (excluding depreciation) are budgeted to increase 1% or $171,000 from the FY 21/22 budget. The increase is primarily due to inflation adjustments, increases in the cost to purchase water, insurance costs, and personnel costs. This increase is offset by a projected decrease in water purchases due to decreased demand. Water purchases, and some operational costs are variable and dependent on the volume of water produced and purchased while other expenses such as salaries, benefits, general liability insurance, and other administrative costs are fixed. More details are outlined in this budget report.

Source of Supply – The purchase price of water from Sonoma Water (SW) (AKA Sonoma County Water Agency) is projected to increase 5.2% in FY 22/23. This change will result in a cost per acre-foot of $1,102 for FY 22/23 versus $1,047 for the current fiscal year and is estimated to increase the cost to purchase water by $280,000.

Stafford Treatment Plant (STP) Water Production – STP water production is projected at 500 MG in FY 22/23 which is lower than the 10-year average annual production of 544 MG. This estimate could differ from actual operations and is dependent on drought conditions, statewide water restrictions, and water allocations from Sonoma Water. The cost of production at the end of FY 20/21 was $7,819/MG and varies depending on the volume and length of production.

Although the cost of STP water production is higher than purchases from SW, the benefits of having a local water supply for resiliency and emergency preparedness outweighs the additional costs in operating the plant.

Personnel Costs - The budget includes a staffing level of 55 full-time equivalent (FTE), see table below. There is an increase of a Junior Engineer, one FTE in the Engineering Department, to address an increase in workload demands due to an increase in Capital and Developer Projects. The temporary staffing budget hours are budgeted at 4,975 which is a reduction from the prior year's budget of 7,480 hours. Less temporary hours are needed due to increased efficiencies in the Consumer Services Department and the addition of the full time Junior Engineer position, decreasing the need for Engineering temporary hours.

FTE Staffing	FY23	FY22
Administration	8.0	8.0
Consumer Services	5.0	5.0
Construction/Maintenance	12.0	12.0
Engineering	10.0	9.0
Maintenance	9.0	9.0
Operations	6.0	6.0
Water Quality	5.0	5.0
	55.00	54.00

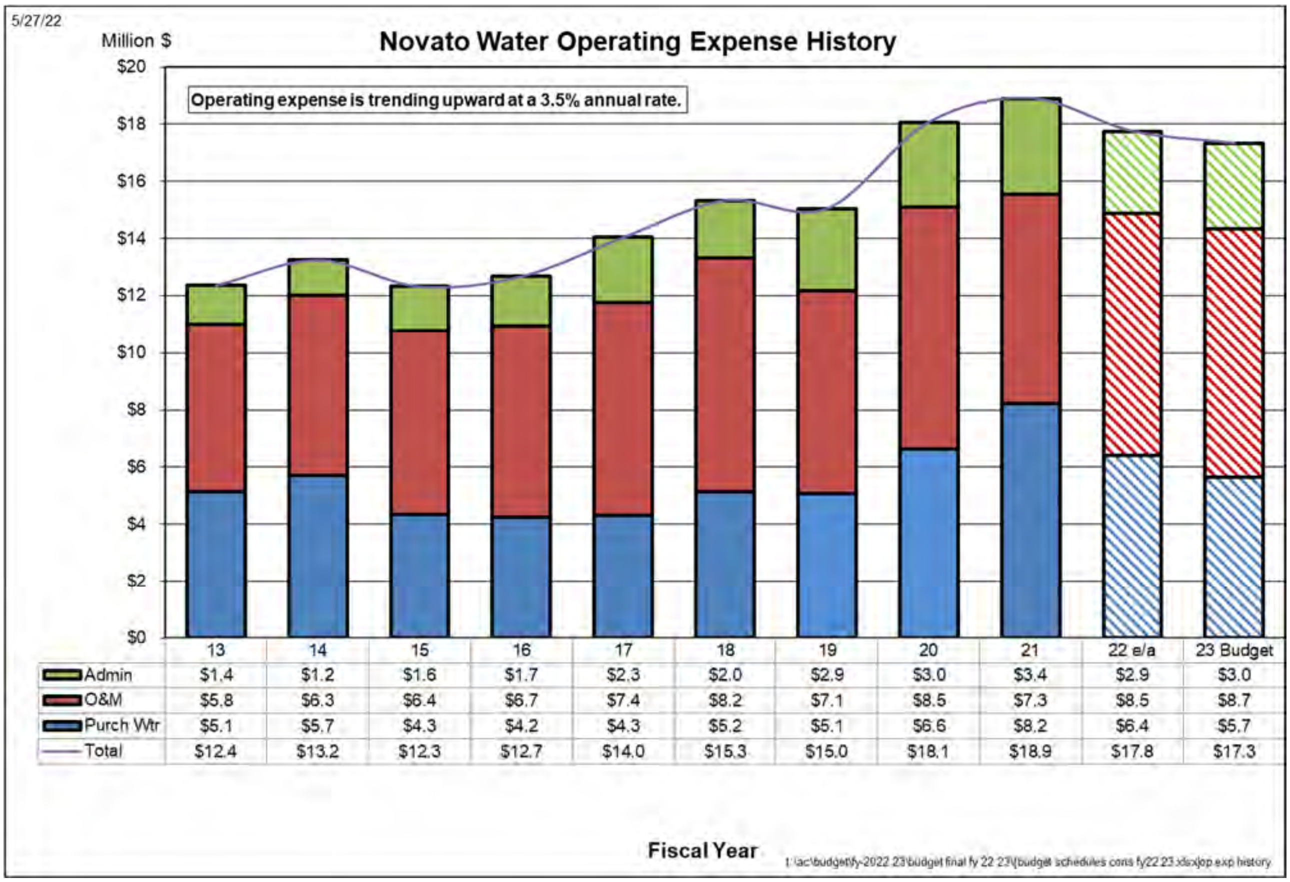
In accordance with the Employee Association and NMWD's Memorandum of Understanding (MOU), a 4.0% cost-of-living salary increase, has been factored into the budget effective October 1, 2022. The MOU links an annual cost-of-living adjustment (COLA) to the change in the Consumer Price Index (CPI). The District entered into a five-year MOU with the NMWD Employee Association beginning on October 1, 2018. The current MOU established a COLA minimum of 2.0% and a maximum of 4%. The 4.0% cost-of-living increase is staff's best projection at this time.

The District's average CalPERS retirement contribution rate will increase 1.81%, to 31.45% of earnings, compared to 29.65% from the rate budgeted last year. When applied to the FY 22/23 budgeted earnings this equates to an increase in pension expense of $173,000. For context the rate in FY 16/17 was 20.2% of earnings and any increases in pension expense has a compounding impact when tied to annual COLA increases. All employees now pay 100% of the CalPERS employee contribution. For budgeting purposes, group health insurance rates remained constant. This cost increased minimally in 2022 and in prior years.

Other Operations & Maintenance Expenses –

- Studies and Special Projects are budgeted at $359K which include an update to the Novato Water Master Plan and a Pipeline Condition Assessment.
- Water Conservation costs are budgeted to increase 19% over budgeted FY 21/22 costs. This is due to ongoing drought conditions and to align with the actual expenditures expected in FY 21/22.
- An addition of $20,000 in non-recurring election costs due to the term expiration of two members of the Board of Directors.
- An increase in insurance premiums and claims of $32,000 from the prior year's budget to align with expected premium costs.

The following chart shows the past 10-years of operating expense (excluding depreciation) for Novato Water. The five-year average increase to actual expenses is 8.6% which is influenced by a one-time payment of $1.1M in FY 19/20 for bond issued debt service made to SW. Additionally, the average increase in operating expenses is impacted by the purchase of 363.5 million gallons of water from SW to backfeed Stafford Lake in FY 21/22 at the cost of $1.1 million. The ten-year actual average increase to operating expenses is 5.6%.



	13	14	15	16	17	18	19	20	21	22 e/a	23 Budget
Admin	$1.4	$1.2	$1.6	$1.7	$2.3	$2.0	$2.9	$3.0	$3.4	$2.9	$3.0
O&M	$5.8	$6.3	$6.4	$6.7	$7.4	$8.2	$7.1	$8.5	$7.3	$8.5	$8.7
Purch Wtr	$5.1	$5.7	$4.3	$4.2	$4.3	$5.2	$5.1	$6.6	$8.2	$6.4	$5.7
Total	$12.4	$13.2	$12.3	$12.7	$14.0	$15.3	$15.0	$18.1	$18.9	$17.8	$17.3

Non-Operating Expenses –

- An increase of $406,000 for costs related to the lease of temporary office and lab space during the Administrative and Laboratory Upgrade Project.

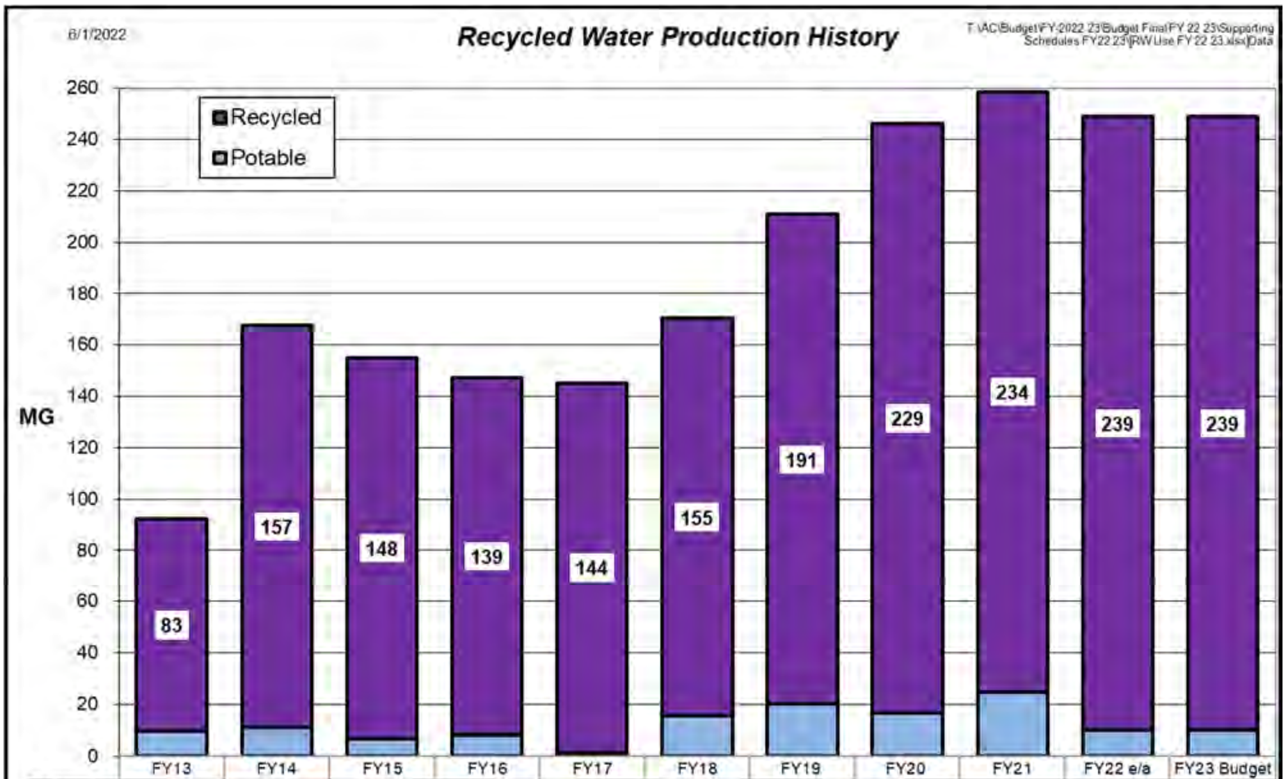
Recycled Water

The FY 22/23 Recycled Water (RW) System Budget projects demand of 249MG which is consistent with the estimated sales volume in FY 21/22. Over the past few years, sales have increased primarily due to the Central expansion project completion in FY 17/18. The budget projects purchase of 180MG of tertiary treated water from Novato Sanitary District for approximately $1,500/MG and 50MG from Las Gallinas Valley Sanitary District, at an average rate of $2,200/MG. The Deer Island Plant is budgeted to produce 5MG during the summer, to keep it operating, and to serve as a back-up facility.

Consistent with the potable water increase, a 6% commodity rate and bimonthly service charge increase was approved by the Board of Directors at a public hearing occurring on June 28, 2022, effective July 1, 2022. The increase is projected to generate $99,000 in additional revenue next fiscal year.

Operating expenses (excluding depreciation) are budgeted to increase 5% or $36,000 from the FY 21/22 budget. This increase is primarily due to refined budget estimates to align more closely with expected actual expenses. The RW system is projected to show a net operating income of $392,000 and an increase of cash for the year of $396,000.

The following chart shows the historical production for the Recycled Water System.

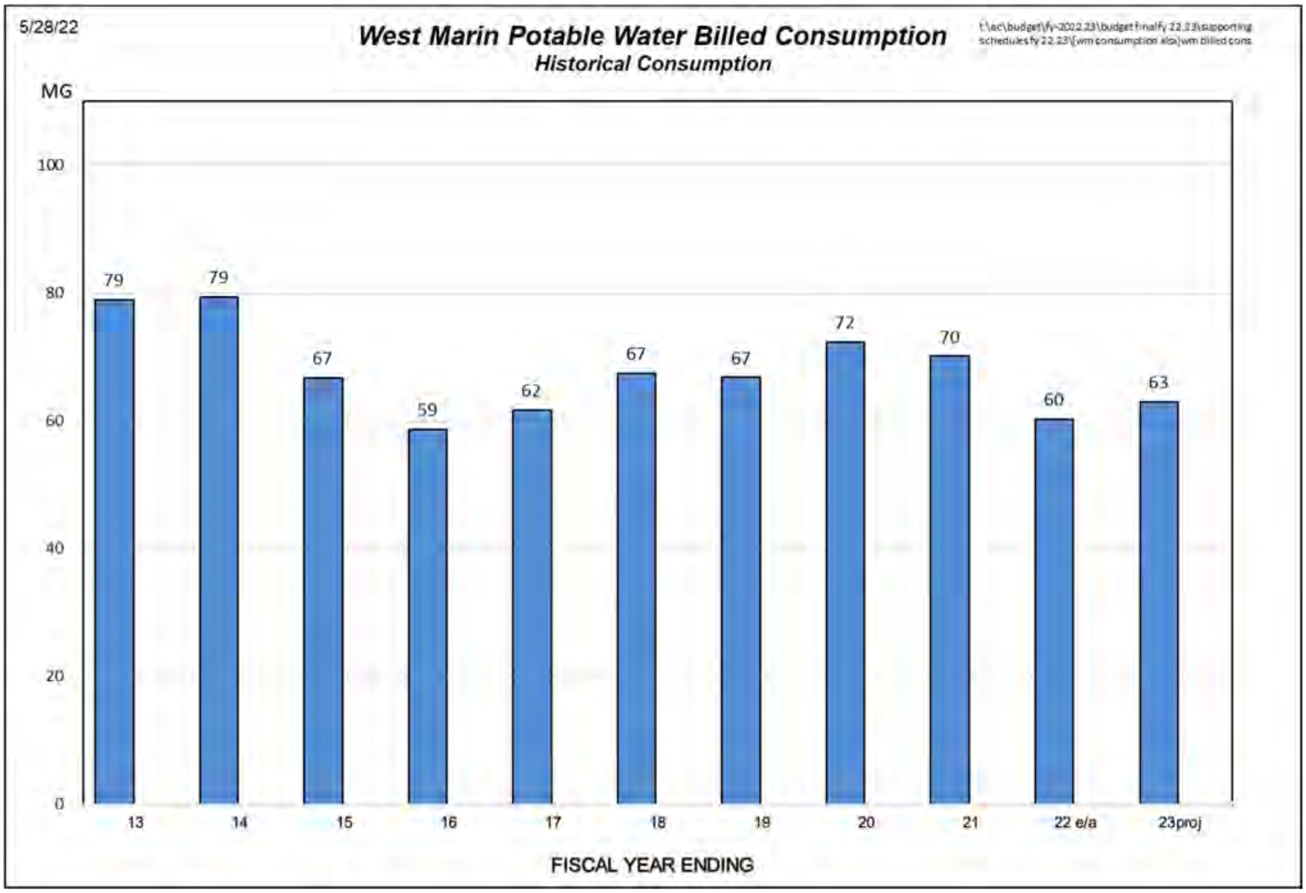


	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22 e/a	FY23 Budget
Recycled	83	157	148	139	144	155	191	229	234	239	239
Potable	9	11	7	8	1	16	20	17	25	10	10

West Marin Water

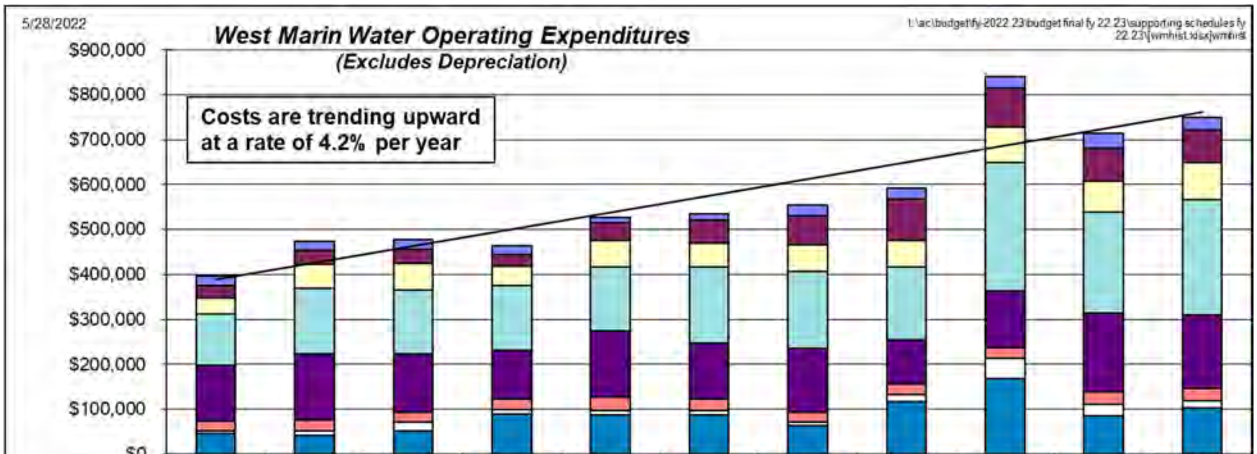
Incorporated in the West Marin Water budget is a 6% rate increase in both the commodity and service charge, effective July 1, 2022. This increase was approved by the Board of Directors at a public hearing on June 28, 2022. There are no new connection fees budgeted for FY 22/23. Included in the five-year financial forecast is revenue for one new connection every other year.

FY 22/23 water sales volume is budgeted at 63MG and is based on the estimated 60 MG in sales for FY 21/22, adjusted up by 5% for the anticipated slight rebound due to normal year water conditions in Lagunitas Creek. See the below chart for the historical consumption for the WM service area.



WM operating expenditures, before depreciation, are budgeted at $750,000 which is $140,000 higher or 22.3% more than the FY 21/22 adopted budget. The increase is primarily due to costs for Water Treatment which include Water Quality and Lab costs for ongoing efforts to monitor salinity intrusion in the West Marin System Source Wells. The budget projects a net operating income of $97,000 and, after capital outlay and debt service, the system is projected to show a cash decrease for the year of $71,000.

The below chart shows the past 10-years of operating expense for West Marin Water.



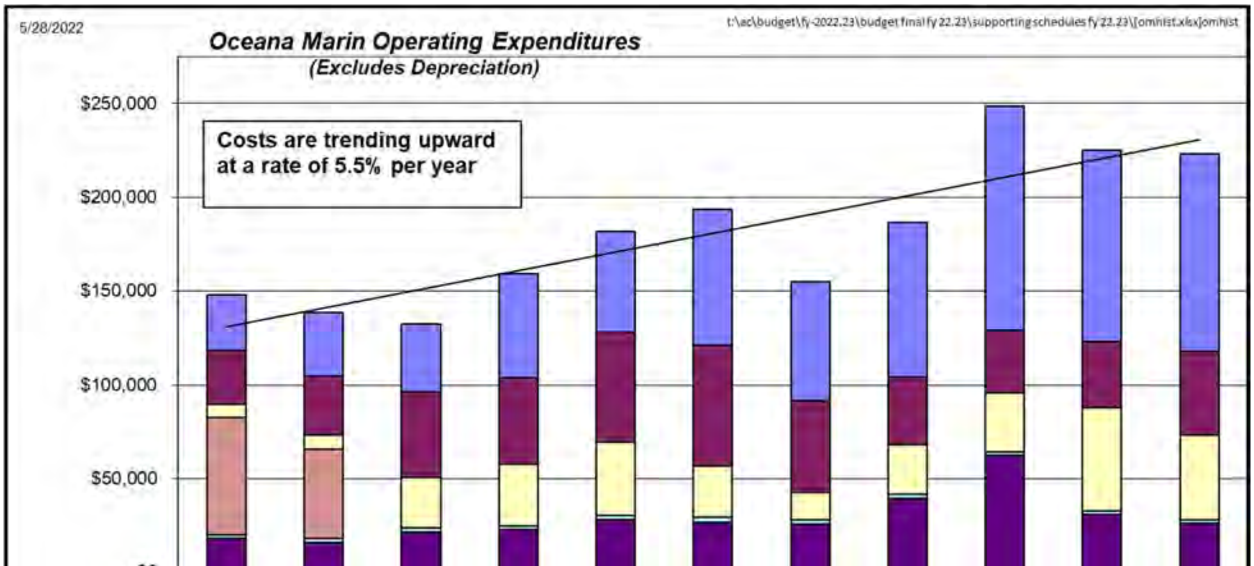
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022 e/a	2023 Budget
Source	$22,161	$21,183	$21,862	$18,290	$12,904	$13,678	$24,458	$22,935	$25,014	$34,000	$27,000
Pumping	$28,195	$30,514	$30,657	$26,199	$38,660	$50,974	$65,515	$91,995	$88,038	$72,000	$73,000
Operations	$34,466	$53,916	$59,531	$43,184	$60,032	$52,794	$59,285	$60,044	$79,176	$70,000	$83,000
Treatment	$113,619	$146,415	$141,132	$144,473	$141,079	$169,778	$169,705	$161,169	$284,865	$224,000	$258,000
T & D	$124,721	$146,566	$129,737	$109,484	$147,913	$123,710	$142,478	$97,879	$125,933	$176,000	$163,000
Cons Acctg	$21,947	$24,334	$23,457	$22,646	$30,414	$27,224	$21,459	$24,374	$24,950	$28,000	$28,000
Wtr Consrv	$5,857	$9,791	$18,960	$9,986	$10,413	$9,615	$7,631	$15,246	$44,357	$24,000	$15,000
G & A	$45,861	$41,561	$51,463	$88,982	$86,366	$86,494	$64,365	$117,324	$168,001	$86,000	$103,000
Total	$396,827	$474,280	$476,799	$463,244	$527,781	$534,267	$554,896	$590,967	$840,334	$714,000	$750,000

Oceana Marin Sewer

A proposed 5% rate increase ($5/month - to $1,296/year) in the Oceana Marin Sewer service charge effective July 1, 2022, is projected to add $14,000 in additional annual revenue. The increase was approved by the Board of Directors at a public hearing on June 28, 2022. Growth in the past three years has remained relatively stable so conservatively there is one new connection fee budgeted for FY 22/23. Included in the five-year financial forecast is revenue for one new connection every other year.

FY 22/23 OM operating expenditures, before depreciation, are budgeted at $223,000 which is an increase of $14,000 or 6.7% from the FY 21/22 adopted budget. The increase is primarily due to an increase in the annual State Water Resources Control Board permit fees for waste discharge. These fees have increased 58% over the last five years. The budget projects a net operating income of $36,000 and, after capital outlay, the system is projected to show a cash decrease for the year of $236,000.

The below chart shows the past 10-years of operating expense for Oceana Marin Sewer.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022 e/a	2023 Budget
Collection	$29,703	$33,587	$36,189	$55,475	$53,664	$72,261	$63,318	$82,426	$119,465	$102,000	$105,000
Treatment	$29,021	$31,901	$45,727	$45,868	$58,688	$64,613	$49,046	$36,060	$33,631	$35,000	$45,000
Disposal	$6,895	$7,257	$27,022	$32,850	$38,854	$27,083	$14,803	$26,545	$31,233	$55,000	$45,000
Contract Ops	$62,281	$47,803	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cons Acctg	$2,162	$2,235	$2,091	$2,131	$2,244	$2,590	$1,977	$2,162	$1,868	$2,000	$2,000
G & A	$18,099	$15,735	$21,604	$22,807	$28,284	$26,870	$25,925	$39,509	$62,440	$31,000	$26,000
Total	$148,161	$138,518	$132,633	$159,131	$181,734	$193,417	$155,069	$186,702	$248,637	$225,000	$223,000

Capital Improvement Project Budget (CIP)

The Fiscal Year 22/23 and FY 23/24 Capital Improvement Project (CIP) budget includes projects recommended for Novato Water, Recycled Water, West Marin Water, and Oceana Marin Sewer. Also included is a debt service schedule detailing the principal and interest payment required to fund prior CIPs.

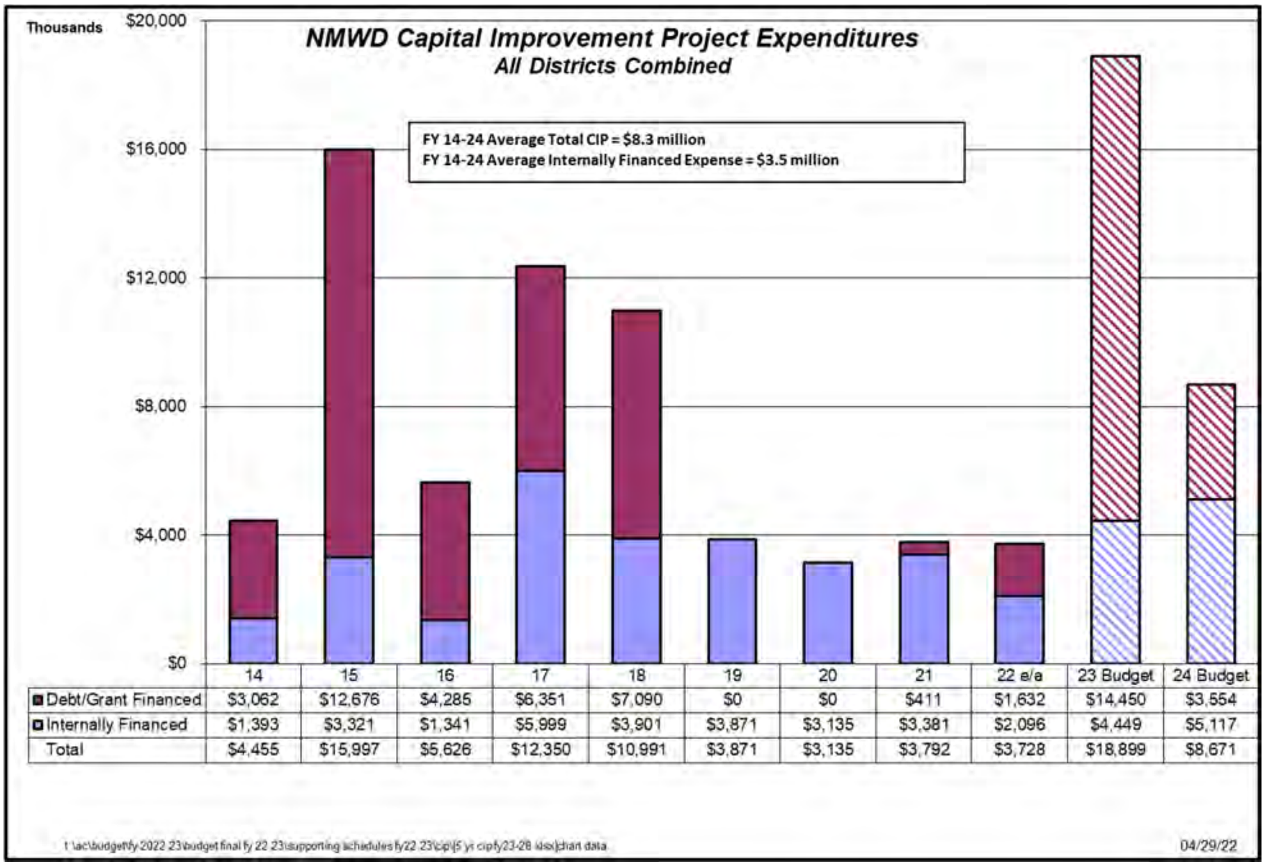
Below is a summary identifying the significant projects (totaling $400,000 or more) to be undertaken over the next two fiscal years. The below table also includes the total cost of the projects which adds all costs occurring within and outside of the two-year budget period.

Project	FY22/23	FY23/24	Total Project Costs
Administration and Laboratory Upgrade Project	$ 12,650,000	$ 2,350,000	$16,350,000
Novato Blvd Widening – Diablo to Grant (4,100')	1,000,000	1,500,000	2,500,000
Lynwood Recoat/Seismic Upgrade	1,000,000	1,000,000	2,000,000
San Mateo Tank 24" Transmission Main	-	332,000	1,328,000
Oceana Marin Treatment Pond Rehab (OM)	1,200,000	205,000	1,405,000
PRE Tank #1 & #2 Replacement (WM)	-	620,000	620,000
Other Projects	3,049,000	2,664,000	-
Gross Project Outlay	18,899,000	8,671,000	24,203,000
Less Loan/Grant Funding	(14,450,000)	(3,554,000)	(18,004,000)
Net Project Outlay (internally funded)	**$4,449,000**	**$5,117,000**	**$6,199,000**

The two-year combined total project outlay, net of grant/loan funding, totals $9.6 million, which is $1 million less than the $10.6 million combined two-year budget adopted last year. The CIP budget includes 38 projects in FY 22/23 and 31 projects in FY 23/24. This comprehensive plan is developed to confirm that adequate funding and staffing exists to accomplish the budgeted projects planned for FY 22/23.

	Net Cash Outlay (Pay-go)		
District	Proposed FY23 & FY23	Adopted FY21 & FY22	Increase (Decrease)
Novato Water	$8,457,000	$8,850,000	$ (393,000)
Recycled Water	-	450,000	(450,000)
WM Water	434,000	791,000	(357,000)
OM Sewer	675,000	510,000	165,000
Total	**$9,566,000**	**$10,601,000**	**$ (1,035,000)**

The below chart shows the District wide 10-year history of capital improvement projects which averages $8.3M per year including $3.5M of internally (or “Pay-Go”) financed projects.



	14	15	16	17	18	19	20	21	22 e/a	23 Budget	24 Budget
Debt/Grant Financed	$3,062	$12,676	$4,285	$6,351	$7,090	$0	$0	$411	$1,632	$14,450	$3,554
Internally Financed	$1,393	$3,321	$1,341	$5,999	$3,901	$3,871	$3,135	$3,381	$2,096	$4,449	$5,117
Total	$4,455	$15,997	$5,626	$12,350	$10,991	$3,871	$3,135	$3,792	$3,728	$18,899	$8,671

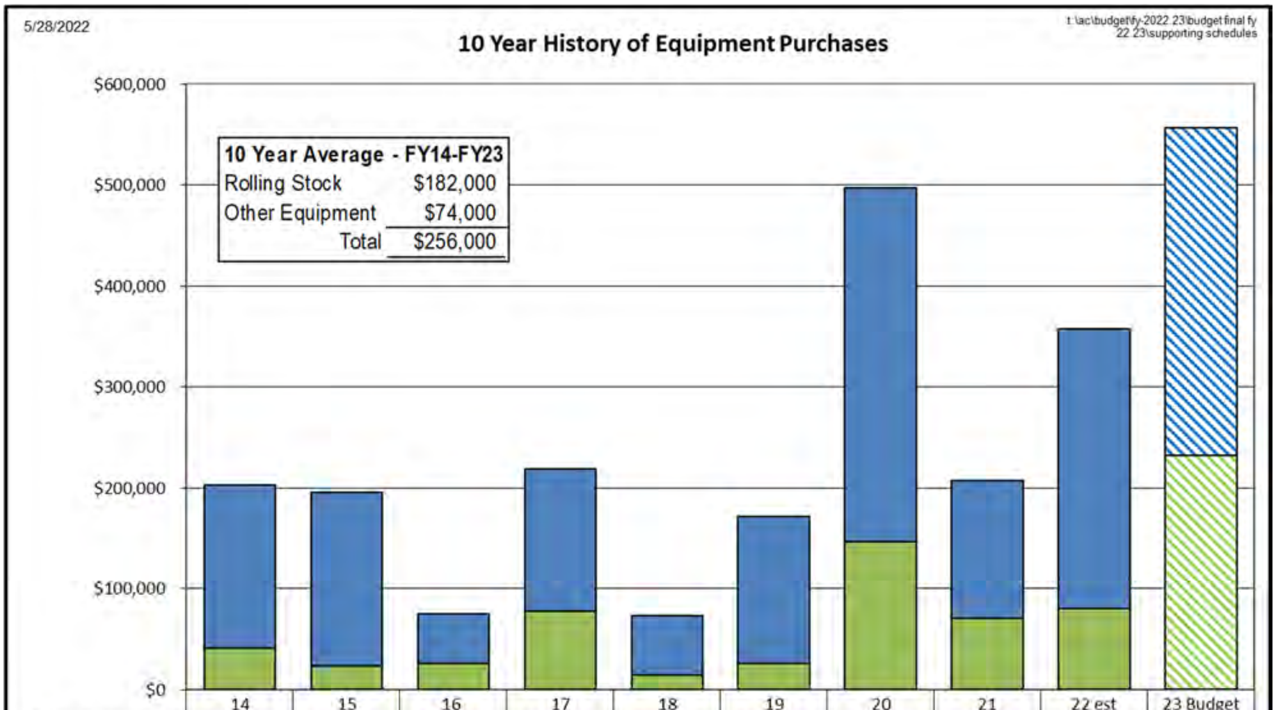
Novato Potable Water's CIP expenditure plan, when viewed over the current fiscal year and the next five years, averages $4.1 million annually in internally funded projects, which is within the budget constraints of the five-year plan as established with the Board approved 2020 Novato and Recycled Water Rate Study. West Marin Water's CIP expenditure plan, when viewed over the next five years, averages $280,000 annually in internally funded projects, which is within the budget constraints of the five-year plan as established with the Board approved 2021 West Marin Water Rate Study.

Equipment Budget

The FY 22/23 Equipment Budget totals $557,000. This is $262,000 higher than the FY 21/22 Equipment Budget of $295,000. FY 21/22 estimated actual expenditures are forecast to come in at $358,000 which is $63,000 above budget.

In FY 18/19 the District entered into a leasing agreement with Enterprise Fleet Management (EFM) with a plan to lease 27 vehicles, phased in over five years. The prior year budget did not include the leased vehicles due to a change in accounting treatment, effective June 30, 2021. There are currently 15 leased vehicles in the District's fleet. Included in the FY 22/23 budget is $205,000 for leased vehicles for the replacement of six additional vehicles, ranging from 6 to 10 years old.

Another significant purchase included in the equipment budget is $150,000 for a meter testing bench and equipment. The following chart shows the ten-year history of equipment purchases.



	14	15	16	17	18	19	20	21	22 est	23 Budget
Rolling Stock	$161,834	$172,989	$48,812	$141,044	$58,143	$145,730	$350,170	$136,581	$278,000	$325,000
Other Equipment	$40,934	$23,231	$26,374	$77,802	$14,731	$25,849	$146,935	$70,748	$80,000	$232,000
Total	$202,768	$196,220	$75,187	$218,846	$72,874	$171,579	$497,105	$207,329	$358,000	$557,000

Debt Service

Principal and interest payments totaling $4.6 million are budgeted as the annual obligation on $48.1 million in outstanding debt (as of June 30, 2022), comprised of:

1.) $3.6 million with a 2.69% interest rate for a bank loan used to finance the Advanced Meter Information (AMI) project;
2.) $6.7 million with a 2.39% interest rate for a State Revolving Fund (SRF) loan used to finance the Stafford Water Treatment Plant Rehabilitation;
3.) $12.1 million in SRF loans (with interest varying from 1%-2.6%) used to finance the recycled water distribution system;
4.) $4.4 million with a 3.54% interest rate for a bank loan used to finance the Aqueduct Energy Efficiency Project and West Marin Treatment Plant Solids-Handling Facility;
5.) $1.3 million with a 2.4% interest rate for a SRF loan used to finance the Deer Island Recycled Water Facility;
6.) $20 million with a 3.11% for a bank loan used to finance the Administration and Laboratory Upgrade Project other capital improvement projects in Novato & West Marin.

The Capital Improvement schedule includes additional debt service of $1,348,000 for the Administration and Laboratory Upgrade Project. The loan was obtained on May 31, 2022 and semi-annual repayments commence in September 2022. Additional debt capacity remains available and the debt financing planned in the CIP budget will allow the District to maintain an average debt service coverage ratio of 1.5 as required by the Board approved Debt Policy. The estimated FY 22/23 consolidated debt service coverage ratio is 1.67.

NORTH MARIN WATER DISTRICT

BUDGET SUMMARY - ALL SERVICE AREAS COMBINED

Fiscal Year 22/23

		Adopted Budget 2022/23	*Estimated Actual 2021/22*	*Adopted Budget 2021/22*
	OPERATING INCOME			
1	Water Sales	**$24,865,000**	$23,382,000	$22,957,000
2	Sewer Service Charges	**306,000**	290,000	290,000
3	Wheeling & Misc Service Charges	**381,000**	494,000	470,000
4	**Total Operating Income**	**$25,552,000**	$24,166,000	$23,717,000
	OPERATING EXPENDITURES			
5	Source of Supply	**$6,182,000**	$6,860,000	$6,559,000
6	Pumping	**627,000**	487,000	646,000
7	Operations	**1,120,000**	1,235,000	1,026,000
8	Water Treatment	**2,802,000**	2,418,000	2,794,000
9	Sewer Service	**195,000**	192,000	195,000
10	Transmission & Distribution	**3,898,000**	4,079,000	4,086,000
11	Consumer Accounting	**508,000**	480,000	528,000
12	Water Conservation	**462,000**	489,000	381,000
13	General & Administrative	**3,222,000**	3,102,000	2,440,000
14	Depreciation Expense	**4,077,000**	3,934,000	3,904,000
15	**Total Operating Expenditures**	**$23,093,000**	$23,276,000	$22,559,000
16	***NET OPERATING INCOME (LOSS)***	**$2,459,000**	$890,000	$1,158,000
	NON-OPERATING INCOME/(EXPENSE)			
17	Tax Proceeds	**$123,000**	$120,000	$116,000
18	Interest Revenue	**332,000**	217,000	241,000
19	Miscellaneous Revenue	**142,000**	69,000	136,000
20	Interest Expense	**(1,119,000)**	(687,000)	(1,372,000)
21	Transfers Out from Capital Expansion Fund	**(590,000)**	-	(501,000)
22	Miscellaneous Expense	**(407,000)**	(284,000)	(3,000)
23	**Total Non-Operating Income/(Expense)**	**($1,519,000)**	($565,000)	($1,383,000)
	NET INCOME/(LOSS)	**$940,000**	$325,000	($225,000)
	OTHER SOURCES/(USES) OF FUNDS			
24	Add Depreciation Expense	**$4,077,000**	$3,934,000	$3,904,000
25	Connection Fees	**902,000**	929,000	558,000
26	MMWD AEEP Capital Contribution	**205,000**	205,000	205,000
27	Loans/Grants	**13,450,000**	1,581,000	5,125,000
28	Marin Country Club Principal Repayment	**39,000**	38,000	38,000
29	West Marin Loan Principal Repayment	**69,000**	-	-
30	Capital Improvement Projects	**(18,899,000)**	(3,730,000)	(11,250,000)
31	CIP Efficiency Adjustment	**-**	-	1,558,000
32	Transfers In from Capital Expansion Fund	**350,000**	-	-
33	Capital Equipment Expenditures	**(557,000)**	(358,000)	(295,000)
34	Low Income Rate Assistance	**(42,000)**	(21,000)	(86,000)
35	Debt Principal Payments	**(3,459,000)**	(2,450,000)	(2,541,000)
36	**Total Other Sources/(Uses)**	**($3,865,000)**	$128,000	($2,784,000)
37	***CASH INCREASE/(DECREASE)***	**($2,925,000)**	$453,000	($3,009,000)

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NOVATO POTABLE WATER

BUDGET SUMMARY

Fiscal Year 22/23

		Adopted Budget 2022/23	*Estimated Actual 2021/22*	*Adopted Budget 2021/22*
	OPERATING INCOME			
1	Water Sales	**$21,927,000**	$20,713,000	$20,398,000
2	Wheeling & Misc Service Charges	**358,000**	356,000	347,000
3	**Total Operating Income**	**$22,285,000**	$21,069,000	$20,745,000
	OPERATING EXPENDITURES			
4	Source of Supply	**$5,775,000**	$6,452,000	$6,141,000
5	Pumping	**547,000**	412,000	561,000
6	Operations	**933,000**	1,061,000	850,000
7	Water Treatment	**2,511,000**	2,166,000	2,594,000
8	Transmission & Distribution	**3,661,000**	3,866,000	3,853,000
9	Consumer Accounting	**476,000**	448,000	498,000
10	Water Conservation	**447,000**	465,000	377,000
11	General Administration	**2,989,000**	2,881,000	2,294,000
12	Depreciation Expense	**3,012,000**	2,918,000	2,807,000
13	**Total Operating Expenditures**	**$20,351,000**	$20,669,000	$19,975,000
14	***NET OPERATING INCOME (LOSS)***	**$1,934,000**	$400,000	$770,000
	NON-OPERATING INCOME/(EXPENSE)			
15	Interest Revenue	**$280,000**	$172,000	$150,000
16	Miscellaneous Revenue	**136,000**	$64,000	136,000
17	Interest Expense	**(846,000)**	(416,000)	(1,088,000)
18	Miscellaneous Expense	**(406,000)**	(283,000)	(2,000)
19	**Total Non-Operating Income/(Expense)**	**($836,000)**	($463,000)	($804,000)
20	***NET INCOME/(LOSS)***	**$1,098,000**	($63,000)	($34,000)
	OTHER SOURCES/(USES) OF FUNDS			
21	Add Depreciation Expense	**$3,012,000**	$2,918,000	$2,807,000
22	Connection Fees	**872,000**	890,000	558,000
24	MMWD AEEP Capital Contribution	**205,000**	205,000	205,000
25	West Marin Loan Principal Repayment	**69,000**	-	100,000
26	Loans/Grants	**12,650,000**	1,350,000	3,575,000
27	Low Income Rate Assistance Program	**(42,000)**	(21,000)	(86,000)
28	Capital Equipment Expenditures	**(557,000)**	(358,000)	(295,000)
29	Capital Improvement Projects	**(16,527,000)**	(3,220,000)	(8,475,000)
30	CIP Efficiency Adjustment	**-**	-	1,558,000
31	Debt Principal Payments	**(2,404,000)**	(1,487,000)	(1,488,000)
32	Connection Fee Transfer from (to) RW	**(890,000)**	(743,000)	(890,000)
33	Loan Transfer WM/OM - Less WM Repay	**(500,000)**	(800,000)	(550,000)
34	**Total Other Sources/(Uses)**	**($4,112,000)**	($1,266,000)	($2,981,000)
33	***CASH INCREASE/(DECREASE)***	**($3,014,000)**	($1,329,000)	($3,015,000)

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NOVATO POTABLE WATER

Fiscal Year 22/23 Five-Year Financial Forecast

		Adopted Budget FY 22/23	Forecast FY 23/24	Forecast FY 24/25	Forecast FY 25/26	Forecast FY 26/27
1		6.00%	5.00%	5.00%	5.00%	5.00%
	Rate Revenue					
2	**Water Rate Revenue**	$20,143,000	$22,178,000	$23,287,000	$24,451,000	$25,674,000
3	Drought Surcharge	750,000	-	-	-	-
4	Change due to growth	15,000	16,000	17,000	18,000	19,000
5	Increase due to rate adjustme	1,019,000	1,109,000	1,164,000	1,223,000	1,284,000
	Non-Rate Revenues					
6	Wholesale Rate Revenue	$142,000	$142,000	$142,000	$142,000	$142,000
7	Other Charges	216,000	182,000	182,000	182,000	182,000
8	Interest Earnings	255,000	173,000	173,000	173,000	173,000
9	Connection Fees	872,000	872,000	872,000	872,000	872,000
10	Miscellaneous Revenue	136,000	75,000	75,000	75,000	75,000
11	Loan Repayment WM	94,000	94,000	94,000	94,000	94,000
12	MMWD AEEP Contributions	205,000	205,000	205,000	205,000	205,000
13	**Total Revenue**	**$23,847,000**	**$25,046,000**	**$26,211,000**	**$27,435,000**	**$28,720,000**
	O&M Costs					
14	Source of Supply	$5,775,000	$6,122,000	$6,489,000	$6,878,000	$7,291,000
15	Pumping	547,000	563,000	580,000	597,000	615,000
16	Other Operations	933,000	961,000	990,000	1,020,000	1,051,000
17	Water Treatment	2,511,000	2,586,000	2,664,000	2,744,000	2,826,000
18	Transmission & Distribution	3,661,000	3,771,000	3,884,000	4,001,000	4,121,000
19	Consumer Accounting	476,000	490,000	505,000	520,000	536,000
20	Water Conservation	447,000	460,000	474,000	488,000	503,000
21	General Administration	2,989,000	3,079,000	3,171,000	3,266,000	3,364,000
22	***Total Operating Expenses***	**$17,339,000**	**$18,032,000**	**$18,757,000**	**$19,514,000**	**$20,307,000**
	Capital Costs					
23	**Total Capital Spending**	**$17,084,000**	**$6,461,000**	**$4,707,000**	**$3,739,500**	**$3,852,000**
24	**Debt/Grant Funded Capital**	**12,650,000**	**2,350,000**	**-**	**-**	**-**
25	**Grant Funded Capital**	**-**	**249,000**	**1,505,000**	**-**	**-**
26	Existing Debt Service	$1,902,000	$3,250,000	$3,250,000	$3,250,000	$3,250,000
27	Cash Funded Capital Projects	4,434,000	3,862,000	3,202,000	3,739,500	3,852,000
28	New Debt Service	1,348,000	-	-	-	-
29	***Total Capital Expenses***	**$7,684,000**	**$7,112,000**	**$6,452,000**	**$6,989,500**	**$7,102,000**
	Transfers/Other					
30	Transfer Out to Recycled Water	$890,000	$890,000	$890,000	$890,000	$890,000
31	Transfer Out to WM/OM	500,000	-	-	-	-
32	Funding for Affordability Program	42,000	84,000	84,000	84,000	84,000
33	Other Expenses	406,000	283,000	-	-	-
34	**Total Revenue Requirement**	**$26,861,000**	**$26,401,000**	**$26,183,000**	**$27,477,500**	**$28,383,000**
35	**Beginning Year Balance**	**$19,333,000**	**$16,319,000**	**$14,964,000**	**$14,992,000**	**$14,950,000**
36	**Surplus/(Shortfall)**	**($3,014,000)**	**($1,355,000)**	**$28,000**	**($42,500)**	**$337,000**
37	Restricted Reserves	$1,045,000	$1,045,000	$1,045,000	$1,045,000	$1,045,000
38	**End of Year Balance**	**$16,319,000**	**$14,964,000**	**$14,992,000**	**$14,949,500**	**$15,287,000**
39	*Minimum Reserves (by policy)*	$12,180,000	$12,411,000	$12,652,000	$12,905,000	$13,169,000
40	*Available Cash (Unrestricted)*	$3,094,000	$1,508,000	$1,295,000	$999,500	$1,073,000
41	**Debt Coverage Ratio**	**1.72**	**1.86**	**1.99**	**2.14**	**2.29**

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NOVATO POTABLE WATER OPERATING BUDGET DETAIL

Fiscal Year 22/23

		Adopted Budget 22/23	Estimated Actual 21/22	Adopted Budget 21/22	Actual 20/21	Actual 19/20	Actual 18/19	Actual 17/18	Actual 16/17
	STATISTICS								
1	Active Meters	20,704	20,694	20,616	20,607	20,554	20,546	20,543	20,544
2	Avg Commodity Rate/1,000 Gal (Net)	$7.37	$6.89	$6.72	$6.68	$6.37	$6.00	$6.00	$5.40
3	Potable Consumption (BG)	2.10	2.10	2.40	2.57	2.40	2.42	2.58	2.31
	OPERATING INCOME								
4	Water Sales	$21,987,000	$20,779,000	$20,470,000	$22,141,460	$20,709,608	$19,145,251	$19,645,814	$16,772,060
5	Bill Adjustments	(60,000)	(66,000)	(72,000)	(61,290)	(59,788)	(72,061)	(143,395)	(130,587)
6	Sales to MMWD	-	-	-	-	-	-	155,846	-
7	Wheeling Charges-MMWD	142,000	165,000	101,000	155,436	104,765	97,866	92,977	91,374
8	Miscellaneous Service Revenue	216,000	191,000	246,000	198,474	257,864	266,268	268,563	252,038
9	**TOTAL OPERATING INCOME**	**$22,285,000**	**$21,069,000**	**$20,745,000**	**$22,434,080**	**$21,012,449**	**$19,437,324**	**$20,019,805**	**$16,984,885**
	OPERATING EXPENSE								
	SOURCE OF SUPPLY								
10	Supervision & Engineering	$9,000	$8,000	$12,000	$9,002	$13,274	$7,564	$9,303	$11,264
11	Operating Expense - Source	15,000	7,000	15,000	7,517	8,289	9,195	6,236	8,513
12	Maintenance/Monitoring of Dam	38,000	21,000	69,000	23,927	30,588	33,686	22,203	24,059
13	Maintenance of Lake & Intakes	14,000	-	21,000	5,790	14,240	24,172	10,690	7,575
14	Maintenance of Watershed	39,000	4,000	46,000	10,378	19,689	4,446	29,646	36,218
15	Water Purchased for Resale to MMWD	-	-	-	-	-	-	111,891	-
16	Water Quality Surveillance	2,000	1,000	18,000	722	1,642	1,669	6,728	3,513
17	Contract Water - SCWA	5,650,000	6,360,000	5,950,000	7,131,008	6,623,534	5,082,987	5,151,516	4,320,623
18	Contract Water - SCWA Backfeed	0	41,000		1,098,109				
19	GASB 68 & 75 Adjustment	8,000	10,000	10,000	3,403	7,592	3,690	8,535	5,682
20	**TOTAL SOURCE OF SUPPLY**	**$5,775,000**	**$6,452,000**	**$6,141,000**	**$8,289,856**	**$6,718,848**	**$5,167,409**	**$5,356,748**	**$4,417,447**
	PUMPING								
21	Operating Expense	$0	$3,000	$3,000	-	-	-	-	-
22	Maintenance of Structures/Grounds	32,000	30,000	33,000	41,581	34,416	56,801	32,611	28,514
23	Maintenance of Pumping Equipment	49,000	47,000	55,000	28,068	158,903	41,304	39,435	30,354
24	Electric Power - Pumping	450,000	312,000	450,000	473,378	341,401	285,772	293,588	246,869
25	GASB 68 & 75 Adjustment	16,000	20,000	20,000	6,887	14,298	5,272	6,967	3,496
26	**TOTAL PUMPING**	**$547,000**	**$412,000**	**$561,000**	**$549,914**	**$549,018**	**$389,149**	**$372,601**	**$309,233**
	OPERATIONS								
26	Supervision & Engineering	$211,000	$264,000	$171,000	$263,382	$232,895	$215,732	$253,594	$234,870
27	Operating Expense	380,000	472,000	319,000	414,387	507,830	306,774	400,138	343,890
28	Maintenance Expense	64,000	65,000	56,000	58,439	52,959	38,570	50,339	47,202
29	Telemetry Equipment/Controls Maint	61,000	53,000	96,000	55,401	61,798	84,979	94,523	101,568
30	Leased Line Expense	20,000	19,000	20,000	18,506	16,656	16,678	17,414	17,592
31	GASB 68 & 75 Adjustment	197,000	188,000	188,000	82,878	136,794	48,442	107,728	63,553
32	**TOTAL OPERATIONS**	**$933,000**	**$1,061,000**	**$850,000**	**$892,993**	**$1,008,932**	**$711,175**	**$923,736**	**$808,675**

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NOVATO POTABLE WATER OPERATING BUDGET DETAIL

Fiscal Year 22/23

		Adopted Budget 22/23	Estimated Actual 21/22	Adopted Budget 21/22	Actual 20/21	Actual 19/20	Actual 18/19	Actual 17/18	Actual 16/17
	WATER TREATMENT								
33	Supervision & Engineering	$187,000	$173,000	$157,000	$130,881	$170,261	$156,176	$169,851	$168,945
34	Operating Expense	250,000	184,000	353,000	144,628	284,929	228,878	276,795	349,671
35	Purification Chemicals	435,000	145,000	435,000	91,248	503,664	376,960	438,348	247,260
36	Sludge Disposal	111,000	81,000	130,000	72,767	93,987	88,352	100,305	107,942
37	Maintenance of Structures/Grounds	83,000	126,000	108,000	99,063	93,901	53,090	50,913	78,910
38	Purification Equipment Maintenance	221,000	326,000	193,000	199,629	200,107	162,714	212,385	186,246
39	Electric Power - Treatment	157,000	142,000	156,000	134,502	160,692	122,831	157,374	129,652
40	Laboratory Expense (net)	768,000	653,000	726,000	619,178	729,142	649,647	758,936	768,965
41	GASB 68 & 75 Adjustment	299,000	336,000	336,000	125,575	244,230	107,310	212,624	150,494
42	**TOTAL WATER TREATMENT**	**$2,511,000**	**$2,166,000**	**$2,594,000**	**$1,617,471**	**$2,480,913**	**$1,945,958**	**$2,377,531**	**$2,188,085**
	TRANSMISSION & DISTRIBUTION								
43	Supervision & Engineering	$677,000	$840,000	$636,000	$633,781	$600,516	$534,500	$659,085	$569,303
44	Maps & Records	146,000	162,000	163,000	132,140	121,602	132,053	159,512	168,267
45	Operation of T&D System	586,000	640,000	674,000	739,662	890,714	720,417	594,175	582,483
46	Storage Facilities Expense	117,000	87,000	147,000	141,484	113,029	107,033	110,077	155,641
47	Maintenance of Valves & Regulators	153,000	183,000	193,000	113,317	135,586	87,285	173,762	196,162
48	Maintenance of Mains	191,000	218,000	204,000	223,073	168,454	167,959	190,307	149,584
49	Backflow Prevention Program	237,000	238,000	243,000	231,595	187,669	231,822	186,692	155,536
50	Maintenance of Copper Services	214,000	194,000	215,000	189,641	131,389	182,789	157,337	159,769
51	Maintenance of PB Service Lines	425,000	424,000	498,000	482,542	443,334	558,788	471,527	473,695
52	Maintenance of Meters	107,000	134,000	145,000	135,771	96,608	113,810	126,985	66,356
53	Detector Check Assembly Maint	83,000	94,000	74,000	40,072	81,718	80,416	46,056	72,208
54	Maintenance of Hydrants	79,000	70,000	79,000	68,567	48,301	25,607	18,087	51,020
55	GASB 68 & 75 Adjustment	646,000	582,000	582,000	271,727	423,300	199,802	349,390	228,385
56	**TOTAL TRANSMISSION & DISTRIB**	**$3,661,000**	**$3,866,000**	**$3,853,000**	**$3,403,372**	**$3,442,219**	**$3,142,281**	**$3,242,992**	**$3,028,409**
	CONSUMER ACCOUNTING								
57	Meter Reading & Collection	$53,000	$25,000	$142,000	$23,359	$38,348	$99,549	$190,554	$182,663
58	Billing & Accounting	153,000	141,000	135,000	197,175	248,703	210,805	280,268	289,503
59	Contract Billing	15,000	16,000	18,000	18,752	13,742	15,484	16,395	16,692
60	Postage & Supplies	60,000	64,000	55,000	69,038	48,071	51,267	52,735	56,373
61	Credit Card Fees	60,000	57,000	65,000	59,613	64,242	55,709	46,678	29,685
62	Lock Box Service	11,000	11,000	11,000	10,998	10,998	10,944	10,944	10,944
63	Uncollectible Accounts	10,000	17,000	5,000	23,681	8,362	14,994	12,352	12,709
64	Office Equipment Expense	64,000	86,000	35,000	28,205	35,601	12,675	45,256	11,350
65	Distributed to Other Operations	(16,000)	(16,000)	(15,000)	(16,454)	(17,814)	(15,104)	(19,008)	(17,161)
66	GASB 68 & 75 Adjustment	66,000	47,000	47,000	27,626	56,438	29,463	75,257	49,950
67	**TOTAL CONSUMER ACCOUNTING**	**$476,000**	**$448,000**	**$498,000**	**$441,993**	**$506,690**	**$485,786**	**$711,431**	**$642,708**

NOVATO POTABLE WATER OPERATING BUDGET DETAIL

Fiscal Year 22/23

		Adopted Budget 22/23	Estimated Actual 21/22	Adopted Budget 21/22	Actual 20/21	Actual 19/20	Actual 18/19	Actual 17/18	Actual 16/17
	WATER CONSERVATION								
68	Residential	$266,000	$279,000	$252,000	$203,188	$198,881	$246,347	$235,438	$270,150
69	Commercial	5,000	4,000	7,000	3,579	6,481	7,983	5,818	1,702
70	Public Outreach/Information	111,000	146,000	98,000	111,992	125,537	51,040	33,789	30,618
71	Large Landscape	10,000	13,000	19,000	10,128	17,317	19,839	33,662	36,818
72	GASB 68 & 75 Adjustment	55,000	23,000	1,000	23,170	34,547	16,575	36,183	21,754
73	**TOTAL WATER CONSERVATION**	**$447,000**	**$465,000**	**$377,000**	**$352,057**	**$382,764**	**$341,784**	**$344,890**	**$361,042**
	GENERAL & ADMINISTRATION								
74	Director's Expense	$46,000	$45,000	$42,000	$41,450	$40,873	$36,815	$37,111	$34,384
75	Legal Fees	31,000	37,000	21,000	28,892	16,569	20,853	20,173	28,043
76	Human Resources	197,000	184,000	51,000	93,557	52,870	96,677	62,348	31,451
77	Auditing Services	25,000	20,000	20,000	16,008	19,651	22,731	19,706	16,220
78	Consulting Services/Studies	324,000	357,000	351,000	115,503	142,010	304,645	223,041	51,567
79	General Office Salaries	1,254,000	1,313,000	1,158,000	1,271,279	1,157,428	1,083,904	1,441,496	1,492,719
80	Office Supplies	36,000	16,000	42,000	31,434	33,783	31,761	33,753	35,048
81	Employee Events	12,000	4,000	12,000	1,186	9,369	10,664	10,123	9,726
82	Other Administrative Expense	56,000	9,000	15,000	8,508	6,281	7,289	12,528	13,960
83	Election Cost	20,000	0	-	250	0	18,915	0	2,077
84	Dues & Subscriptions	98,000	125,000	97,000	106,192	83,386	79,986	59,362	59,046
85	Vehicle Expense	8,000	8,000	8,000	8,112	8,112	8,112	8,634	9,325
86	Meetings, Conf & Training	156,000	125,000	194,000	79,640	111,593	107,583	149,670	186,436
87	Telephone, Water, Gas & Electricity	58,000	47,000	52,000	48,474	46,251	38,758	40,595	45,355
88	Building & Grounds Maintenance	32,000	73,000	60,000	97,509	77,130	58,884	75,130	62,856
89	Office Equipment Expense	128,000	123,000	120,000	112,374	143,224	109,014	97,003	95,465
90	Insurance Premiums & Claims	195,000	192,000	163,000	145,870	109,939	99,040	92,292	87,319
91	Retiree Medical Benefits	221,000	210,000	224,000	209,174	186,221	197,855	174,528	164,969
92	(Gain)/Loss on Overhead Charges	159,000	153,000	(90,000)	(107,012)	(322,446)	905,403	(357,925)	(19,931)
93	G&A Distributed to Other Operations	(169,000)	(202,000)	(135,000)	(147,885)	(130,592)	(140,526)	(157,976)	(161,036)
94	G&A Applied to Construction Projects	(363,000)	(348,000)	(501,000)	(351,489)	(389,809)	(374,552)	(346,105)	(290,813)
95	GASB 68 & 75 Adjustment	465,000	390,000	390,000	1,547,510	1,578,730	140,290	306,927	328,170
96	**TOTAL GENERAL & ADMINISTRATION**	**$2,989,000**	**$2,881,000**	**$2,294,000**	**$3,356,536**	**$2,980,572**	**$2,864,101**	**$2,002,414**	**$2,282,356**
97	Depreciation Expense	$3,012,000	$2,918,000	$2,807,000	$2,857,337	$2,660,688	2,752,212	$2,730,867	$2,710,627
98	**TOTAL OPERATING EXPENSE**	**$20,351,000**	**$20,669,000**	**$19,975,000**	**$21,761,528**	**$20,730,643**	**$17,799,855**	**$18,063,210**	**$16,748,582**
100	***NET OPERATING INCOME/(LOSS)***	**$1,934,000**	**$400,000**	**$770,000**	**$672,551**	**$281,805**	**$1,637,470**	**$1,956,595**	**$236,303**

NOVATO RECYCLED WATER
BUDGET SUMMARY
Fiscal Year 22/23

		Adopted Budget 2022/23	*Estimated Actual 2021/22*	*Adopted Budget 2021/22*
	OPERATING INCOME			
1	Recycled Water Sales	**$1,746,000**	$1,647,000	$1,554,000
2	Bimonthly Service Charge	**123,000**	116,000	116,000
3	Miscellaneous Service Charges	**15,000**	15,000	-
3	**Total Operating Income**	**$1,884,000**	$1,778,000	$1,670,000
	OPERATING EXPENDITURES			
4	Purchased Water - NSD	**$270,000**	$264,000	$270,000
5	Purchased Water - LGVSD	**110,000**	110,000	120,000
6	Pumping	**7,000**	3,000	9,000
7	Operations	**104,000**	104,000	97,000
8	Water Treatment	**33,000**	28,000	35,000
9	Transmission & Distribution	**74,000**	37,000	65,000
10	Consumer Accounting	**2,000**	2,000	2,000
11	General Administration	**104,000**	104,000	70,000
12	Depreciation	**788,000**	768,000	779,000
13	**Total Operating Expenditures**	**$1,492,000**	$1,420,000	$1,447,000
14	***NET OPERATING INCOME (LOSS)***	**$392,000**	$358,000	$223,000
	NON-OPERATING INCOME/(EXPENSE)			
15	Interest Revenue	**$30,000**	26,000	$70,000
16	MCC Interest Payments	**10,000**	11,000	11,000
17	Transfers Out from Capital Expansion Fund	**(590,000)**	-	(501,000)
18	Deer Island SRF Loan Interest Expense	**(30,000)**	(36,000)	(36,000)
19	Distrib System SRF Loans Interest Exp	**(201,000)**	(215,000)	(215,000)
20	**Total Non-Operating Income/(Expense)**	**($781,000)**	($214,000)	($671,000)
21	***NET INCOME/(LOSS)***	**($389,000)**	$144,000	($448,000)
	OTHER SOURCES/(USES) OF FUNDS			
22	Add Depreciation Expense	**$788,000**	$768,000	$779,000
23	Connection Fees Transferred from (to) Novato	**890,000**	743,000	890,000
24	RW Central Area Expansion Grant	**-**	147,000	0
25	Marin Country Club Principal Repayment	**39,000**	38,000	38,000
26	Capital Improvement Projects	**(350,000)**	(30,000)	(100,000)
27	Transfers In from Capital Expansion Fund	**350,000**	0	0
28	Deer Island SRF Loan Principal Payments	**(243,000)**	(237,000)	(237,000)
29	Distrib System SRF Loan Principal Pmts	**(689,000)**	(675,000)	(675,000)
30	**Total Other Sources/(Uses)**	**$785,000**	$754,000	$695,000
31	***CASH INCREASE/(DECREASE)***	**$396,000**	$898,000	$247,000

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NOVATO RECYCLED WATER
Fiscal Year 22/23 Five-Year Financial Forecast

	Fiscal Year Ending June 30 >	Adopted Budget FY 22/23	Forecast FY 23/24	Forecast FY 24/25	Forecast FY 25/26	Forecast FY 26/27
1	Active Services @ Fiscal Year End	96	96	96	96	96
2	Commodity Rate/1,000 Gal	$7.01	$7.36	$7.73	$8.12	$8.52
3	Consumption (MG)	249	224	224	224	224
	OPERATING REVENUE					
4	Recycled Water Sales	$1,746,000	$1,650,000	$1,732,000	$1,819,000	$1,910,000
5	Bimonthly Service Charge	123,000	129,000	135,000	142,000	149,000
6	Water Loads & Turn on Charges	15,000	15,000	15,000	15,000	15,000
7	**Total Operating Revenue**	**$1,884,000**	**$1,794,000**	**$1,882,000**	**$1,976,000**	**$2,074,000**
	OPERATING EXPENSE					
8	Purchased Water - NSD	$270,000	$278,000	$286,000	$295,000	$304,000
9	Purchased Water - LGVSD	110,000	110,000	110,000	110,000	110,000
10	Other Operating Expenses	324,000	334,000	344,000	354,000	365,000
11	Depreciation	788,000	788,000	788,000	788,000	788,000
12	**Total Operating Expense**	**$1,492,000**	**$1,510,000**	**$1,528,000**	**$1,547,000**	**$1,567,000**
	NON-OPERATING REVENUE/(EXPENSE)					
13	Interest Revenue	$40,000	$40,000	$40,000	$40,000	$40,000
14	Interest Expense	(231,000)	(213,000)	(193,000)	(190,000)	(185,000)
15	Transfers Out from Capital Expansion Fun	(590,000)	(536,000)	(571,000)	(609,000)	(648,000)
16	Other Revenue/(Expense)	-	-	-	-	-
17	**Total Non-Op Revenue/(Expense)**	**($781,000)**	**($709,000)**	**($724,000)**	**($759,000)**	**($793,000)**
18	**NET INCOME/(LOSS)**	**($389,000)**	**($425,000)**	**($370,000)**	**($330,000)**	**($286,000)**
	OTHER SOURCES/(USES) OF FUNDS					
19	Add Depreciation Expense	$788,000	$788,000	$788,000	$788,000	$788,000
20	Loan Principal Repayment Received	39,000	39,000	39,000	39,000	39,000
21	Grants	-	-	-	-	-
22	Novato Potable FRC Fund Trsf	890,000	890,000	890,000	890,000	890,000
23	Capital Improvement Projects	(350,000)	(200,000)	(100,000)	(100,000)	(100,000)
24	Transfers In from Capital Expansion Fund	350,000	200,000	100,000	100,000	100,000
25	Deer Island TP Loan Principal	(243,000)	(246,000)	(249,000)	(251,000)	(253,000)
26	SRF Loan Principal - System Expansion	(689,000)	(704,000)	(721,000)	(722,000)	(725,000)
27	Other Sources/(Uses)	-	-	-	-	-
28	**Total Other Sources/Uses**	**$785,000**	**$767,000**	**$747,000**	**$744,000**	**$739,000**
29	**Cash Increase/(Decrease)**	**$396,000**	**$342,000**	**$377,000**	**$414,000**	**$453,000**
30	**Ending Reserve Balance**	**$6,574,000**	**$6,916,000**	**$7,293,000**	**$7,707,000**	**$8,160,000**
31	**% Rate Increase[1]**	**6.0%**	**5.0%**	**5.0%**	**5.0%**	**5.0%**

[1] Fiscal year 2023 Rate increase approved by the Board of Directors on June 28, 2022. FY 2024 through 2027 are projections for financial forecasting purposes only - not yet approved by the Board of Directors.

WEST MARIN WATER
BUDGET SUMMARY
Fiscal Year 22/23

		Adopted Budget 2022/23	*Estimated Actual 2021/22*	*Adopted Budget 2021/22*
	OPERATING INCOME			
1	Water Sales	**$1,069,000**	$1,022,000	$1,005,000
2	Misc Service Charges	**8,000**	7,000	7,000
3	**Total Operating Income**	**$1,077,000**	$1,029,000	$1,012,000
	OPERATING EXPENDITURES			
4	Source of Supply	**$27,000**	$34,000	$28,000
5	Pumping	**73,000**	72,000	76,000
6	Operations	**83,000**	70,000	79,000
7	Water Treatment	**258,000**	224,000	165,000
8	Transmission & Distribution	**163,000**	176,000	168,000
9	Consumer Accounting	**28,000**	28,000	26,000
10	Water Conservation	**15,000**	24,000	4,000
11	General Administration	**103,000**	86,000	64,000
12	Depreciation Expense	**230,000**	201,000	269,000
13	**Total Operating Expenditures**	**$980,000**	$915,000	$879,000
14	***NET OPERATING INCOME (LOSS)***	**$97,000**	$114,000	$133,000
	NON-OPERATING REVENUE/(EXPENSE)			
15	Tax Proceeds - PR-2 Tax Allocation	**$60,000**	$58,000	$56,000
16	Miscellaneous Revenue	**6,000**	5,000	-
17	Interest Revenue	**8,000**	2,000	6,000
18	Loan Interest Expense	**(42,000)**	(20,000)	(30,000)
19	**Total Non-Operating Income/(Expense)**	**$32,000**	$45,000	$32,000
20	***NET INCOME/(LOSS)***	**$129,000**	$159,000	$165,000
	OTHER SOURCES/(USES) OF FUNDS			
21	Add Depreciation Expense	**$230,000**	$201,000	$269,000
22	Connection Fees	**-**	39,000	-
23	Grant/Loan Proceeds	**340,000**	884,000	550,000
24	Capital Improvement Projects	**(647,000)**	(438,000)	(1,085,000)
25	Debt Principal Payments	**(123,000)**	(51,000)	(141,000)
26	**Total Other Souces/(Uses)**	**($200,000)**	$635,000	($407,000)
27	***CASH INCREASE/(DECREASE)***	**($71,000)**	$794,000	($242,000)

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WEST MARIN WATER

Fiscal Year 22/23 Five-Year Financial Forecast

	BASIC DATA	Adopted Budget FY 22/23	Forecast FY 23/24	Forecast FY 24/25	Forecast FY 25/26	Forecast FY 26/27
1	Active Meters	789	790	790	791	791
2	Avg Commodity Rate/1,000 Gal	$12.94	$13.72	$14.54	$15.41	$15.88
3	Potable Consumption (MG)	63.0	65.0	65.0	65.0	65.0
	OPERATING REVENUE					
4	Commodity Charge	$815,000	$892,000	$945,000	$1,002,000	$1,032,000
5	Bimonthly Service Charge	254,000	269,000	285,000	285,000	285,000
6	Miscellaneous Service Charges	8,000	8,000	8,000	8,000	8,000
7	**Total Operating Revenue**	**$1,077,000**	**$1,169,000**	**$1,238,000**	**$1,295,000**	**$1,325,000**
8	Operating Expenditures	$750,000	$773,000	$796,000	$820,000	$845,000
9	Depreciation Expense	230,000	241,000	253,000	279,000	287,000
10	**Total Operating Expense**	**$980,000**	**$1,014,000**	**$1,049,000**	**$1,099,000**	**$1,132,000**
11	**NET OPERATING INCOME**	**$97,000**	**$155,000**	**$189,000**	**$196,000**	**$193,000**
	NON-OPERATING REVENUE/(EXPENSE)					
12	Interest Revenue	$8,000	$7,000	$6,000	$5,000	$4,000
13	Interest Expense	(42,000)	(38,000)	(34,000)	(30,000)	(26,000)
14	PR-2 County Tax Allocation	60,000	61,000	62,000	63,000	64,000
15	Miscellaneous	6,000	6,000	6,000	6,000	6,000
16	**Total Non-Op Revenue/(Expense)**	32,000	36,000	40,000	44,000	48,000
17	**Net Income**	**$129,000**	**$191,000**	**$229,000**	**$240,000**	**$241,000**
	OTHER SOURCES/(USES)					
18	Add Depreciation Expense	$230,000	$241,000	$253,000	$279,000	$287,000
19	Connection Fees	-	23,000	-	23,000	-
20	Capital Improvement Projects	(647,000)	(727,000)	(1,560,000)	(501,000)	(647,000)
21	Grant/Loan Proceeds	340,000	100,000	1,100,000	-	-
22	Loan from Novato Water Principal	(69,000)	(72,000)	(74,000)	(76,000)	(78,000)
23	Debt Principal Payments	(54,000)	(55,000)	(57,000)	(59,000)	(61,000)
24	**Total Other Sources/(Uses)**	**($200,000)**	**($490,000)**	**($338,000)**	**($334,000)**	**($499,000)**
25	**Cash Increase/(Decrease)**	**($71,000)**	**($299,000)**	**($109,000)**	**($94,000)**	**($258,000)**
26	Operating Reserve	$250,000	$258,000	$265,000	$273,000	$174,000
27	System Expansion Reserve	585,000	278,000	162,000	60,000	-
28	Liability Contingency Reserve	99,000	99,000	99,000	99,000	-
29	**ENDING CASH BALANCE**	**$934,000**	**$635,000**	**$526,000**	**$432,000**	**$174,000**
30	**% Rate Increase[1]**	**6.0%**	**6.0%**	**6.0%**	**6.0%**	**3.0%**

[1]Fiscal year 2023 Rate increase approved by the Board of Directors on June 28, 2022. FY 2024 through FY 2027 are projections for financial forecasting purposes only - not yet approved by the Board of Directors.

OCEANA MARIN SEWER
BUDGET SUMMARY
Fiscal Year 22/23

		Adopted Budget 2022/23	*Estimated Actual 2021/22*	*Adopted Budget 2021/22*
	OPERATING INCOME			
1	Monthly Sewer Service Charge	**$306,000**	$290,000	$290,000
2	Misc Service Charges	**-**	-	-
3	**Total Operating Income**	**$306,000**	$290,000	$290,000
	OPERATING EXPENDITURES			
4	Sewage Collection	**$105,000**	$102,000	$94,000
5	Sewage Treatment	**45,000**	35,000	54,000
6	Sewage Disposal	**45,000**	55,000	47,000
7	Consumer Accounting	**2,000**	2,000	2,000
8	General Administration	**26,000**	31,000	12,000
9	Depreciation Expense	**47,000**	47,000	49,000
10	**Total Operating Expenditures**	**$270,000**	$272,000	$258,000
11	***NET OPERATING INCOME (LOSS)***	**$36,000**	$18,000	$32,000
	NON-OPERATING REVENUE/(EXPENSE)			
12	OM-1/OM-3 Tax Allocation	**$63,000**	$62,000	$60,000
13	Interest Revenue	**4,000**	6,000	4,000
14	Interest Expense	**-**	-	(3,000)
15	Miscellaneous Expense	**(1,000)**	(1,000)	(1,000)
16	**Total Non-Op Income/(Expense)**	**$66,000**	$67,000	$60,000
	NET INCOME/(LOSS)	**$102,000**	$85,000	$92,000
	OTHER SOURCES/(USES) OF FUNDS			
17	Add Depreciation Expense	**$47,000**	$47,000	$49,000
18	Connection Fees	**30,000**	-	-
19	Grant/Loan Proceeds	**960,000**	-	1,450,000
20	Capital Improvement Projects	**(1,375,000)**	(42,000)	($1,590,000)
21	**Total Other Souces/(Uses)**	**($338,000)**	$5,000	($91,000)
22	***CASH INCREASE/(DECREASE)***	**($236,000)**	$90,000	$1,000

OCEANA MARIN SEWER

Fiscal Year 22/23 Five-Year Financial Forecast

		Adopted Budget FY 22/23	Forecast FY 23/24	Forecast FY 24/25	Forecast FY 25/26	Forecast FY 26/27
1	Number of Connections	236	236	237	237	237
2	Monthly Service Charge	$108.00	$113.00	$119.00	$125.00	$131.00
	OPERATING REVENUE					
3	Monthly Service Charge	$306,000	$320,000	$338,000	$356,000	$373,000
4	**Total Operating Revenue**	**$306,000**	**$320,000**	**$338,000**	**$356,000**	**$373,000**
	OPERATING EXPENSE					
5	Operating Expenditures	$223,000	$229,000	$235,000	$242,000	$249,000
6	Depreciation Expense	47,000	70,000	79,000	87,000	92,000
7	**Total Operating Expense**	$270,000	$299,000	$314,000	$329,000	$341,000
8	**NET OPERATING INCOME**	**$36,000**	**$21,000**	**$24,000**	**$27,000**	**$32,000**
	NON-OPERATING REVENUE/(EXPENSE)					
9	Interest Revenue	$4,000	$3,000	$1,000	$6,000	$4,000
10	Interest Expense	-	(16,000)	(14,000)	(25,000)	(23,000)
11	OM-1/OM-3 Tax Allocation	63,000	64,000	65,000	66,000	67,000
12	Miscellaneous Expense	(1,000)	(1,000)	(1,000)	(1,000)	(1,000)
13	**Total Non-Op Revenue/(Expense)**	**$66,000**	**$50,000**	**$51,000**	**$46,000**	**$47,000**
14	**Net Income**	**$102,000**	**$71,000**	**$75,000**	**$73,000**	**$79,000**
	OTHER SOURCES/(USES)					
15	Add Depreciation Expense	$47,000	$70,000	$79,000	$87,000	$92,000
16	Connection Fees	30,000	-	30,000	-	-
17	Capital Improvement Projects	(1,375,000)	(565,000)	(452,000)	(282,000)	(312,000)
18	Grant/Loan Proceeds	960,000	305,000	800,000	-	-
19	Debt Principal Payments	-	(43,000)	(45,000)	(81,000)	(86,000)
20	**Total Other Sources/(Uses)**	**($338,000)**	**($233,000)**	**$412,000**	**($276,000)**	**($306,000)**
21	**Cash Increase/(Decrease)**	**($236,000)**	**($162,000)**	**$487,000**	**($203,000)**	**($227,000)**
22	**ENDING CASH BALANCE**	**$297,000**	**$135,000**	**$622,000**	**$419,000**	**$192,000**
23	**% Rate Increase[1]**	**5.0%**	**5.0%**	**5.0%**	**5.0%**	**5.0%**

[1]Fiscal year 2023 Rate increase approved by the Board of Directors on June 28, 2022. FY 2024 through FY 2027 are projections for financial forecasting purposes only - not yet approved by the Board of Directors.

CAPITAL IMPROVEMENT PROJECTS

			FY23	FY24	FY23 & FY24 Project Description
1.	PIPELINE REPLACEMENTS/ADDITIONS				
	a. Main/Pipeline Replacements				
1.7189.00	1	Replace 12" Pipe S. Novato Blvd (785LF)	$50,000	$200,000	Replace 60 year old pipe near or at its end of useful life/in conjunction with City paving
1.7183.xx	2	Replace Plastic Thin Walled Pipe < 4-inch	$150,000	$150,000	Ongoing systematic replacement of all plastic thin walled pipe < 4-inch.
1.7195.00	3	Novato Blvd Widening - Diablo to Grant (4100LF)	$1,000,000	1,500,000	Replaces 60 year old cast iron pipe and replaces 50+ old ACP with 12" PVC; Joint project with City and Novato Sanitary District
		Subtotal	$1,200,000	$1,850,000	
	b. Main/Pipeline Additions				
1.7150.00	1	San Mateo Tank 24" Transmission Main	$20,000	$332,000	Grant Project combined with Crest Pump Station
	2	Loop Los Robles Rd and Posada Del Sol (230LF)	-	$125,000	Master Plan Project 1b-11, Correlated with item No. 1b. 6 below (2025)
1.7206.00	3	Loop Zone Mall Area Near Nave Ct/ S. Novato	$275,000	-	Master Plan Project 1b-09, Correlated with item No. 1b. 6 below (2030)
		Subtotal	$295,000	$457,000	
	c. Polybutylene (PB) Service Line Replacements				
1.7139.xx	1	Replace PB in Sync w/City Paving (30 Services)	$60,000	-	Ongoing sys replacement of PB services in advance of City paving projects
1.7123.xx	2	Other PB Replacements (40 Services)	$80,000	-	
		Subtotal	$140,000	-	
	d. Relocations to Sync w/City & County CIP				
1.8737.xx	1	Other Relocations	$25,000	$70,000	Relocate facilities for yet to be identified City/County Projects
		Subtotal	$25,000	$70,000	
	e. Aqueduct Replacements & Enhancements				
1.7118.02	1	MSN B2-Utility Agreement Costs	$12,000	-	Finalize pipeline easements and agreements
		Subtotal	$12,000	-	
		TOTAL PIPELINE REPLACEMENTS/ADDITIONS	$1,672,000	$2,377,000	

CAPITAL IMPROVEMENT PROJECTS

			FY23	FY24	FY23 & FY24 Project Description
2.	SYSTEM IMPROVEMENTS				
1.7007.16	a.	DCDA Repair/Replace-FY23 (~8/yr)	$100,000	$100,000	Master Plan Project 2-01
1.7090.04	b.	Anode Installations-FY23 (150/yr)	$10,000	$10,000	Master Plan Project 2-03
1.6313.20	c.	Pressure Reducing Station - Harbor Drive	-	$25,000	Upgrades and improvements to valves and vaults
1.6302.21	d.	Rehab Black Point Pressure Regulating Station	-	$175,000	Upgrades and improvements to valves and vaults
1.7136.00	e.	Facilities Security Enhancements	$25,000	-	
	f.	Other System Improvements	$200,000	-	
		TOTAL SYSTEM IMPROVEMENTS	$335,000	$310,000	
3.	BUILDING, YARD, STP IMPROVEMENTS				
	a.	Administration Building			
1.6501.44	1	NMWD Headquarters Upgrade (Note 1)	$12,650,000	$2,350,000	50-year-old building requires significant upgrading; Phases 1 - 2 shown
		Subtotal	$12,650,000	$2,350,000	
	b.	Yard Upgrade			
	1	Program Assessment for Site Improvements	-	$75,000	Re-confirm previous site program study and phase projects as required
		Subtotal	-	$75,000	
	c.	Stafford Treatment Plant			
1.6610.22	1	Replace Sludge Line to Center Road (4"@ 4,400')	$25,000	-	
1.6610.xx	2	Other Treatment Plant Improvements	$50,000	$100,000	Miscellaneous plant improvements, include roll up door
1.6600.97	3	Efficiency Improvements	$50,000	-	Improvement of sludge treatment process as suggested in the Efficiency Study and HSPS
1.6610.23	4	Water Supply Enhancement - STP Modifications	$50,000	-	Based on outcome of Local Water Supply Enhancement Study
		Subtotal	$175,000	$100,000	
	d.	Stafford Dam / Watershed			
1.6600.69	1	Dam Concrete Repair (Apron)	-	$150,000	Ongoing patch repairs as needed until full replacement FY27
1.6600.96	2	Leveroni Creek Embankment Repair (Note 2)	-	$175,000	Repair/stabilize culvert embankment under access road to STP/IVGC
1.6610.24	3	Water Supply Enhancements - Dam	$50,000	-	Based on outcome of Local Water Supply Enhancement Study
		Subtotal	$50,000	$325,000	
		TOTAL BUILDING, YARD, STP IMPROVEMENTS	$12,875,000	$2,850,000	

CAPITAL IMPROVEMENT PROJECTS

			FY23	FY24	FY23 & FY24 Project Description
4.	STORAGE TANKS/PUMP STATIONS				
	a. Clear Tank Sites				
		1 Woodland Heights (120,000 gal, 1974)	-	$100,000	Consider for future Recycled Water Opportunities
1.6207.20		2 Old Ranch Rd Tank (removal post install Tank No. 2)	$100,000	-	
		Subtotal	$100,000	$100,000	
	b. Tank Rehabilitation				
1.6216.20		1 Fire Flow Backfeed Valve Nunes Tank	$200,000	-	Master Plan Project 4-03
		2 Recoating of Other Tanks (Garner in FY23)	$170,000	$17,000	
1.6213.24&1.6214.20		3 Lynwood Seismic Upgrade/Coating	$1,000,000	$1,000,000	Master Plan Project 4-04
		Subtotal	$1,370,000	$1,017,000	
	c. Pump Station Rehabilitation and Replacement				
1.6141.00		1 Crest PS	$10,000	-	See 1.b.1 San Mateo Tank 24" Main
1.6112.26		2 Lynwood PS Upgrade	$40,000	$200,000	Upgrades tied to Study
		Subtotal	50,000	$200,000	
	d. Hydropneumatic Systems				
1.7170.00		1 Hydropneumatic Upgrades, Phase 1	$50,000	$250,000	Specific project to be confirmed by Hydraulic Pneumatic Study
		Subtotal	$50,000	$250,000	
	e.	1 Other Tank & PS Improvements	$75,000	$75,000	Master Plan Project 4-07. Includes SS discharge, tank cleaning system, etc
		Subtotal	$75,000	$75,000	
		TOTAL STORAGE TANKS/PUMP STATIONS	$1,645,000	$1,642,000	
		TOTAL NOVATO SERVICE AREA	$16,527,000	$7,179,000	
5.	RECYCLED WATER				
5.7162.04	a. Replace CI in Atherton Avenue (1320LF)		$350,000	-	Evaluate 1950's era cast iron pipe re-purposed for RW, potential slip lining
5.7162,xx	b. Other Recycled Water Expenditures		-	$100,000	Retrofit existing potable irrigation customers to RW
	c. Reservoir Hill Tank Leak Repair		-	$100,000	Small leak detected in FY22; needs repair
		TOTAL RECYCLED WATER PROJECTS	$350,000	$200,000	

CAPITAL IMPROVEMENT PROJECTS

			FY23	FY24	FY23 & FY24 Project Description
6.		WEST MARIN WATER SYSTEM			
2.6609.20	a.	New Gallagher Well #2	$380,000	-	West Marin Master Plan Project 3-02
2.8829.xx	b.	PB Replace in Sync w/ County Paving	-	$52,000	West Marin Master Plan Project 1c-01 For 25 replacements
2-7185-00	c.	Gallagher Ranch Streambank Stabilization	$5,000	$5,000	Monitoring costs over 5 years.
	d.	PRE Tank #1 & #2 Replacement	-	$620,000	West Marin Master Plan Project 4-04 & 4-05
2.8912.00	e.	Lagunitas Creek Bridge Pipe Replacement (Caltrans)	$52,000	$50,000	Relocate/replace 8-inch water main across Lagunitas Creek Bridge
	f.	Miscellaneous Water System Improvements	$150,000	-	West Marin Master Plan Project 4-12
2.7192.xx	g.	PRE Replace 2-inch Galvanized Pipe	$45,000	-	Replacement of aging galvanized pipe
2.7203.00	h.	Raise Valves for HWY 1 Paving	$15,000	-	Relocation of water facilities in conjunction with Caltrans Paving
		TOTAL WEST MARIN WATER SYSTEM PROJECTS	$647,000	$727,000	
7.		OCEANA MARIN SEWER SYSTEM			
8.8672.28	a.	Infiltration Repair (Manhole Relining)	$40,000	$40,000	Ongoing work to identify and repair collection pipelines to prevent rainwater from leaking into the system
8.7173.00	b.	OM Treatment Pond Rehab-404 Grant-FEMA	$1,200,000	$205,000	Hazard mitigation project to armor the existing earthen treatment pond berms to minimize storm erosion and damage due to earthquakes
8.7173.01	c.	OM Treatment Pond Rehab-Grant Management	$10,000	$10,000	
	d.	North St. Lift Station Bypass	-	$310,000	
8.7208.00	e.	Sewer Force Main Improvements	$125,000	-	Adding isolation valves or other appurtenances in the 3,000+ LF FM to allow for repairs in the system. Commence Design and wait for funding
		TOTAL OCEANA MARIN SEWER SYSTEM PROJECTS	$1,375,000	$565,000	

CAPITAL IMPROVEMENT PROJECTS

	FY23	FY24	FY23 & FY24 Project Description
SUMMARY - GROSS PROJECT OUTLAY			
Novato Water	$16,527,000	$7,179,000	
Recycled Water	$350,000	$200,000	
West Marin Water	$647,000	$727,000	
Oceana Marin Sewer	$1,375,000	$565,000	
GROSS PROJECT OUTLAY	$18,899,000	$8,671,000	
LESS FUNDED BY LOANS/GRANTS/OTHER			
a. Office/Yard Building Refurbish (Note 1)	($12,650,000)	($2,350,000)	
b. Crest PS/San Mateo Tank Pipeline Grant	-	($249,000)	
c. RW Capital Replacement Expansion Fund	($350,000)	($200,000)	
d. WM Novato Water Loan to WM (Note 3)	($150,000)	($350,000)	
e. OM Novato Water Loan to WM (Note 4)	($500,000)	-	
f. WM CA DWR Drought Relief Grant	($340,000)	-	
g. WM Lagunitas Ck Bridge Pipeline Grant	-	($100,000)	
h. OM Treatment Pond Rehab Grant (Note 5)	($460,000)	($305,000)	
TOTAL LOAN/GRANT FUNDS	($14,450,000)	($3,554,000)	
SUMMARY - NET PROJECT OUTLAY			
Novato Capital Improvement Net Project Outlay	$3,877,000	$4,580,000	
Recycled Water	$0	$0	
West Marin Water	$157,000	$277,000	
Oceana Marin Sewer	$415,000	$260,000	
NET PROJECT OUTLAY	$4,449,000	$5,117,000	
Total Number of District Projects	38	31	

Novato 5-Year Average of Internally Funded Projects FY23-FY27	**$4,120,000**
RW 5-Year Average of Internally Funded Projects FY23-FY27	**$60,000**
West Marin 5-Year Average of Internally Funded Projects FY23-FY27	**$280,000**
Oceana Marin 5-Year Average of Internally Funded Projects FY23-FY27	**$260,000**

CAPITAL IMPROVEMENT PROJECTS

		FY23	FY24	FY23 & FY24 Project Description
NOVATO POTABLE WATER DEBT SERVICE				
a.	STP SRF Loan	$1,044,000	$1,044,000	
b.	AEEP Bank Loan	$482,000	$482,000	
c.	Advanced Meter Info Retrofit Loan	$376,000	$376,000	
d.	Admin Building Renovation Loan (Note 1)	$1,348,000	$1,348,000	
		$3,250,000	$3,250,000	
NOVATO RECYCLED WATER DEBT SERVICE				
e.	Deer Island Facility SRF Loan	$273,000	$273,000	
f.	RW North Expansion SRF Loan	$282,000	$282,000	
g.	RW South Expansion SRF Loan	$332,000	$332,000	
h.	RW Central Exp SRF Loan (Net of MCC)	$276,000	$276,000	
		$1,163,000	$1,163,000	
WEST MARIN WATER DEBT SERVICE				
i.	WM Novato Loan Payback	$94,000	$94,000	
j.	TP Solids Handling Bank Loan	$71,000	$71,000	
		$165,000	$165,000	
OCEANA MARIN SEWER DEBT SERVICE				
k.	OM Novato Loan Payback	-	$59,000	
		$0	$59,000	
	TOTAL DEBT SERVICE	$4,578,000	$4,637,000	
	NET PROJECT OUTLAY & DEBT SERVICE	**$9,027,000**	**$9,754,000**	

CAPITAL IMPROVEMENT PROJECTS

	FY23	FY24	FY23 & FY24 Project Description
STUDIES & SPECIAL PROJECTS			
a. Novato Water Rate Study	-	$60,000	
b. Novato Water Master Plan Update (Note 6)	$175,000	-	
c. Novato Connection Fee Study	$20,000	-	
d. Compensation Survey & Review	$15,000		
e. Lynwood /San Marin Zone 2 Modification Evaluation	$30,000	-	
f. Stafford Lake Sediment Survey (every 10 yrs.)	-	$60,000	
g. Cathodic Protection Master Plan (Note 7)	-	$40,000	
h. Drought Contingency Plan - NBWRA	$9,000		
i. West Marin Connection Fee Study	$10,000	-	
j. West Marin Water Master Plan (every 10 years)	-	$65,000	
k. Coast Guard Housing-PRTP Study	$25,000	-	
l. Stafford Dam Master Plan	$25,000	-	
m. Tank & Pipeline Easement	-	$25,000	
n. Pipeline Condition Assessment (Note 8)	$50,000	-	
Total studies undertaken by the District	$359,000	$250,000	

Note 1 - $16.3M NMWD Headquarters Upgrade is funded by a 20 year 3.11% interest Bank Loan.

Note 2 - Project developed as part of October 2017 Feasibility Assessment prepared by Prunuske Chatham, Inc.

Note 3 - Loan from Novato Water - As included in the 2021 WM Water rate study - to be paid back with interest. Loan to occur in FY22 & FY23.

Note 4 - Loan from Novato Water - As included in the five-year financial forecast.

Note 5 - Project to be funded 60% by grants. Eligible project costs are budgeted at $1.5M (60%=$914K). Also includes loans for capital projects of $250K in FY23.

Note 6 - Novato Master Plan Update will be enhanced to include hydraulics, vulnerabilities (seismic, flooding, etc.), Frosty Lane pit, San Marin pit and NMA

Note 7 - Cathodic Protection Master Plan to Include an inventory and assessment of critical pipelines, casings, and highway crossings.

Note 8 - Perform pipeline condition assessment including large diameter pipelines to prioritize master plan designated improvements. Incl pipelines in narrow R/W and creek crossings.

EQUIPMENT EXPENDITURES

Fiscal Year 22/23 Budget

Account		Item	Approved	Description
	1	**OPERATIONS/MAINTENANCE**		
12107.01.00	a.	Meter Maintenance Program	$150,000	Testing Bench for Meters up to 2"
12105.01.00	b.	Total Organic Carbon (TOC) Analyzer	$42,000	
			$192,000	
	2	**Engineering & Construction**		
12106.01.00	a.	GPS Unit (Surveying)	$40,000	Field GPS unit for locating new and exist. pipes, valves, etc.
			$40,000	
	3	**VEHICLE & ROLLING EQUIPMENT EXPENDITURES**		
12108.01.00	a.	STP Forklift 5,000 lbs	$60,000	
12104.01.00	b.	100 KW Portable Generator	$60,000	
12104.01.00	c.	Leased Vehicles	$205,000	Replace 6 Vehicles #515, 516, 518, 520, 521 & 522
			$325,000	
		Total	**$557,000**	

RECAP	Adopted Budget 2021/22	Estimated Actual 2021/22	**Proposed Budget 2022/23**
Equipment	$160,000	$80,000	$232,000
Rolling Stock	$135,000	$278,000	$325,000
	$295,000	**$358,000**	**$557,000**

North Marin Water District
Sewer Cleaning Matrix

The District's sewer maintenance staff and contractors should collect all observations made during sewer cleaning operations regarding the extent and nature of materials removed. The matrix below provides guidance for any changes to be made to the frequency of the "hot spot" pipes based on cleaning results and/or CCTV data.

	Clear	**Light**	**Moderate**	**Heavy**
Debris	No observable debris	Minor amount of debris 1-2 passes	moderate amounts of debris 3-4 passes	Significant amounts of debris More than 4 passes Operator concern for future stoppage
Grease	No observable grease	Minor amounts of grease 15 minutes or less to clean 1-2 passes	Small "chunks" No "logs" 15-30 minutes to clean 3-4 passes	Big "chunks" or "logs" More than 4 passes Operator concern for future stoppage
Roots	No observable roots	Minor amounts of roots 1-2 passes	Thin stringy roots No "clumps" 3-4 passes	Thick roots Large "clumps" More than 4 passes Operator concern for future stoppage
Debris: Structural pipe fragments, soil, rock, etc.	No observable materials	Specify material (if possible) Minor amounts of material	Specify material Moderate amounts of material per line segment	Specify material Significant amounts of material per line segment. Operator concern for future stoppage.
	Clear	Light	Moderate	Heavy
Action:	Decrease frequency to next lower frequency after 2 clear results (e.g. months to 12 months)	Continue current maintenance frequency	Increasing current maintenance frequency to next higher frequency (e.g. 6 months to 3 months)	Increasing current maintenance frequency to next higher frequency (e.g. 6 months to 3 months)

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North Marin Water District

LIST OF AVAILABLE MAINTENANCE EQUIPMENT
Provided by the Contract Operator

- Combination Vacuum and Hydrojet truck
- Push cameras
- Hand-held GPS unit
- Trash pump and hoses
- Vacuum trailer
- Disposable cameras
- Spill berm & Spill mat
- Spill Shark (water based spill absorbent)
- 6 inch and 2 inch pumps

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Appendix D

Element 5 (Design and Performance Provisions) Supporting Documents

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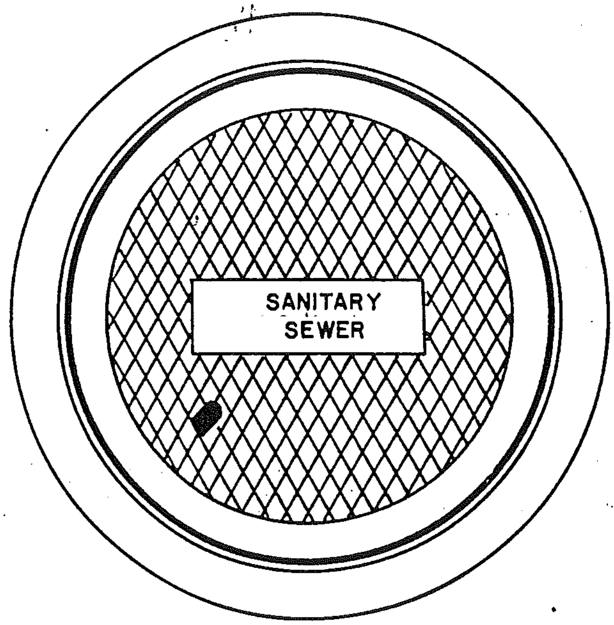
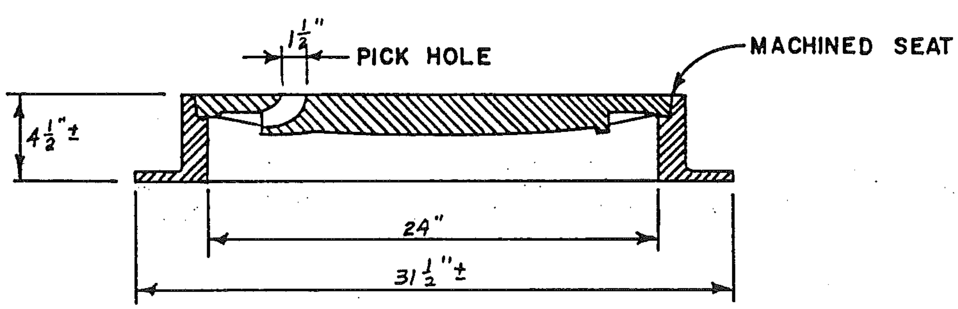
NORTH MARIN WATER DISTRICT

STANDARD DRAWINGS

SEWER



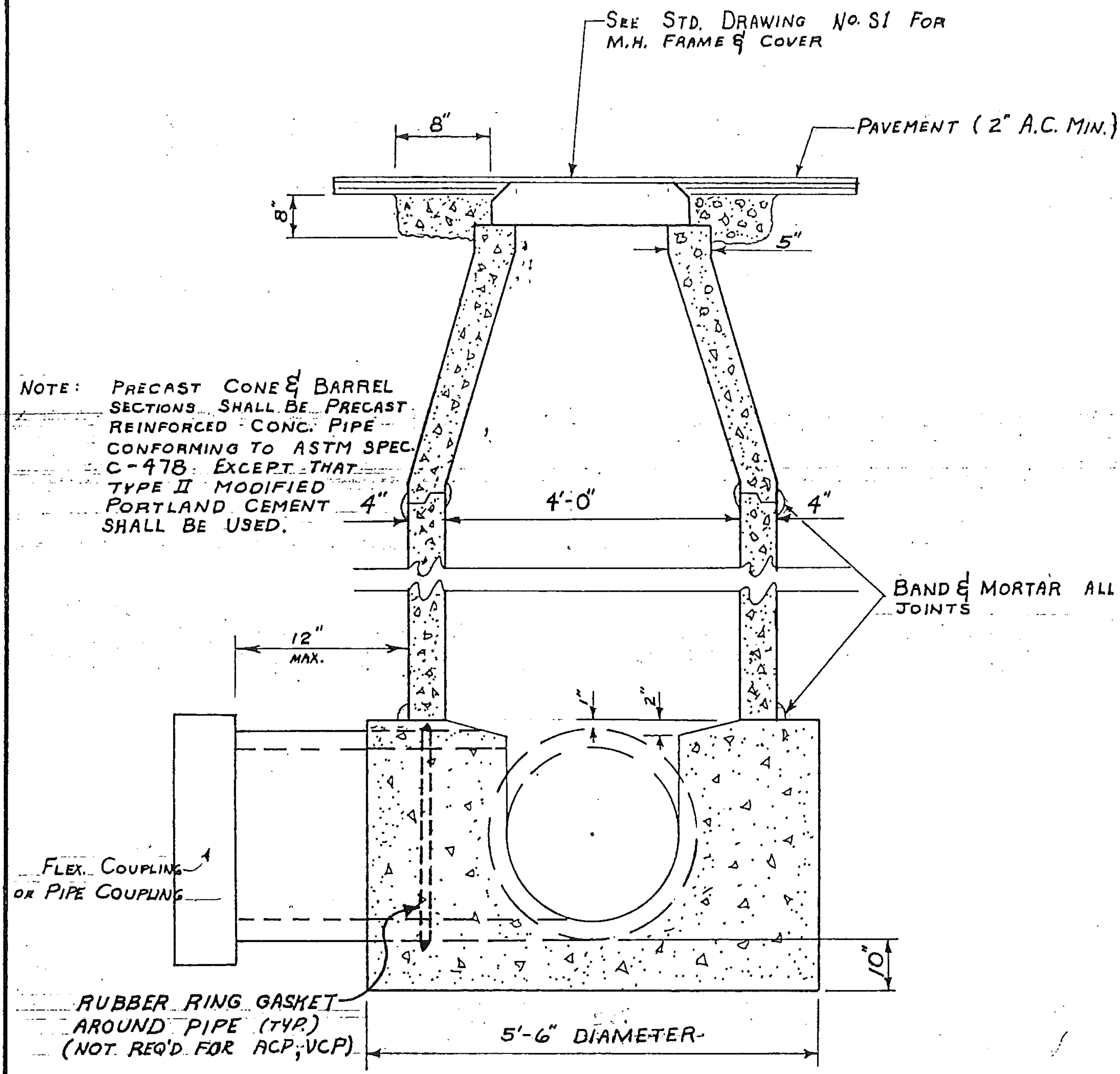


COVER – 130#
FRAME – 138#
TOTAL 268#

NOTE: CASTINGS SHALL BE DIPPED IN ASPHALT PAINT

MANHOLE FRAME and COVER — PHOENIX P-1090
— NEENAH R-1792-FL
— OR EQUAL

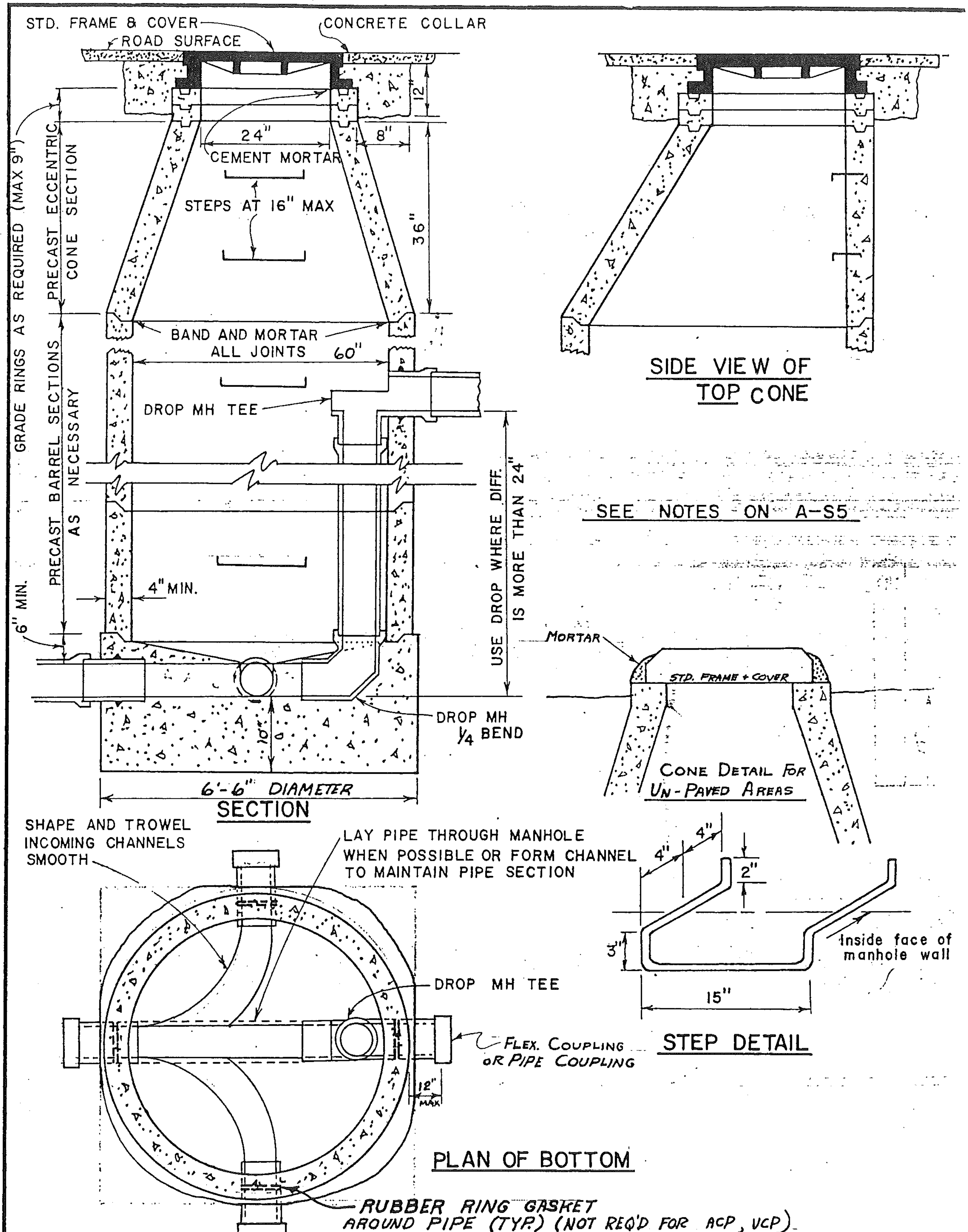
NORTH MARIN COUNTY WATER DISTRICT NOVATO, CALIFORNIA	STANDARD MANHOLE FRAME and COVER	DES	DR	CH	REC	SCALE NONE
			RDG			DATE APRIL 29, 1976
		APPROVED:				SHEET NO. OF SHEETS
		RE 11595				NO. A-S1



NOTES:

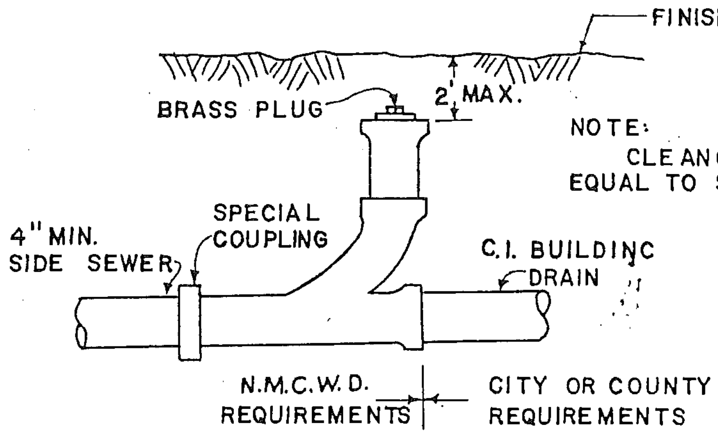
1. ALL CONCRETE SHALL BE CLASS "A" (6 SACK MIX)
2. CONCRETE BASE SHALL BE PLACED AGAINST UNDISTURBED EARTH
3. NO CONCRETE SHALL BE PLACED PRIOR TO FORM INSPECTION BY THE ENGINEER
4. MANHOLE FRAME MAY BE AJUSTED EITHER BEFORE OR AFTER PAVING, BUT FINAL GRADE MUST CONFORM TO THE FINISHED GRADE OF THE PAVING WITHIN 1/8"

NORTH MARIN COUNTY WATER DISTRICT NOVATO, CALIFORNIA	STANDARD MANHOLE FOR CONDUIT UP THRU 33" DIA. (Rev. 7/13/72)	DES	DR	CH	REC	SCALE NONE
			R.D.G.			DATE APRIL 19, 1971
		APPROVED:				SHEET NO. OF SHEET
						NO. A— S2

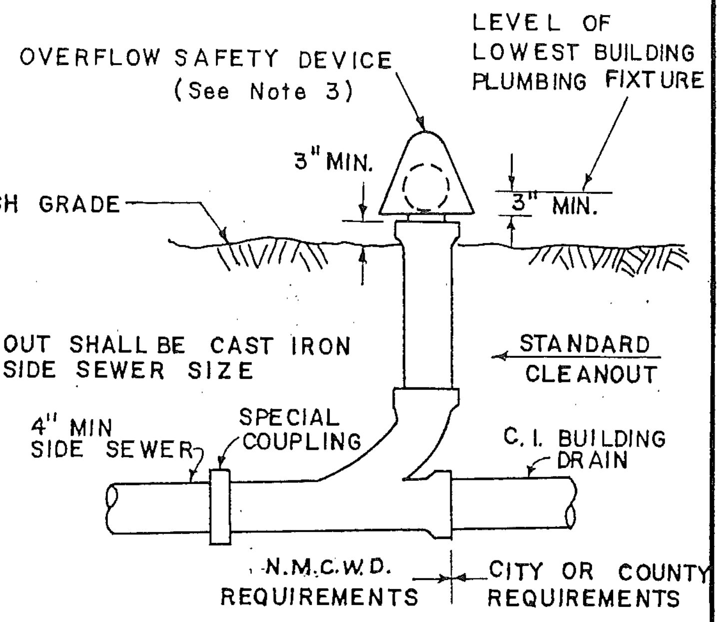


NORTH MARIN COUNTY WATER DISTRICT NOVATO, CALIFORNIA	STANDARD SEWER MANHOLE WITH DROP (Rev. 7/13/72)	DES	DR	CH	REC	SCALE NONE
			R.D.G.			DATE APRIL 19, 1971
		APPROVED:				SHEET NO. OF SHEETS
						NO. A — S3

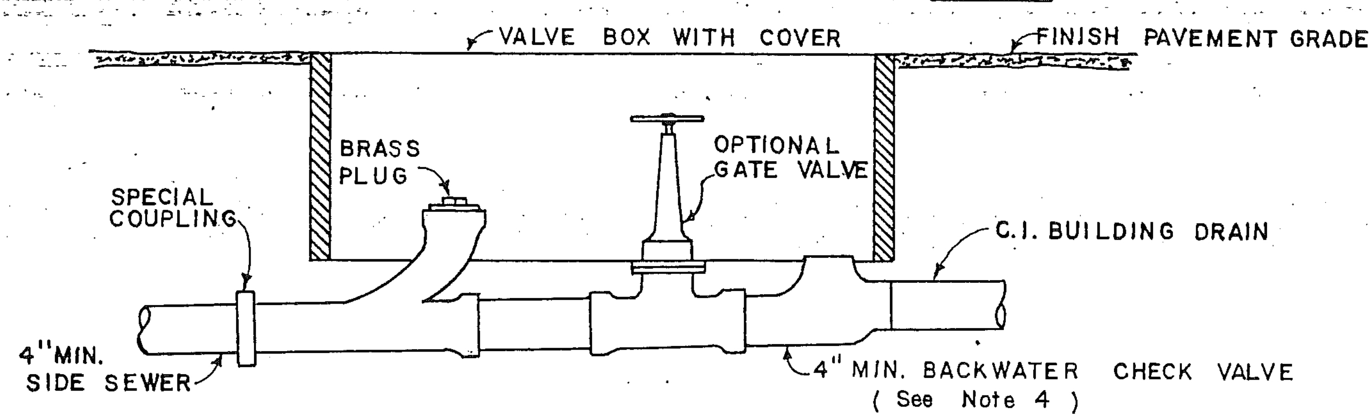
CLEANOUTS LOCATED UNDER PAVED DRIVEWAYS, WALKWAYS, ETC. SHALL BE RAISED TO GRADE AND INSTALLED IN YARD BOXES AS DIRECTED BY THE DISTRICT ENGINEER.



NOTE:
CLEANOUT SHALL BE CAST IRON EQUAL TO SIDE SEWER SIZE



STANDARD CLEANOUT, TYPE A BACKWATER PREVENTION DEVICE



TYPE B BACKWATER PREVENTION DEVICE

SEE NOTES ON No. A-S5

NORTH MARIN COUNTY WATER DISTRICT NOVATO, CALIFORNIA	STANDARD CLEANOUT and BACKWATER PREVENTION DEVICES	DES	DR	CH	REC	SCALE NONE
			R.D.G.			DATE APRIL 19, 1971
		APPROVED:				SHEET NO. OF SHEETS
						NO. A-S4

NOTES FOR STANDARD SEWER MANHOLE

1) Manhole base shall be Class A (6-sack) concrete and shall be poured against undisturbed soil.

2) Precast concrete cone, barrel and grade rings shall conform to A.S.T.M. Spec. C-478, except that Type II Modified portland cement shall be used.

3) Steps shall be 3/4" steel rod, galvanized after fabrication.

4) Frame and cover may be adjusted to grade either before or after paving, but final grade shall conform to adjacent finish pavement grade within 1/3".

5) Eccentric cone section shall be positioned as directed by the District Engineer.

6) Where frame and cover is set after paving, the concrete collar shall be brought to finish grade and the exposed concrete surface shall be colored with SS-1 paving oil before the concrete has set.

7) A concrete collar need not be installed where the manhole is outside the paved street surface or in an easement.

NOTES FOR STANDARD CLEANOUT AND BACKWATER PREVENTION DEVICES

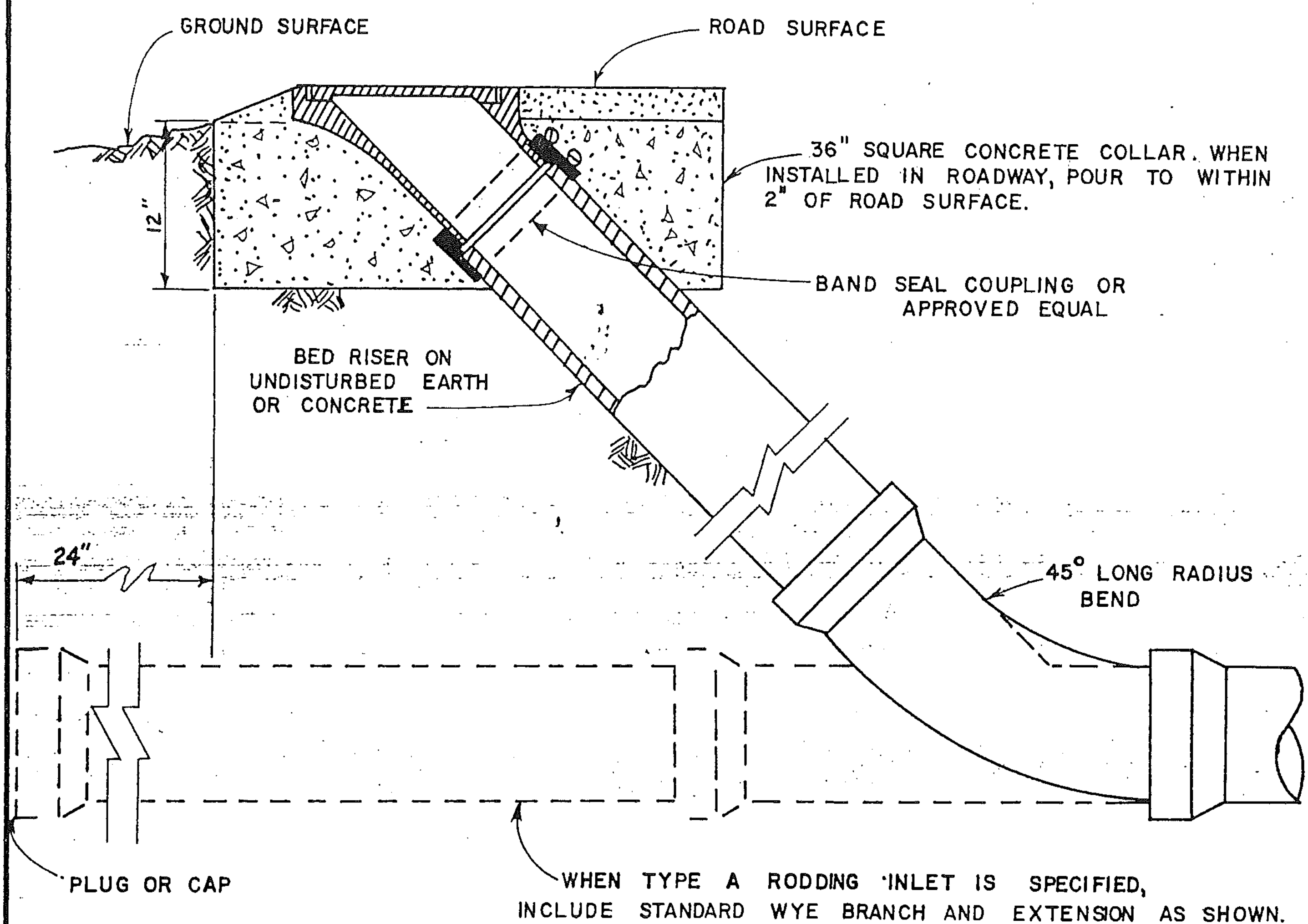
1. "A" Standard 4" Cleanout is the minimum District requirement.

2. "B" Backwater Prevention Device is required and shall be installed where the side sewer serves plumbing fixtures that are located below the rim elevation of the upstream manhole or rodhole in the reach of main sewer into which the side sewer connections.

3. A Type A Backwater Prevention Device shall be installed in those locations where sewage can overflow on the surrounding area without damage to property. The overflow safety device shall be as manufactured by Ream Machine Shop, 3297 Mount Diablo Blvd., Lafayette, California, or approved equal.

4. A Type B Backwater Prevention Device shall be installed in those locations where the cleanout must be located within a paved area or where, because of potential damage to adjacent property, an overflow device cannot be used. The gate valve is optional but should be installed for additional protection. The backwater check valve shall be Josam Series No. 1170, or approved equal.

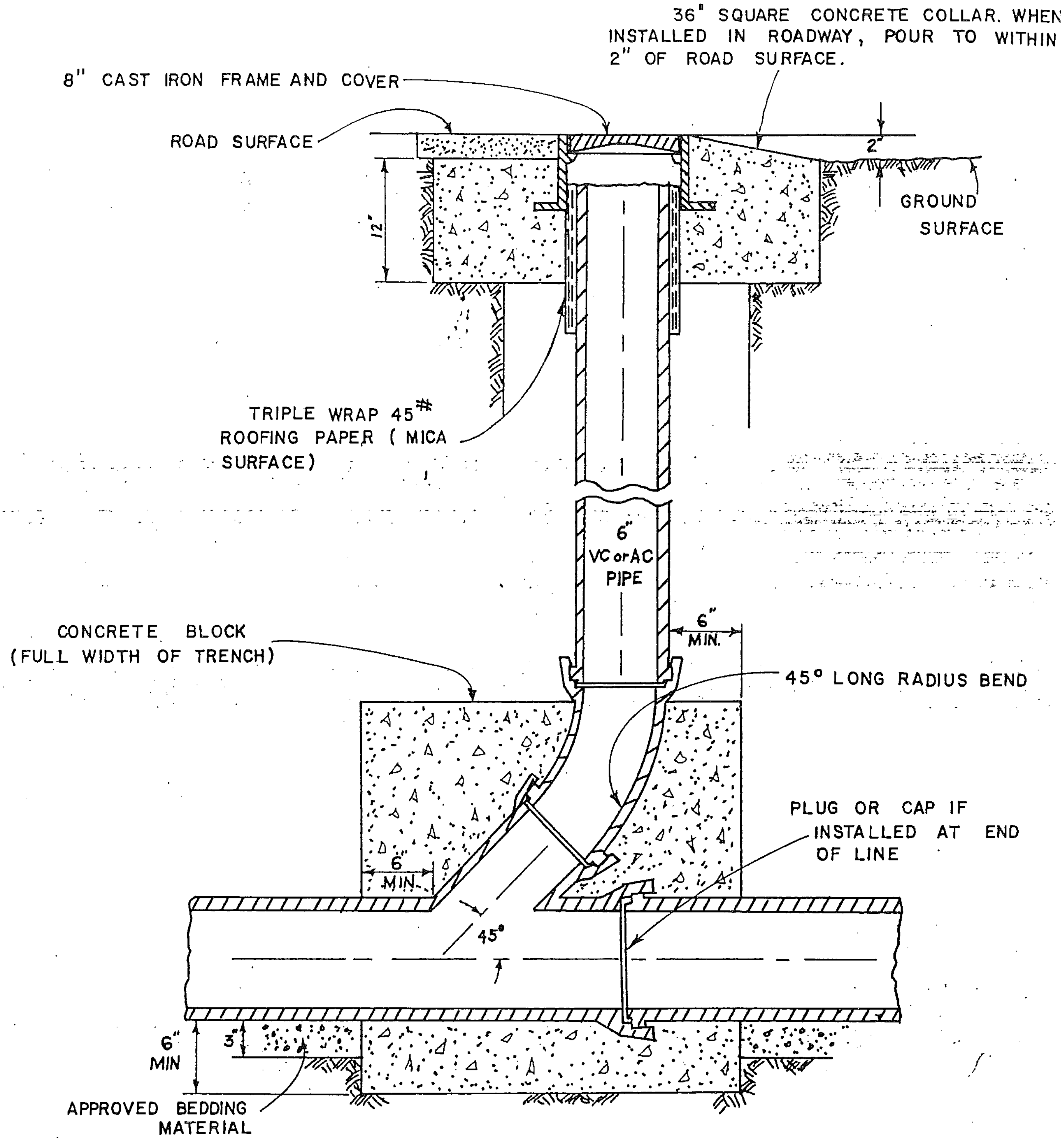
NORTH MARIN COUNTY WATER DISTRICT NOVATO, CALIFORNIA	NOTES	DES	DR	CH	REC	SCALE NONE
			R.D.G.			DATE APRIL 19, 1971
		APPROVED:				SHEET NO. OF SHEETS
						NO. A— S5



Notes:

1) *Frame and cover shall be PHOENIX P-7103 or equal.*
2) *Concrete shall be Class A (6-sack mix).*
3) *Backfill shall not be placed until installation has been inspected and approved.*
4) *Frame and cover may be adjusted to grade either before or after paving, but final grade shall conform to adjacent finished pavement grade within 1/8".*
5) *Type A Rodding Inlet shall be installed when shown on plans or as required by the District Engineer.*

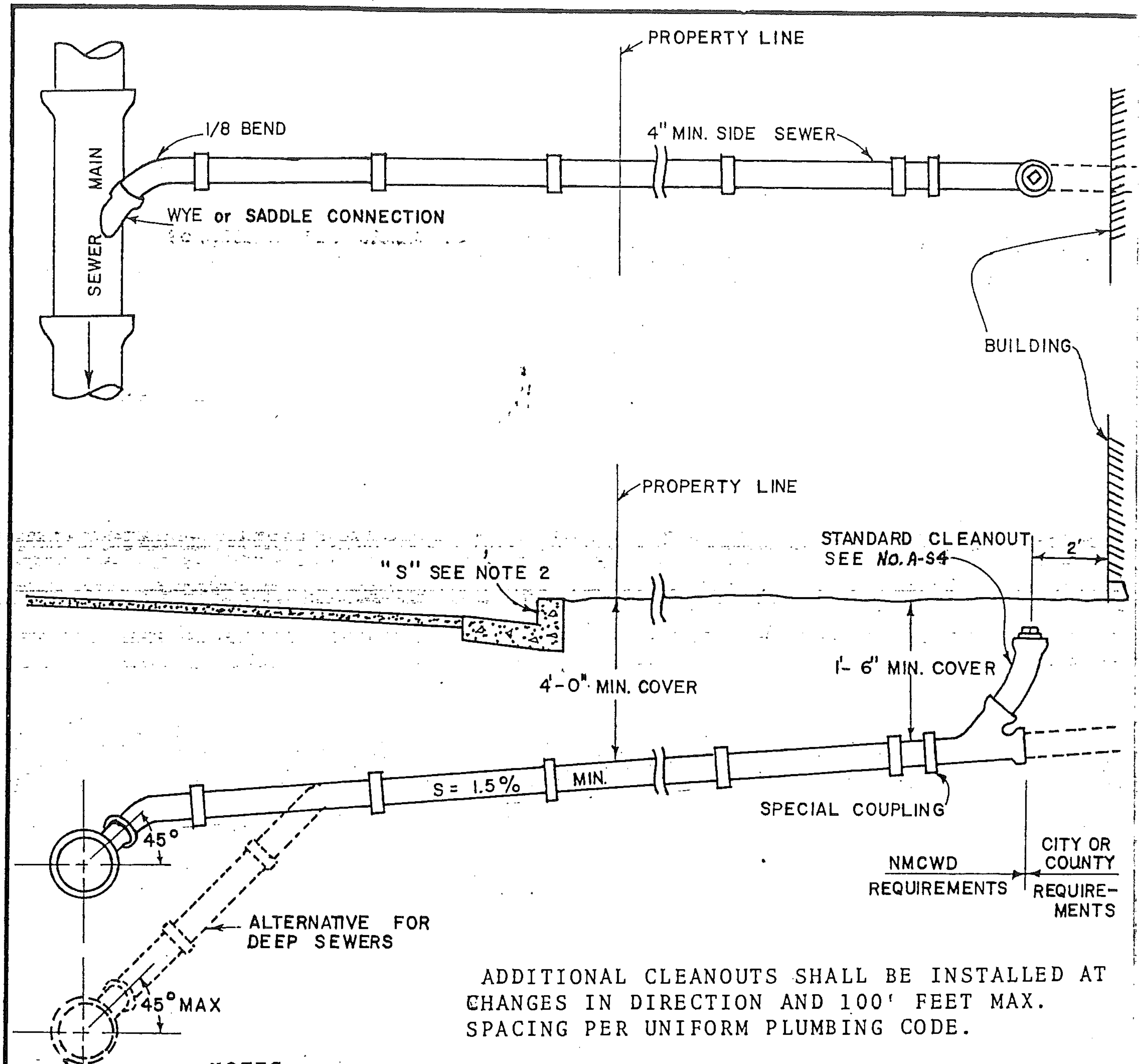
NORTH MARIN COUNTY WATER DISTRICT NOVATO, CALIFORNIA	STANDARD 6 INCH RODDING INLET	DES	DR	CH	REC	SCALE	NONE
			R.D.G.			DATE	APRIL 19, 1971
		APPROVED:				SHEET NO. OF SHEETS	
						NO.	A- S 6



NOTES:

1) *Frame and cover shall be Ajax No. 258 or approved equal.*
2) *Concrete shall be Class A (6-sack mix).*
3) *Backfill shall not be placed until pipe installation has been inspected and approved.*
4) *Frame and cover may be adjusted to grade either before or after paving, but final grade shall conform to adjacent finished pavement grade within 1/8".*

NORTH MARIN COUNTY WATER DISTRICT NOVATO, CALIFORNIA	STANDARD 6 INCH FLUSHING INLET	DES	DR R.DG.	CH	REC	SCALE NONE DATE APRIL 19, 1971 SHEET NO. OF SHEET NO. A-S7
		APPROVED				



ADDITIONAL CLEANOUTS SHALL BE INSTALLED AT CHANGES IN DIRECTION AND 100' FEET MAX. SPACING PER UNIFORM PLUMBING CODE.

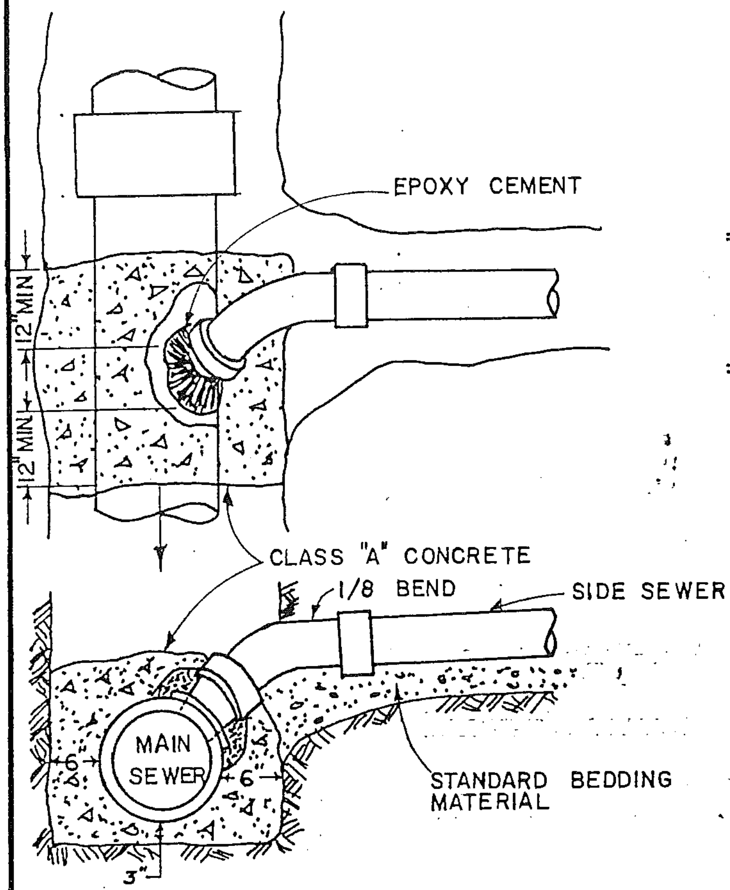
NOTES:

1. *When a lateral sewer is installed in advance of the building sewer, it shall be terminated at or near the property line. The end of the lateral shall be marked with a 2"x2" redwood stake from the top of pipe to a point 6" above the finished ground surface.*

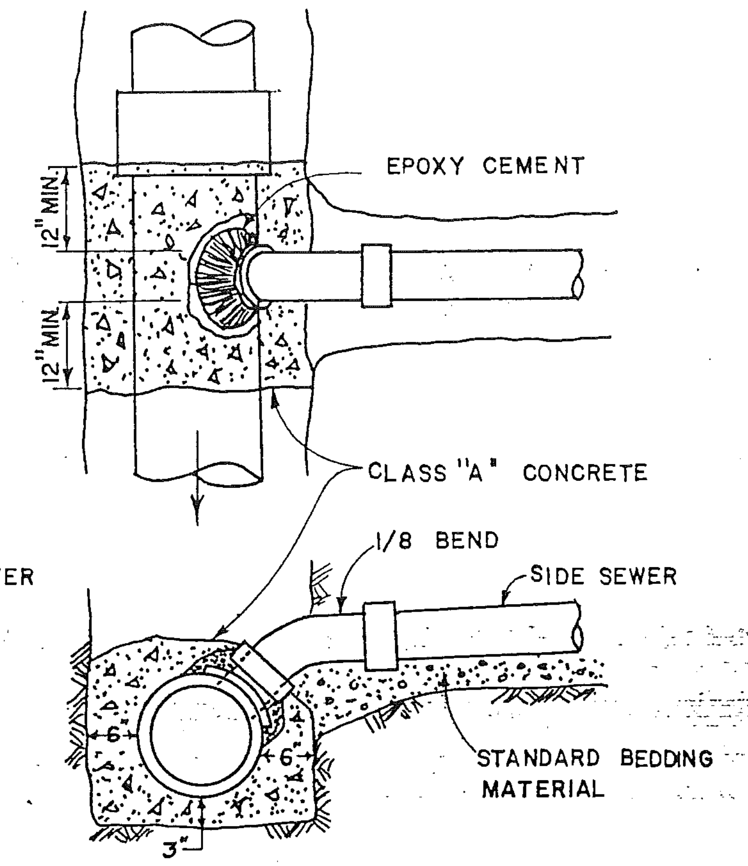
2. *2Where concrete curbs and gutters exist or are to be part of an improvement, each side sewer shall be permanently located by imprinting or chiseling an "S" (3" size) in the face of the curb vertically above the sewer pipe.*

3. *Backfill shall not be placed until pipe installation has been inspected and approved.*

NORTH MARIN COUNTY WATER DISTRICT NOVATO, CALIFORNIA	TYPICAL SIDE SEWER DETAILS	DES	DR	CH	REC	SCALE NONE
			R.D.G.			DATE APRIL 19, 1971
		APPROVED:				SHEET NO. OF SHEETS
						NO. A-S8



COLLAR WYE SADDLE



COLLAR TEE SADDLE

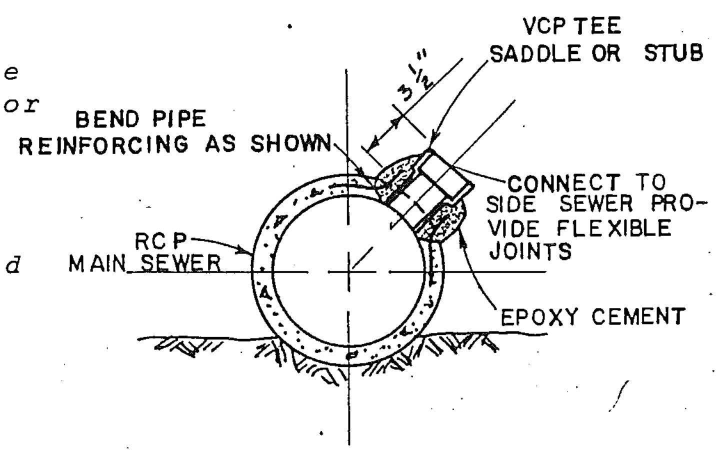
NOTES:

1. *The epoxy cement, used shall be Johns-Manville "Joint Master" or approved equivalent.*

2. *No pipe shall be connected to the saddle fitting until the installation has been inspected and approved by the District inspector.*

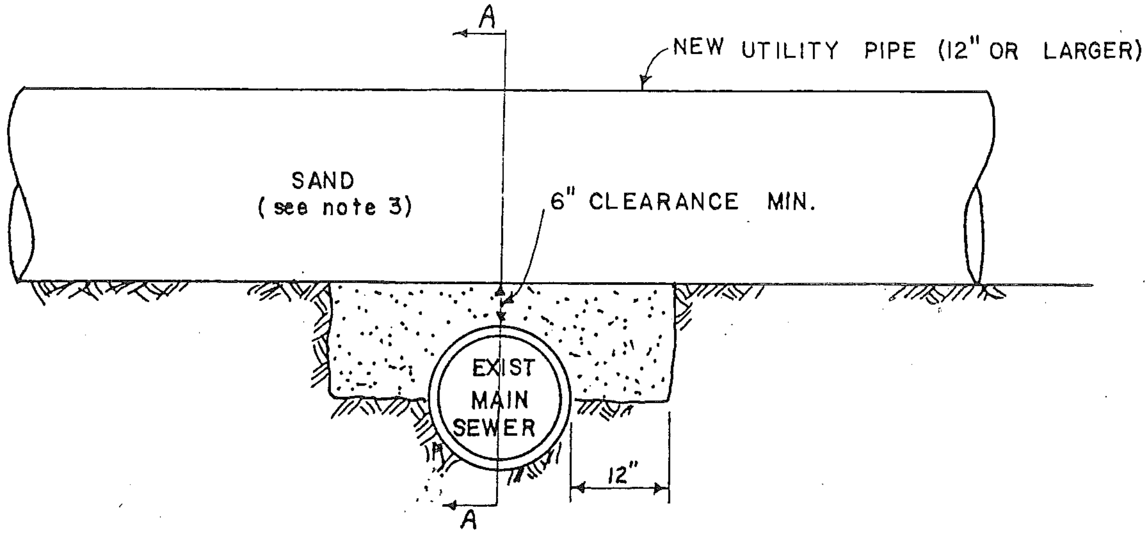
3. *When side and main sewers are equal in diameter, a standard wye branch (same type as main sewer) shall be installed in the main sewer.*

4. *Saddle connections shall be made only by licensed contractors.*

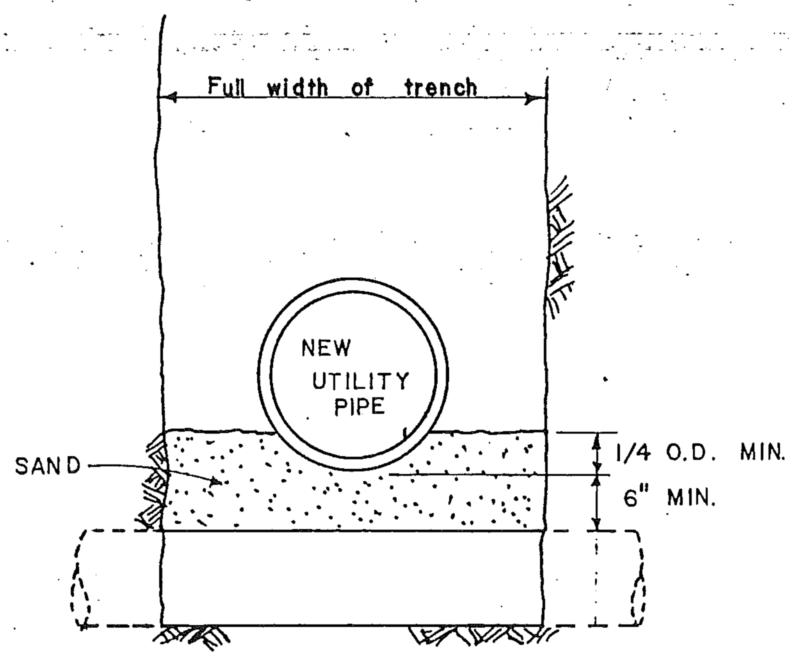


CONNECTION TO R.C.P.

NORTH MARIN COUNTY WATER DISTRICT NOVATO, CALIFORNIA	SADDLE CONNECTION DETAILS	DES	DR	CH	REC	SCALE NONE
			R.D.G.			DATE APRIL 19, 1971
		APPROVED:				SHEET NO. OF SHEETS
						NO. A– S9



MAIN SEWER

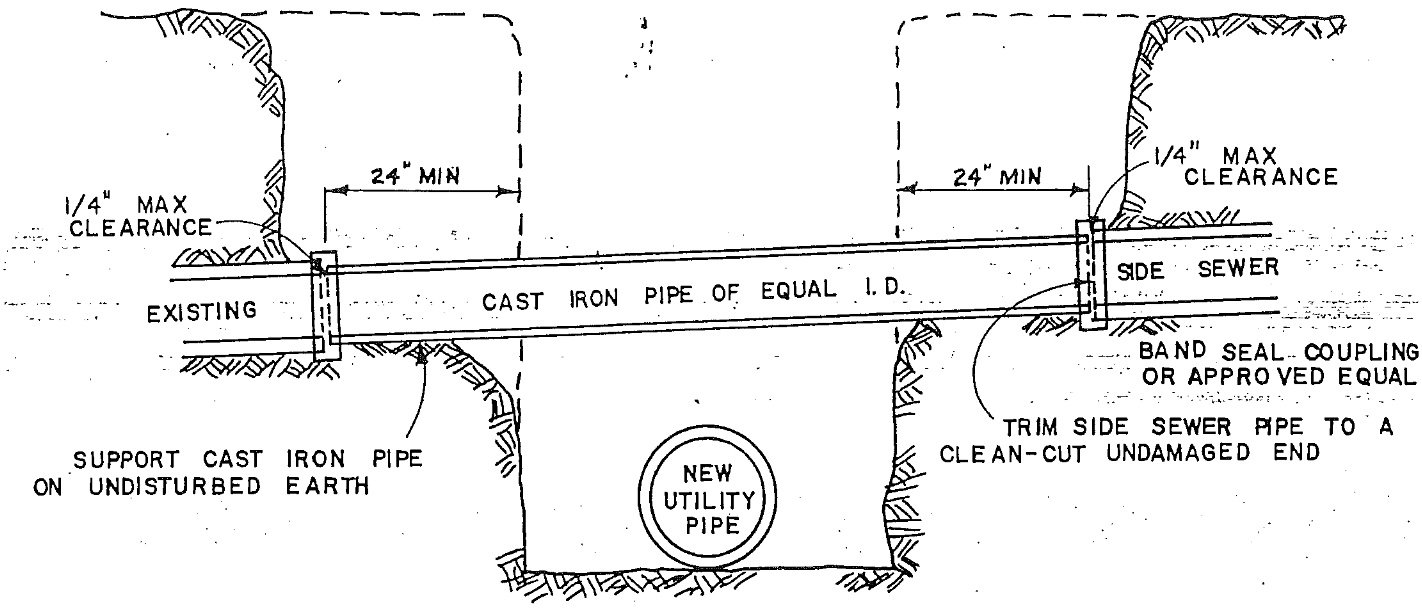


SECTION A-A

NOTES:

1. *Sewer protection as detailed hereon, shall be provided when a new utility pipe, 12" or larger, is installed above an existing main sewer and the clearance is less than 12".*
2. *Backfill shall not be placed until pipe installation has been inspected and approved.*

NORTH MARIN COUNTY WATER DISTRICT NOVATO, CALIFORNIA	MAIN SEWER PROTECTION BELOW UTILITY CROSSING	DES	DR R.D.G.	CH	REC	SCALE NONE DATE APRIL 19, 1971
		APPROVED:				SHEET NO. OF SHEETS NO. A- S 10



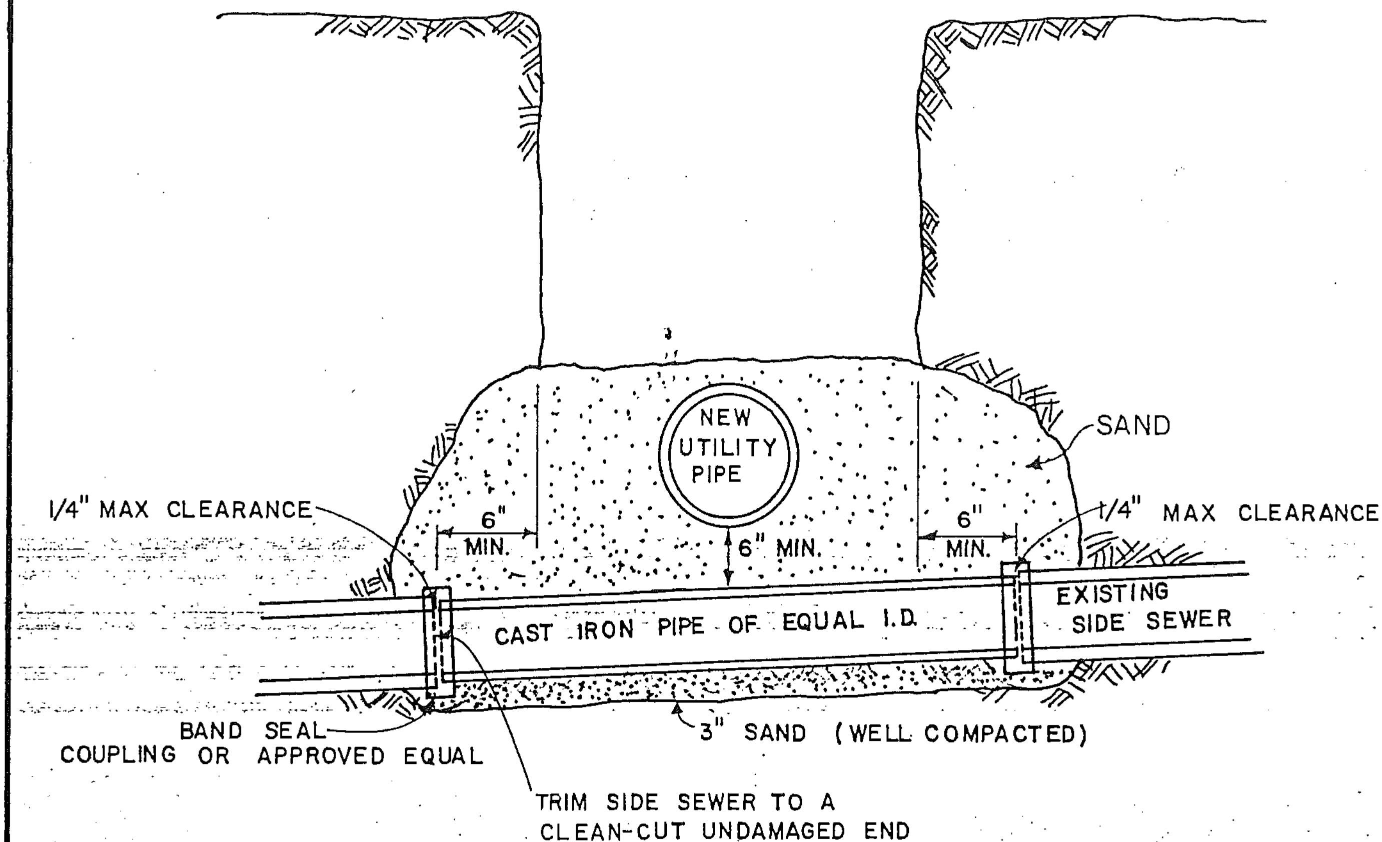
NOTES:

1. *Sewer protection, as detailed hereon, shall be provided when a new utility pipe, 12" or larger, is installed below an existing side sewer.*

2. *Backfill shall not be placed until pipe installation has been inspected and approved.*

3. *Minimum of 6" clearance shall be maintained between new utility pipe and side sewer.*

NORTH MARIN COUNTY WATER DISTRICT NOVATO, CALIFORNIA	SIDE SEWER PROTECTION ABOVE UTILITY CROSSING	DES	DR	CH	REC	SCALE NONE
			R.D.G.			DATE APRIL 19, 1971
		APPROVED:				SHEET NO. OF SHEETS
						NO. A- S11



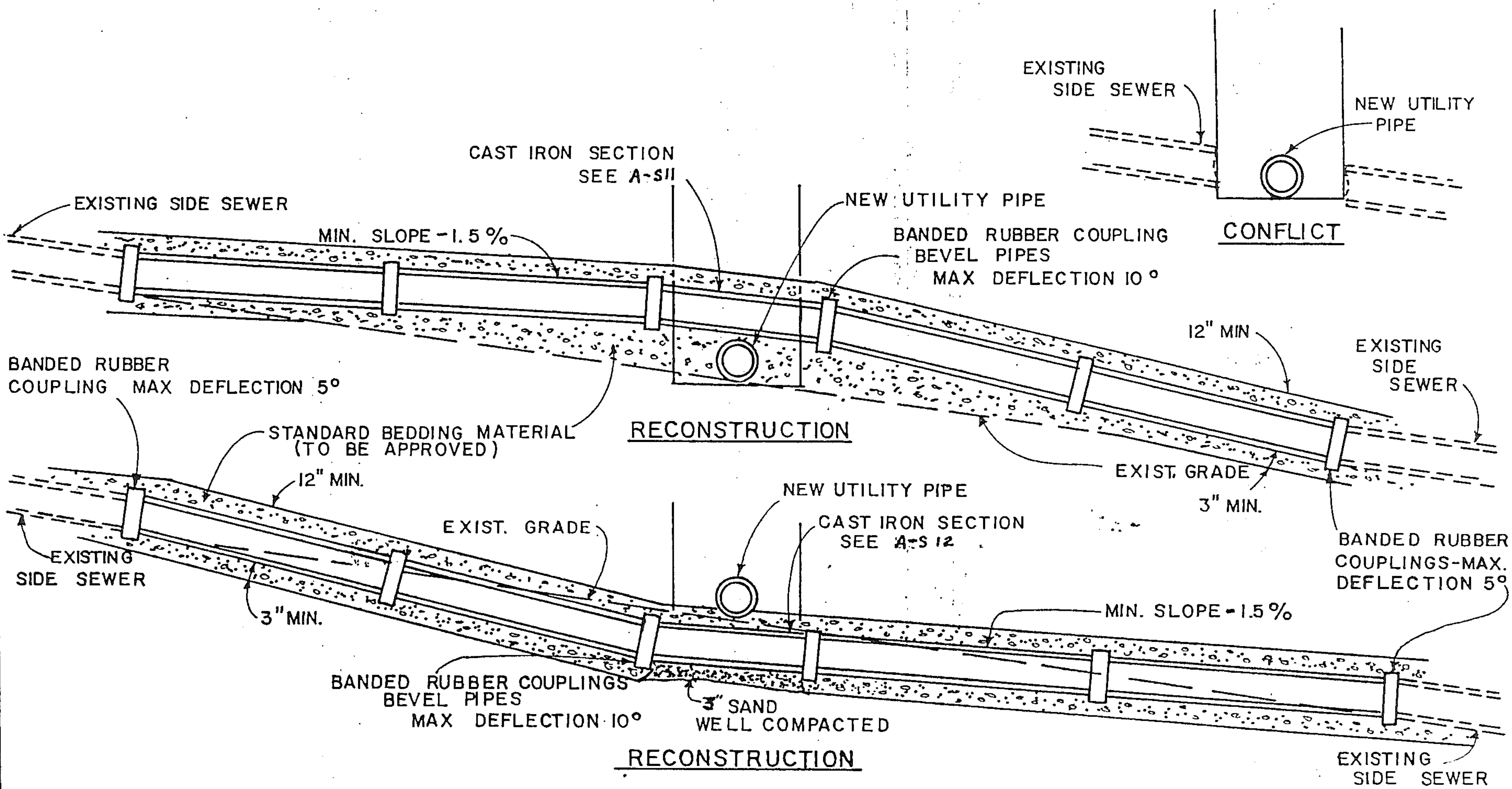
NOTES:

1. *Sewer protection, as detailed hereon, shall be provided when a new utility pipe, 12" or larger, is installed above an existing side sewer and the clearance is less than 12".*

2. *Backfill shall not be placed until pipe installation has been inspected and approved.*

3. *Sand to be well compacted below utility pipes.*

NORTH MARIN COUNTY WATER DISTRICT NOVATO, CALIFORNIA	SIDE SEWER PROTECTION BELOW UTILITY CROSSING	DES	DR	CH	REC	SCALE NONE
			R.D. G.			DATE APRIL 19, 1971
		APPROVED:				SHEET NO. OF SHEETS
						NO. A— S 12



NOTES:

1) *When new utility pipe or conduit conflicts with sewer line grade, the utility pipe or conduit shall be raised or lowered, if possible, to miss the sewer line. If it is not possible to move the utility line, written permission shall be obtained from the North Marin County Water District and the sewer line reconstructed in accordance with one of the details above and the Standard Specifications of the District.*

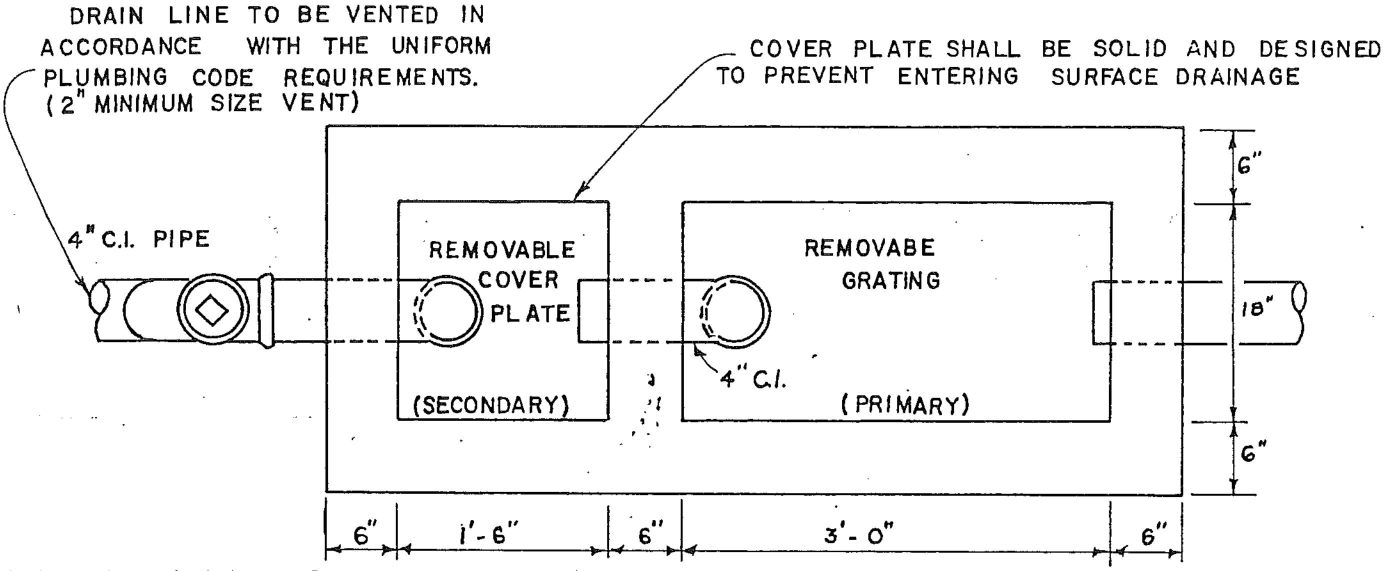
NORTH MARIN COUNTY WATER DISTRICT
NOVATO, CALIFORNIA

SIDE SEWER RECONSTRUCTION AT UTILITY CROSSINGS

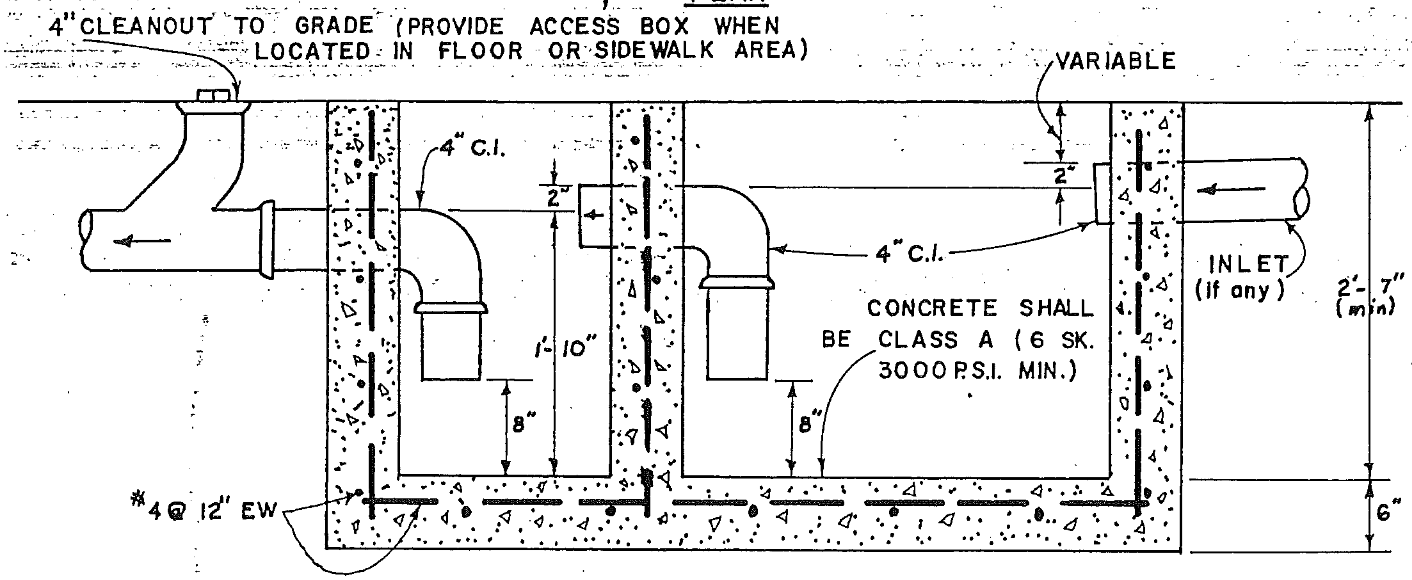
DES	DR	CH	REC
	R.D.G.		

APPROVED:

SCALE NONE
DATE APRIL 19, 1971
SHEET NO. OF SHEETS
NO. A— S 13



PLAN



SECTION

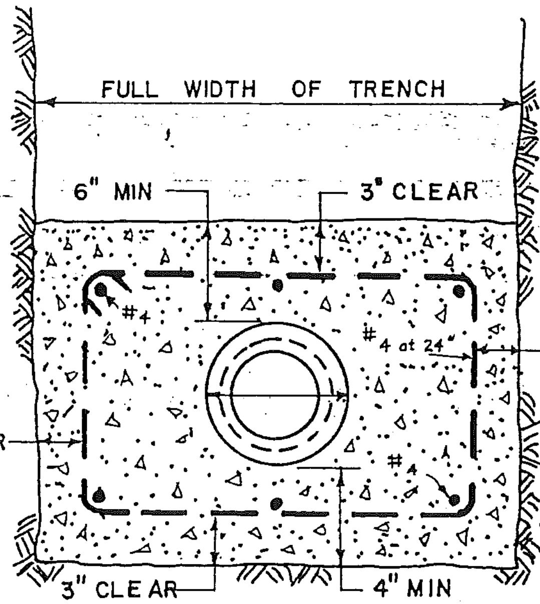
NOTES:

1) *Cover plate and grating shall be designed to sustain anticipated wheel or other loadings.*

2) *No surface or roof drainage will be permitted to enter interceptor.*

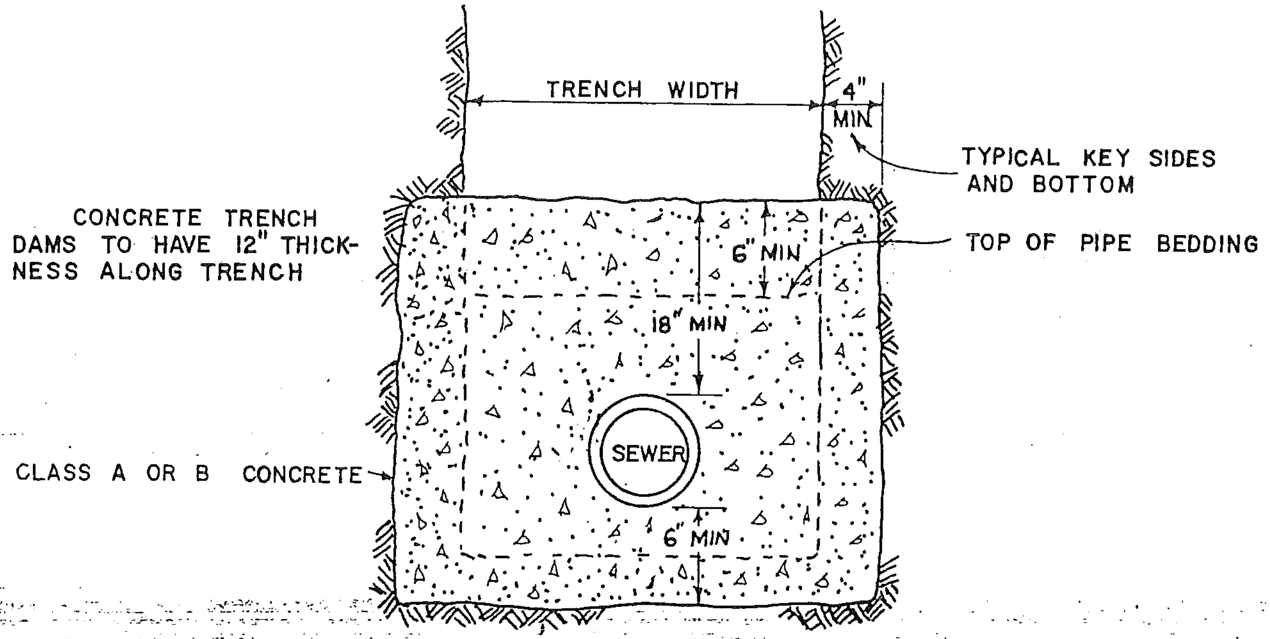
3) *Primary interceptor may be separated from secondary interceptor. Maximum separation shall be 25' unless separately vented.*

NORTH MARIN COUNTY WATER DISTRICT NOVATO, CALIFORNIA	STANDARD GREASE AND SAND INTERCEPTOR	DES	DR	CH	REC	SCALE NONE
			R.D.G.			DATE APRIL 19, 1971
		APPROVED:				SHEET NO. OF SHEETS
						NO. A — S 14

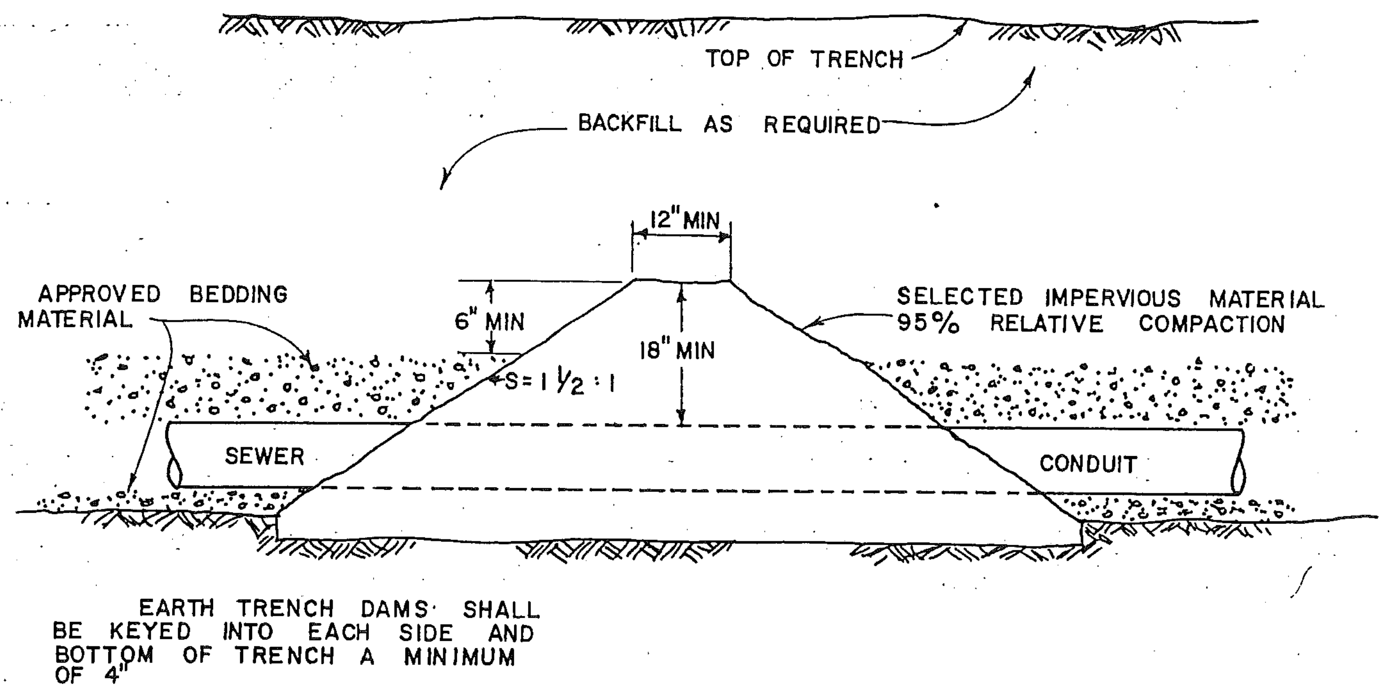


ENCASEMENT

NORTH MARIN COUNTY WATER DISTRICT NOVATO, CALIFORNIA	STANDARD CONCRETE ENCASEMENT	DES	DR	CH	REC	SCALE NONE
			R.D.G.			DATE APRIL 19, 1971
		APPROVED:				SHEET NO. OF SHEETS
						NO. A— S 15



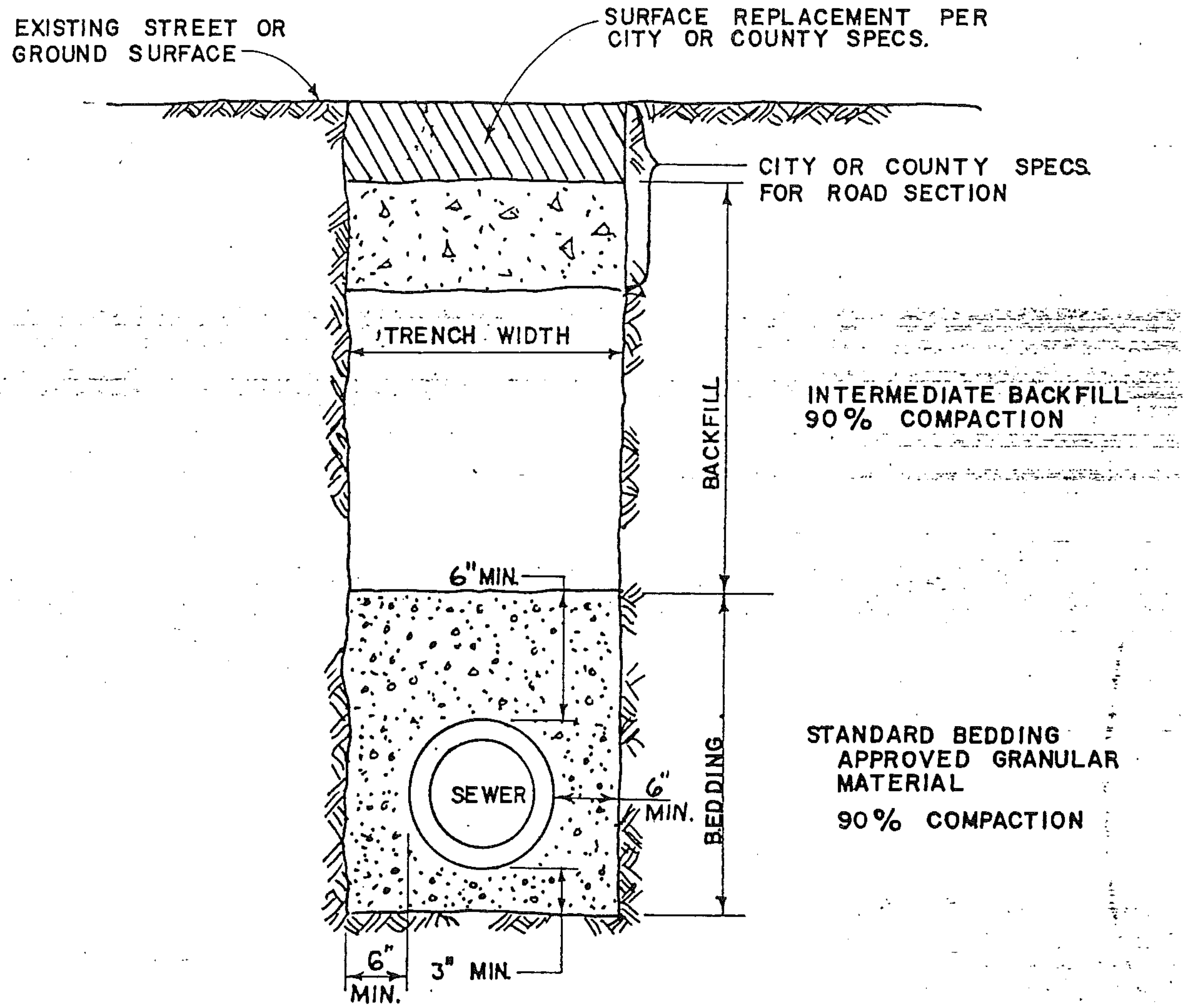
CONCRETE TRENCH DAM



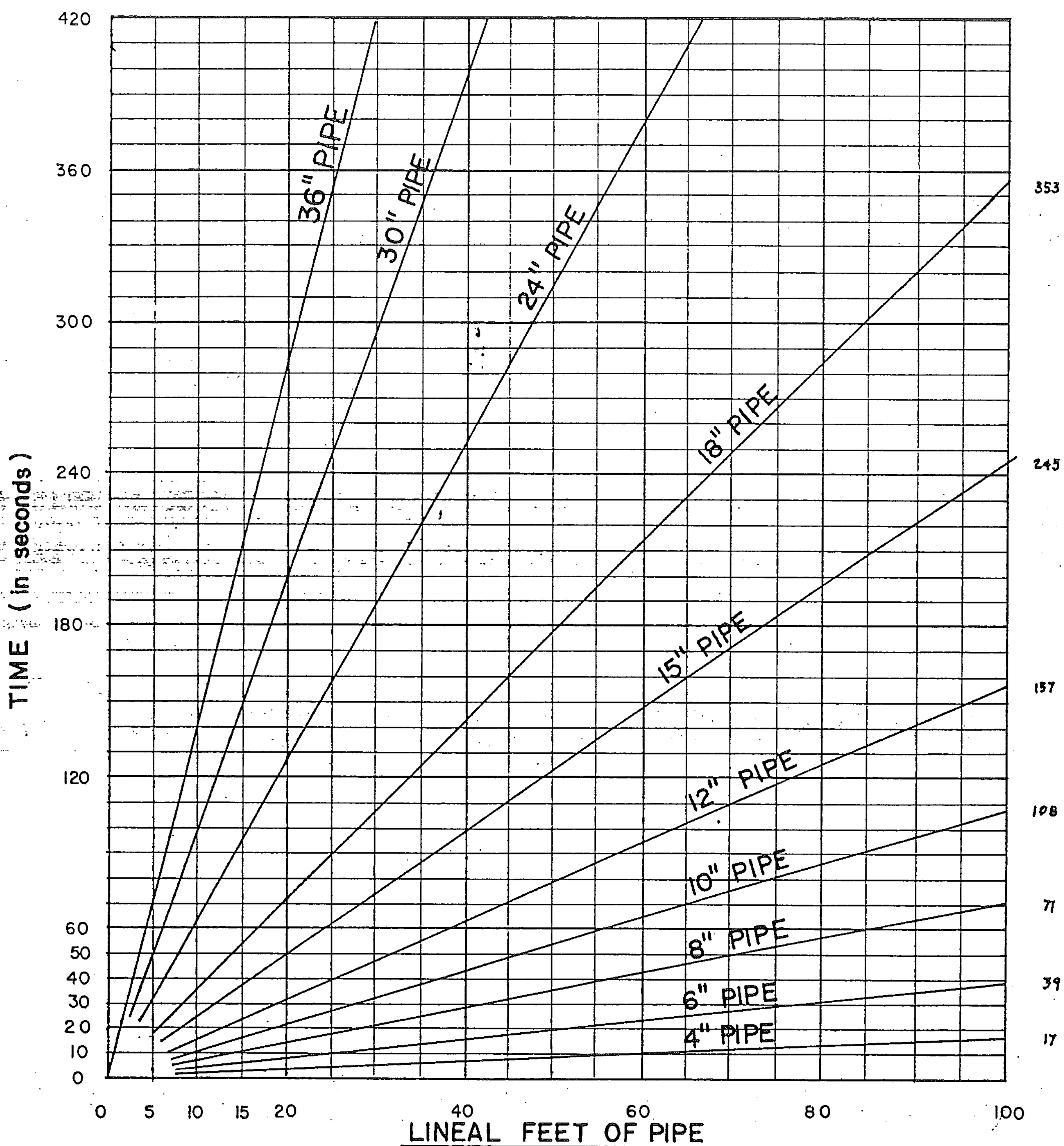
EARTH TRENCH DAM

1. *Concrete trench dam may be used only where specifically called for by the Engineer.*
2. *Form ends, cushion pipe with 1/2" Protecto Wrap tape, 1" foam rubber pad, or 1/2" plastic foam. Pipe cushion pad to project 1" minimum beyond face of concrete.*
3. *Earth trench dam shall be hand tamped under the pipe.*

NORTH MARIN COUNTY WATER DISTRICT — NOVATO, CALIFORNIA	STANDARD TRENCH DAMS	DES	DR: R.D.G.	CH	REC	SCALE: NONE; DATE: APRIL 19, 1971
		APPROVED: [signature]				SHEET NO. OF SHEETS; NO. A — S 16

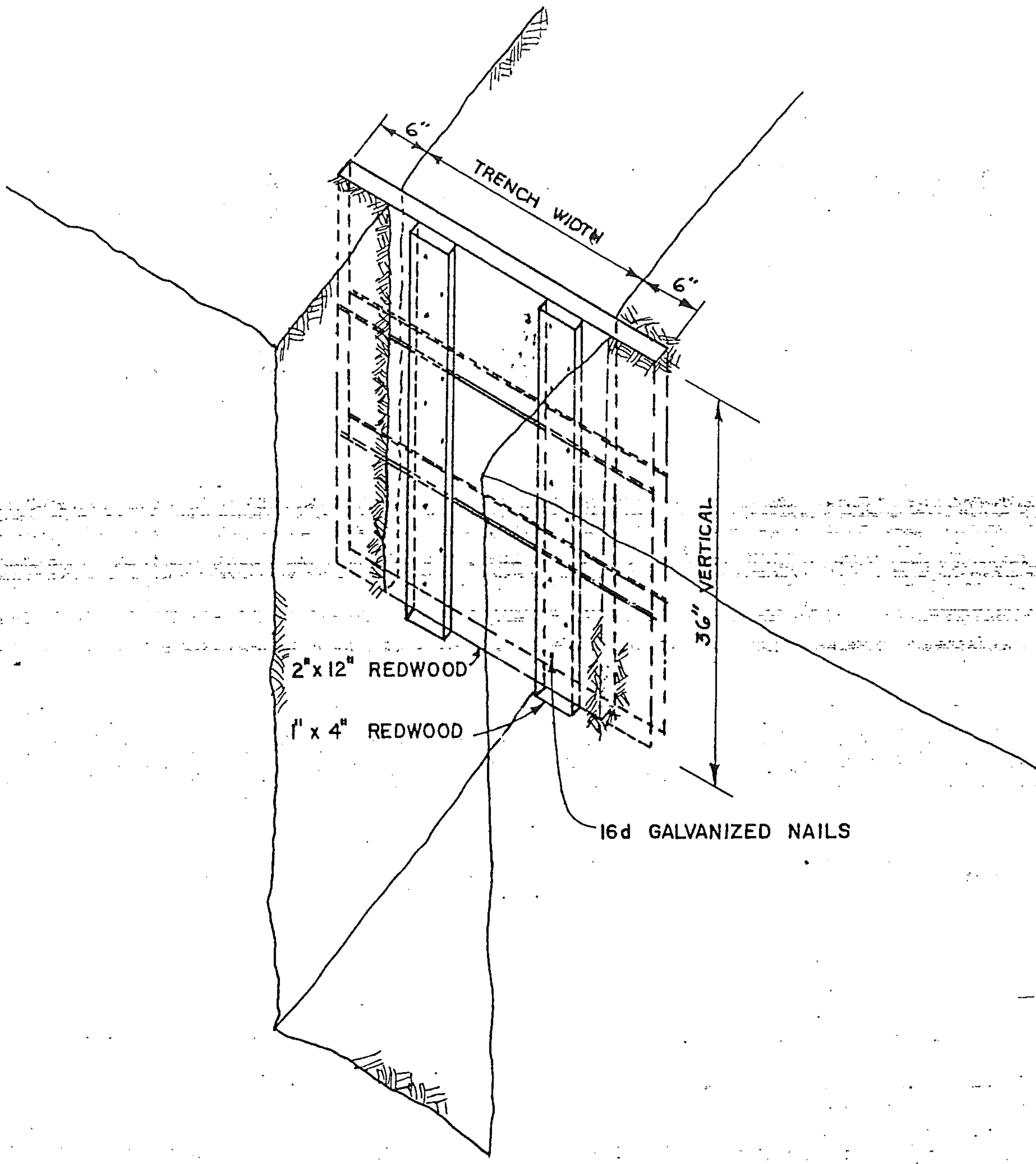


NORTH MARIN COUNTY WATER DISTRICT NOVATO, CALIFORNIA	STANDARD TRENCH DETAIL	DES	DR	CH	REC	SCALE NONE
			R.D.G.			DATE APRIL 19, 1971
		APPROVED:				SHEET NO. OF SHEETS
						NO. A—S17



AN ALLOWABLE PRESSURE DROP OF 1 P.S.I., AFTER APPLYING 4 P.S.I. PRESSURE, SHALL HAVE AN ELAPSED TIME OF NOT LESS THAN 2 SECONDS PER CUBIC FOOT VOLUME OF PIPE UNDER TEST.

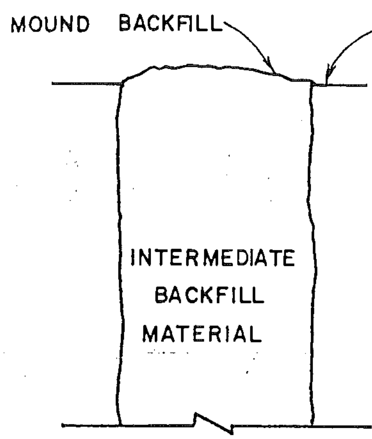
NORTH MARIN COUNTY WATER DISTRICT NOVATO, CALIFORNIA	ALLOWABLE LEAKAGE CHART AIR TEST	DES	DR R.D.G.	CH	REC	SCALE NONE DATE APRIL 19, 1971 SHEET NO. OF SHEETS NO. A—S 19
		APPROVED:				



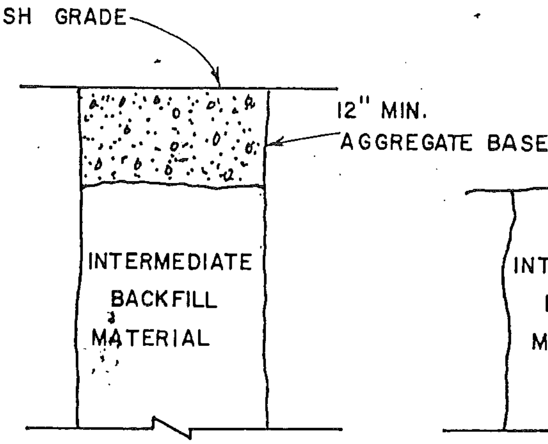
NOTES:

1. *Standard Redwood Check Dam to be placed at 20-foot intervals where ground slope is 1 to 1 or greater or as required by the District engineer.*

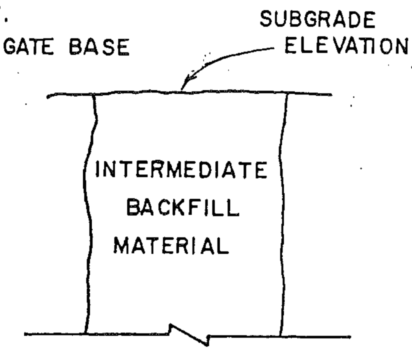
NORTH MARIN COUNTY WATER DISTRICT NOVATO, CALIFORNIA	STANDARD REDWOOD CHECK DAM	DES	DR	CH	REC	SCALE NONE
			R.D.G			DATE APRIL 19, 1971
		APPROVED				SHEET NO. OF SHEETS
						NO. A-S 20



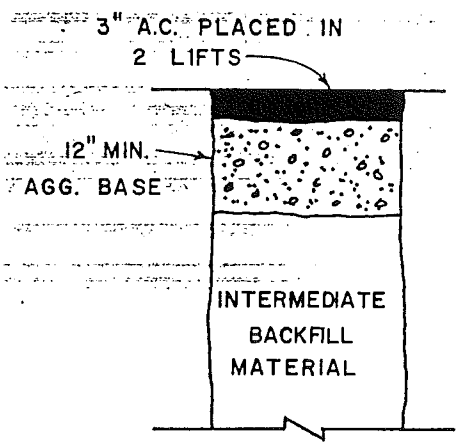
TYPE A



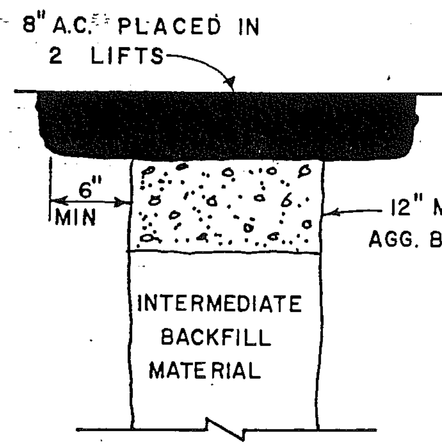
TYPE B



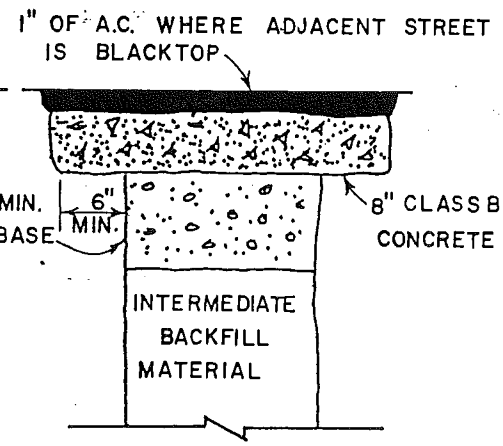
TYPE C



TYPE D



TYPE E



TYPE F

NORTH MARIN COUNTY WATER DISTRICT NOVATO, CALIFORNIA	STANDARD SURFACE REPLACEMENT	DES	DR	CH	REC	SCALE NONE
			R.D.G.			DATE APRIL 19, 1971
		APPROVED				SHEET NO. OF SHEETS
						NO. A-S21

Appendix E

Element 6 (Overflow Emergency Response Plan) Placeholder for Future Supporting Documents

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Appendix F

Element 7 (FOG Program) Placeholder for Future Supporting Documents

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Appendix G

Element 8 (Capacity Assurance) Supporting Documents

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North Marin Water District

2015 MASTER PLAN UPDATE

Final Report

For the Oceana Marin Wastewater System

NMWD Job File 8 4046.00

January 13, 2016

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NUTE ENGINEERING

Civil & Sanitary Consultants

January 13, 2016

Mr. Drew McIntyre, Chief Engineer
North Marin Water District
999 Rush Creek Place
Novato, CA 94948

Re: Oceana Marin Wastewater System
2015 Master Plan Update
NMWD Job File 8 4046.00

Letter of Transmittal

Dear Drew:

As authorized we have completed the 2015 Master Plan Update for the Oceana Marin Wastewater System.

In brief summary, we have identified improvements to the gravity sewer system necessary to reduce the entrance of extraneous water due to infiltration/inflow as well as improvements to the main pump station and the treatment and storage ponds necessary to improve their reliability. We also recommend construction of a parallel force main from the main pump station to the ponds to improve reliability and provide redundancy. The effluent disposal field requires additional study to determine if improvements might be necessary.

The most critical project involves upgrading the main pump station by relocating the motor control center and other electrical equipment out of the pump pit to a new small building next to the engine generator set building. This will eliminate the possibility that the electrical work will be flooded out which would render the pump station inoperable.

The estimated cost of these improvements in 2015 dollars is $3.12 million, not including any improvements to the disposal field. If these improvements are undertaken over a 20 year period the annual expenditure would be $156,000, plus the adjustment for inflation.

We appreciated the opportunity to assist the NMWD on this planning effort and hope to keep involved as these projects are implemented.

Very truly yours,

NUTE ENGINEERING

By: Mark T. Wilson, P.E.

By: W. Edward Nute, P.E.

NORTH MARIN WATER DISTRICT
OCEANA MARIN WASTEWATER SYSTEM 2015 MASTER PLAN UPDATE

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BACKGROUND

The Oceana Marin subdivision was originally developed in the 1960s and is located just north of the older unincorporated community of Dillon Beach. The streets in Oceana Marin are private and patrolled but the community is not gated.

Wastewater in Oceana Marin is collected by gravity sewers and then pumped to a treatment facility consisting of two ponds and a subsurface disposal field. Since all treated wastewater is retained on land the Oceana Marin facility is able to operate under Waste Discharge Requirements which were adopted in 1992. Except for nine homes, the community of Dillon Beach is not connected to the Oceana Marin sewer system.

The current Oceana Marin wastewater system now serves 229 single family homes with a build out potential of approximately 300 homes. Potable water is provided to Oceana Marin residents by the Estero Mutual Water Company and the Cal Water Service Company, depending on location.

Oceana Marin is situated on a hillside above the Pacific Ocean overlooking a popular recreational beach. Any sewage spill would flow directly onto the beach and into the Pacific Ocean. Fines assessed for a spill could be very large. For this reason it is important to assure there is sufficient redundancy and reliability in the wastewater collection, pumping, treatment and disposal system.

A Long Range Plan Update, dated December 2005, was prepared for the Oceana Marin Wastewater System by Bracewell Engineering, Inc. The 2005 Long Range Plan updated previous plan reports prepared in 1990 and 1996. These earlier plans provided background information on the wastewater flows and operational data on the pumping, treatment and disposal trenches.

The wastewater treatment system consists of two ponds, one of which is used primarily for storage. The overall capacity of the Oceana Marin sewer system is limited by the ability of the trench disposal system to dispose of the treated effluent, which includes extraneous infiltration/inflow (I/I) to the sewer system, rainwater falling on the ponds and pond seepage return flows. The 2005 Long Range Plan concluded that the capacity of the pond treatment system was adequate for the projected growth through 2015.

The recommendations of the 2005 report focused on improving and optimizing the effluent disposal field. In addition, the report recommended that a study be conducted of how best to minimize the I/I to the sewer system to allow more efficient operation of the pump station and to increase the margin of safety in the operation of the disposal field.

There are also concerns about the wind erosion of the banks of two treatments ponds and there have been instances of plugging of the drip irrigation lines going to the leach field by algae from the ponds. It may be necessary to line the ponds or at least control the bank erosion. The ponds are close to various potable water well sites so it is important to make sure there is no cross contamination.

The disposal capacity of the trench field was tested in 1995 and found to be 63,000 gallons per day (gpd). The 2005 report did not test the trench field but concluded that the disposal capacity was 29,600 gpd based on actual operation. Apparently, the lesser disposal capacity is adequate for the present needs but it may be advisable to set up another test. The original testing was conducted twice, once during the spring and a second time during the summer. Each test was conducted over a 30 day period.

OBJECTIVE

The objective of the 2015 Master Plan Update for the Oceana Marin Wastewater System is to update the previous Master Plans including an evaluation of the capacity and future demands over a 20 year planning period and to provide a list of recommended capital improvement projects.

APPROACH

The operational success of the Oceana Marin sewage system depends on the disposal of all the sewage and any extraneous water generated in the sewer system. The approach to developing the 2015 Master Plan Update will consist of analyzing and updating the available flow and monitoring data in the previous master plans, reviewing the present condition of the various pumping, treatment and disposal facilities and developing a program of capital improvements.

The following are considered critical factors in the operation of the Oceana Marin system:

- Minimize inflow/infiltration of extraneous storm water and groundwater which enter the sewer system.
- Ensure reliability of the pump stations.
- Provide redundancy in the mechanical systems as well as the force main. Construction of a second parallel force main might be advisable.
- Maintain the pond treatment and storage capacity of the two ponds including controlling bank erosion.
- Maintain the effectiveness of the trench disposal system as necessary to dispose of all the wastewater generated in Oceana Marin.

Because of the close proximity of Oceana Marin to beaches the Long Range Plan Update summarized below focuses on providing redundancy and reliability for the Oceana Marin sewer system.

PREVIOUS STUDIES

Since its construction in the 1970s the following studies have been conducted on the Oceana Marin wastewater system:

- Bracewell Engineering, "*Disposal System Capacity at Oceana Marin Final Report*", 1990

- Bracewell Engineering, "*Long Range Master Plan for Oceana Marin Wastewater System*", 1996

- Bracewell Engineering, "*Long-Range Master Plan Update for Oceana Marin Wastewater System*", December 2005

The 1990 report evaluated the capacity of the disposal field and recommended modifications to the pond treatment system and disposal field to increase the effluent disposal capacity. These improvements were completed in 1991.

The 2005 Master Plan Update reviewed the operation data of the Oceana Marin system and concluded that the capacity of the existing disposal system is the limiting unit process.

FACILITY INSPECTION

As a part of developing the Master Plan an inspection of the Oceana Marin facilities was made on April 16, 2015. Inspections were made of the two pump stations, the treatment and storage ponds, dosing siphon and disposal field. We also walked the sewer alignment along the cliff below Kailua Way. In attendance were Robert Clark, Brad Stompe and Vernon Stafford of the NMWD staff, Todd Beecher of Beecher Engineers, Troy Pearce of AYS Engineering Inc. and Mark Wilson and W. Edward Nute of Nute Engineering.

SERVICE NEEDS

The Oceana Marin service area is shown on Figure 1, which shows the NMWD Improvement District of Oceana Marin and Dillon Beach and the annexations. The Oceana Marin service area comprises all of Oceana Marin and nine homes along Ocean View Ave in the older section of Dillon Beach.

Land Use in Oceana Marin is governed by the Dillon Beach Community Plan dated August 1989, which was approved by the California Coastal Commission in June 1989. Oceana

N

1"=200'

FIGURE 1

NO.	DATE	REVISION	BY	APP.
2	9/3/13	ADDED ANNEXATION NO. 11 TO OM-3	AC	CC
1	01/04/07	ADDED ANNEXATION NO. 10 TO OM-3	AC	CC
0	11/01/04	FIRST CAD FILE EDITION		

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

NORTH MARIN WATER DISTRICT
IMPROVEMENT DISTRICTS
OCEANA MARIN AND DILLON BEACH

DES	DR	CH	SCALE : 1"=200'
	CC		DATE : 11/01/04
APPROVED: CHIEF ENGINEER			SHEET NO. : 1 OF 1 SHEETS
R.E. C40936			SERVICE AREA / JOB.NO. / NO.001

Marin is a planned community with single family homes and a potential for multiple units. Table 1 summarizes the potential dwelling units in the Oceana Marin service area.

TABLE 1 – OCEANA MARIN SERVICE AREA – SERVICE CONNECTIONS

	Potential Homes	Existing Homes
Oceana Marin		
Original subdivision unit	262	216
Parcel J	3	3
Parcel K zoning	14 – 38	0
Parcel L zoning	5 – 13 (act = 4)	0
Parcel M	1	1
Old Dillon Beach homes	17	11
TOTALS	**302 – 334**	**231**

Even though Parcels K and L are zoned for as many as 38 and 13 homes respectively it is likely that the actual number will be on the low end. In fact Parcel L, zoned for 5 – 13 homes, was subdivided into only 4 parcels in 2006. The number of lots was restricted because of a jurisdictional wetlands on the parcel.

Assuming the low numbers of homes for Parcels K and L the potential build out of the present service area would be 302 units. For the purpose of this study it is estimated that the total number of connections to the present service area of the Oceana Marin sewer system will be around 300 homes.

The vacant lots in the original subdivision are slowly being built out. Historically NMWD estimates that the rate of growth in Ocean Marin has been approximately 1 new home connection per year.

The occupancy of the homes in Oceana Marin is difficult to estimate. There are some full time residents, weekenders, renters as well as seasonal weekenders and renters. The Bracewell Master Plan of 2005 analyzed the flow records between 1973 and 2005 and concluded that the average occupancy was 1.35 persons per home with a flow of 76 gallons per capita per day (gpcd). In the ten years since 2005 there h have been only 13 new connections and the conditions in Oceana Marin have not changed except for the recent drought. For the purpose of this report it is concluded that the occupancy of 1.35 persons per connection appears to be reasonable.

Table 2A

NMWD OCEANA MARIN WASTEWATER SYSTEM

INFLUENT FLOWS TO PONDS, Gallons

YEAR	2009	2010	2011	2012	2013	2014	2015	ADF
JAN	330,000	914,000	790,000	475,000	930,000	382,000	930,000	21,894
FEB	663,000	581,180	577,000	432,000	426,000	658,000	564,350	19,906
MAR	383,000	649,000	875,330	640,000	422,000		449,036	18,378
APR	420,000	533,000	577,000	558,000	498,000	590,439	405,011	17,055
MAY	440,000	276,000	522,000	416,000	390,000	410,000		13,194
JUNE	448,000	641,000	484,000	408,000	408,000	455,000		15,800
JULY	614,000	589,000	799,000	434,000	751,000	610,307		20,416
AUG	440,000	651,000	535,000	547,000	376,000	532,004		16,565
SEPT	441,000	388,000	414,000	432,000	404,000	370,491		13,608
OCT	386,000	411,000	424,000	422,000	421,000	381,494		13,148
NOV	361,000	414,000	467,000	425,000	460,000	438,000		14,250
DEC	419,000	924,000	535,000	783,000	237,000	1,035,200		21,146
TOTALS	5,345,000	6,971,180	6,999,330	5,972,000	5,723,000	5,862,935	2,348,397	

Table 2B

NMWD OCEANA MARIN WASTEWATER SYSTEM

DISCHARGE TO IRRIGATION FIELDS OCT - SEPT

YEAR	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
OCT	0	0	637,000	559,000	0	212,000
NOV	0	699,000	662,000	0	0	344,000
DEC	647,000	718,000	632,000	0	0	0
JAN	347,000	591,000	0	818,000	0	992,000
FEB	738,000	858,000	0	809,000	0	254,000
MAR	924,000	1,190,000	0	770,000		725,000
APR	592,000	880,000	0	0	892,560	98,000
MAY	782,000	1,010,000	0	529,000	542,000	
JUN	0	0	294,000	156,000	489,000	
JUL	555,000	400,100	582,000	304,000	0	
AUG	1,040,000	771,000	757,000	359,000	459,000	
SEP	0	0	603,000	377,000	0	
TOTALS	5,625,000	7,117,100	4,167,000	4,681,000	2,382,560	2,625,000

WASTEWATER FLOWS

The main Oceana Marin pump station is equipped with a flow meter as is the discharge to the effluent disposal field. Table 2A summarizes the monthly influent flows pumped to the treatment pond between 2010 and 2015 and Table 2B summarizes the monthly flows to the disposal field between the months of October through September of the next year for the years 2010 – 2015.

As described above Oceana Marin has some full time residents, including renters and some vacation rentals. The higher flow for June, July and August would correspond with vacation rentals during the summer. Because of its remote location and uncertain weather, Oceana Marin will probably never be fully occupied with permanent residents.

Table 3 gives two projections of the average dry weather flow (ADWF) and two projections of the per capita flow rate. The first projection includes only the months of June July and August and the second includes the months of May through September. As can be seen in Table 2A the three summer months and particularly the month of July have higher flows than May and September, probably due to higher summer occupancy. The three month ADWF is approximately 10% higher than the five month ADWF.

TABLE 3 DRY WEATHER FLOW ASSUMPTIONS

Connections	229
Average Occupancy Rate, persons/connection	1.35
Average Population	309
ADWF June, July, August, 2009–2014, gallons	17,612
Per capita flow, gpcd	57
ADWF May through September, 2009-2014, GPD	15,917
Per capita flow, gpcd	51.5
Biochemical Oxygen Demand (BOD), mg/l	200
Suspended Solids, mg/l	200

Using the Bracewell assumption of 1.35 persons per connection and the existing 229 connections to the Oceana Marin sewer system the per capita flow rate is computed to be 57 gpcd for June July and August which represents a 25% reduction from the 76 gpcd projected by Bracewell in 2005. This reduction may be explained by the prolonged drought in the area. For the five months between May and September the per capita flow rate computes to be 51.5 gpcd. Once the drought subsides the per capita sewage discharge may rebound closer to the 76 gpcd.

For the purpose of projecting annual base sewage flows we have assumed that the May through September ADWF is more appropriate. For the existing development of 229 homes the annual base sewage flow @15,917 GPD will be 5,809,705 gallons.

At a full build-out the Oceana Marin development of an estimated 300 homes at the Bracewell occupancy rate of 1.35 persons/connection and a per capita flow rate of 51.5 gpcd would produce a dry weather flow of around 20,858 god producing an annual base flow of 7,612,988 gallons. If the per capita flow rate increases to 76 gpcd the annual base flow will be 11,234,700 gallons.

Infiltration/Inflow – The flow pumped to the ponds is influenced by infiltration/inflow (I/I) into the sewer system. The County maintains a weather station at Oceana Marin. Graphs of the daily rainfall for 2010 through 2015 are shown in Appendix A. The recorded rainfall totals between October 1 and September 30 for these years together with the measured sewage flow and flow to the disposal field are shown in Table 4.

The flows to the disposal field are managed so that the ponds are as low as possible at the end of the dry season, i.e. in October. This maximizes the ability to store winter flows in the ponds and minimizes the loading on the disposal field in the winter. During the summer and over a prolonged drought water is lost through evaporation, which accounts for the lower flow applied to the disposal field than comes into the ponds.

TABLE 4 – RAINFALL VERSUS TOTAL ANNUAL FLOWS

Time period	Rainfall	Total flow to ponds, gal	Excess flow over base flow*, gal	Total flow to disposal field, gal
10/1/09–9/30/10	30.93”	6,338,180	528,475	5,625,000
10/1/10–9/30/11	36.01”	7,322,330	1,512,625	7,117,100
10/1/11–9/30/12	23.95”	5,768,000	(41,705)	4,167,000
10/1/12–9/30/13	23.82”	6,235.000	425,295	4,681,000
10/1/13–9/30/14	18.12”	5,126,241	(190,037)	2,382,560
10/1/14–4/15/15	22.69”	4,203,091	828,687	2,625,000

*Base flow for the existing 229 connections is estimated to be 5,809,705 gallons or as prorated for missing data.

It should be noted that 2014 and 2015 were considered drought years and the domestic water usage and I/I would have been lower than the historic normal. During these years the flow to the disposal field was about half that of other years.

Although this is less than six full years of data it is apparent that the total flow to the ponds is greatly influenced by the rainfall. The average rainfall for Oceana Marin is probably around 30”. The last four years had less than normal rainfall. It should be noted that for the period between October 1, 2014 and April 2015, a total of 12.69” of rain was recorded in December 2014 and 3.58“ of rain fell over three days in February 2015. These two concentrated storms probably account for the 868,687 gallons of excess sewage flow over the prorated base flow even though the total rainfall October 1, 2014 to April 2015 was only 22.69”.

Based on the six years of data summarized in Table 4, during a normal year the excess sewage flow over the base flow, which is pumped to the ponds on an annual basis, is estimated to account for an additional 1,000,000 gallons. During a wet year the excess annual flow could constitute approximately 2,000,000 gallons. These excess flows represent the I/I entering the system and it should be emphasized that these I/I amounts are only estimates to be used for planning the operation of the disposal field.

Projected annual wastewater flows – Based on the above analysis Table 5 gives the existing and projected annual wastewater flows for dry and wet years and assuming an occupancy of 1.35 persons per connection and 51.5 gpcd flow rate and no change in the I/I rates.

TABLE 5 – PROJECTED ANNUAL WASTEWATER FLOWS, gallons

	Existing 229 homes	**Build-out 300 homes**
Dry year		
Domestic wastewater flow	5,809,705	7,612,988
I/I flow	1,000,000	1,000,000
Totals	6,809,705	8,612,988
	Existing 229 homes	**Build-out 300 homes**
Wet year		
Domestic wastewater flow	5,809,705	7,612,988
I/I flow	2,000,000	2,000,000
Totals	7,809,705	9,612,988

WASTEWATER FACILITIES

The Oceana Marin Wastewater Facilities consist of a conventional sewer collection system, two pump stations, pressure force mains, a pond treatment system and a subsurface land disposal field. Many of these facilities were constructed with the initial development and various improvements have been made over the years.

The collecting sewers are located on generally west facing slopes where any spills would drain toward the Pacific Ocean and the beaches below the cliffs. The disposal field is located on a north facing slope which drains toward the Estero de San Antonio which discharges to the Pacific Ocean.

The treatment ponds and disposal field are located on the top of the hill above the development. Estero Mutual Water Company and the Cal Water Service Company maintain potable water facilities nearby, including wells and a storage pond.

REGULATORY ISSUES

The Oceana Marin sewer system is under the jurisdiction of the California Regional Water Quality Control Board North Coast Region. Waste discharge requirements (WDR) have been issued rather than a NPDES Permit. Since the Oceana Marin system discharges treated effluent to the land through an underground disposal field there is no discharge to receiving waters.

The current WDR for the Oceana Marin system are set forth in Order No. 92-57, ID No. 1880173MAR (see Appendix B) and references a project which involved minor changes to the original facilities. This order describes the project location and the treatment and disposal system in use. The Water Quality Control Plan for the North Coast Region adopted April 28, 1988 is referenced as the basis for this order.

The Oceana Marin disposal system is within the watershed of the Estero de San Antonio. The listed beneficial uses of the Estero de San Antonio and its tributaries include municipal and domestic water supply, water contact recreation, fish spawning and shellfish harvesting. These beneficial uses are very restrictive and dictate the discharge requirements set forth in Order No. 92-57.

Sewage from Oceana Marin is treated in an aerated pond and the treated effluent is disposed of through underground leach lines. The disposal field is to be operated so that no water surfaces or runs off. Order No. 92-57 requires that the pond effluent be disinfected after the pond treatment and prior to going to the leach field. Since no effluent surfaces or runs off, disinfection does not seem to serve any purpose. In fact, the residual chlorine may be affecting the micro biology in the soil.

Waste Discharge Requirements Review Procedures – The current WDR is now 23 years old and the Water Quality Control Plan for the North Coast Region now in effect is dated May 2011. This plan includes a policy on the control of water quality with respect to onsite waste treatment and disposal practices, which primarily pertains to individual septic tanks and leach fields but would also apply to the Oceana Marin disposal system, since there are no specific policies regarding large disposal fields.

In order to get an idea of the way the State handles WDRs we contacted Blair Allen of the San Francisco Bay Regional Water Quality Control Board. He explained that the Oceana Marin WDR is very old and that WDRs do not have fixed expiration dates, or a mandated renewal schedule. Internally, the Water Boards have an administrative protocol for periodic review of WDRs, with a 3-tiered schedule of 5, 10 or 15 years between reviews, based on the case's assigned "Threat-to-Water-Quality" rating.

In the past decade actual implementation of WDR reviews has been hampered by limited budget and staff. So in reality the individual Water Boards may be seriously back-logged on their formal review schedule.

Aside from a standard review protocol, the alternate approach is to consider the actual discharges, the discharge facility, infrastructure, natural surroundings, who is operating it, and so forth, and compare that with the WDR. If the WDR does not reflect current water quality requirements or the facility has a history of non-compliance, then it deserves attention. If the WDR is even partially in tune with current requirements, then perhaps the WDR does not have to be reconsidered very often.

Statewide General Waste Discharge Requirements for Sanitary Sewer Systems – On May 2, 2006 the State Water Resources Board adopted Order No. 2006-0003-DWQ which set forth requirements for all publically owned sewer systems greater than one mile in length. These Statewide General Waste Discharge Requirements focused on preventing sanitary sewer overflows (SSOs) to receiving waters and required each agency to develop a Sewer System Management Plan (SSMP).

In December 2013 NMWD adopted an SSMP for the Oceana Marin sewer system. The SSMP set forth management, operation and maintenance goals for the sewer system together with specific measures and procedures for containing any sewage spills. Required spill notification procedures and report forms are also included.

State Water Board Policy for Onsite Wastewater Treatment Systems – State Water Board policy regulates onsite wastewater treatment systems (OWTS). The policy was adopted June 19, 2012 and will be incorporated in the next update of the Water Quality Control Plan for the North Coast Region.

Recommendation – It is recommended that NMWD initiate discussions with the staff of the North Coast RWQCB regarding updating the WDR to conform to any new State policies regarding land disposal facilities applicable to the Oceana Marin system. Oceana Marin has a good record of compliance so the update may not be a high priority. The RWQCB staff should be kept apprised of improvements made to the Oceana Marin wastewater facilities and the issue of disinfection by chlorination prior to final disposal in the effluent disposal field be reviewed.

2015 MASTER PLAN ESTIMATED COSTS

The facility improvements described below are intended to be incorporated into the 20 year Master Plan for Oceana Marin. The cost estimates are planning level estimates based on 2015 construction costs for the San Francisco Bay Area representing an ENR construction cost index of 11,160. The allowance for contingencies and incidentals does not include costs for project design and construction management. The construction costs for future years are escalated on a 5% annual inflation factor to the year of construction.

SEWAGE COLLECTION SYSTEM

The Oceana Marin development is located at Dillon Beach in West Marin County and was developed in the 1960's and 1970's. The publicly owned sewage collection system is about 5 miles long and generally consists of gravity sewer mains, the majority of which are asbestos cement pipe (ACP). Over the years there has been some root intrusion, internal deterioration and pipe failures due to ground movement. Where repairs have been made sections of PVC or ductile iron pipe have been installed. As described below three sewers were rehabilitated in 2012 using cured in place pipe (CIPP) liners.

All sewage is pumped to a wastewater treatment facility consisting of a treatment pond and a storage pond. The treated effluent from these ponds is applied to the land via subsurface disposal. In order not to overload the subsurface disposal field it is important to limit the entrance of extraneous infiltration and inflow (I/I) into the sewer system.

The sewer system also includes sewer laterals which are privately owned. The length of the private laterals is roughly equivalent to the length of the publically owned sewer mains.

The Oceana Marin development is located on very steep terrain and many of the public sewage collection lines are located both in paved roads and in easements below the homes. Some of the slopes where the sewers are in easements range in grade from 20 to 35%, Some manholes can only be accessed by foot. The steeper easement areas are generally grassy and brushy and in some areas there has been some local ground movement. Along the cliff above the ocean the backyards are mostly covered with heavy ice plant. There are no backyard fences and few private property improvements to restrict access.

I/I Reduction – I/I is defined as excess groundwater or rainwater which enters the sewer system. Infiltration is defined as groundwater which enters pipes underground. Inflow is rain water which enters the sewer system through illegal drainage connections. A third component is rainfall induced I/I which is water that can enter the sewers through underground pipe defects during intense rainfall events.

Unlike pressure pipes such as water mains, leaks do not come to the surface to evidence themselves but must be detected through various technologies. As a practical matter it will never be possible to completely eliminate I/I from a gravity sewer system. Rehabilitation projects are never perfect and some leaks will remain or will increase because other nearby leaks have been "bottled up". In other words, expectations of I/I reduction need to be tempered with reality. The greatest I/I reductions will be achieved by assigning the highest priority to repairing or rehabilitating those sewers or manholes which are discovered to have identifiable defects.

I/I can be reduced by rehabilitating the sewers including the private laterals. If it is assumed that sewer mains and laterals are equally leaky and that the public sewer mains represent about half of the pipeline length in the ground then rehabilitation projects that focus on the sewer mains will only address half of the problem. In some cases when the sewer main is rehabilitated so it is relatively watertight the groundwater will migrate to enter defects in the private laterals.

Many sanitation agencies have spent years and many dollars rehabilitating their sewers with very little to show for it in terms of I/I reduction. Some agencies rehabilitate the private laterals along with sewer main rehabilitation projects or require homeowners to repair their laterals when defects are found. In the San Francisco Bay Area sanitation agencies are adopting ordinances which require homeowners to inspect and test their lateral on sale of the property and rehabilitate it if it is found defective. This "point of sale" lateral inspection requirement results in a lengthy time to reduce I/I from laterals since there are generally not many home sales in any one year.

The main tools for locating leaks in sewers are closed circuit televising (CCTV) and smoke testing. NMWD already has a well-developed program for CCTV of the sewer mains on a regular schedule. The last smoke testing was done in 2014.

Smoke Testing – Smoke testing involves blowing non-toxic smoke into a section of sewer through a manhole while making observations of smoke coming out of the ground indicating a defect or coming out of a drain indicating an illegal drainage connection. The defects are documented and the smoke coming out of the ground is photographed. Where defects or illegal drainage connections are found in private laterals notices are sent to the property owner with a request to repair the defect. This procedure requires notification of homeowners of the smoke test, conducting the smoke testing, documentation of the defects, sending notices to the property owners to repair the defect found, and follow up with smoke testing to make sure the repair has been made and is successful.

Pipe Segment Inventory and CCTV – NMWD cleans and televises one fifth of the sewer pipe segments in Oceana Marin each year. Televising is done with a closed circuit TV (CCTV) camera and the results are summarized in a spreadsheet which is updated every two years. The inventory spreadsheet of 2014 is included as the NMWD OM Master Sewer List, Appendix C. Private laterals have not been inspected.

The Appendix C spreadsheet identifies sewer defects and problems together with recommendations for repairs. The length of the different pipe types in the system, the number of structures and the number of various types of defects found are summarized in Table 6 below.

Joint offset, joint separation, cracks and exposed gasket make up more than a third of the defects found and slightly less than one third of the defects are roots in the pipe joints even though there are very few trees in Oceana Marin. If there were more trees this total would be much higher. Grease and sags constitute about 14% of the defects.

TABLE 6– CCTV INVENTORY OF PUBLIC SEWER MAINS – 2014

PIPE TYPE	Length, feet	Percent
ABS	113	0.4
ACP	16,841	61.8
PVC	4,290	15.8
CIPP	3,257	12.0
Not reported	2,698	10.0
TOTALS	**27,199**	**100.0**
STRUCTURES		
Manholes	103	
Rodholes (Main line cleanouts)	36	
MAJOR DEFECTS FOUND BY CCTV		
Joint offset, joint separation, crack, gasket exposed	47	38.5
Sag in pipe or grease accumulation	17	14.0
Roots in joint	40	32.8
Infiltration/Inflow	7	5.7
Lateral problem at main	9	7.4
Camera can't get through pipe	2	16
TOTALS	**122**	**100.0**

There are some 103 manholes and 36 rodholes in the Oceana Marin sewer system. NMWD regularly inspects and smoke tests these structures and schedules repairs as necessary. NMWD inspection reports for work done on February 28, 2014 and dated 6/1/15 are listed in Appendix D.

Recommendations – It is recommended that reduction of I/I be continued as a long term objective. CCTV and smoke testing are tools to inventory the condition of sewer lines and locate leaks and identify repair locations and sewer rehabilitation projects as described below.

SEWER REHABILITATION

Rehabilitation of sewer mains and manholes will eliminate some of the I/I and should be continued on an on-going basis. The more I/I that can be reduced the less wastewater that needs to be pumped, treated and stored and ultimately discharged to the disposal field. Wet years will produce more wastewater because of the I/I generated in the sewers.

Some defects found in the CCTV are sags or grease accumulation. These types of defects are not necessarily related to I/I but may require more frequent maintenance to keep the sewer from becoming restricted. Sags will accumulate debris and grease and if the sewer plugs up it could result in an overflow. CIPP lining or pipebursting will take the same alignment of the original sewer so a sewer with a sag must be dug up and a section re-laid to eliminate the defect.

The private sewer laterals will also contribute I/I. Smoke testing described above will be able to locate some of the points of direct inflow. The homeowner will need to be requested to fix the leak. However, since laterals are considered the property of the homeowner it will be difficult to require further lateral rehabilitation. Adopting an ordinance requiring that laterals be tested upon the sale of a home will be a way to test the laterals and get defective ones fixed over the long term.

The following is information on the sewer rehabilitation methods and a list of proposed sewer main rehabilitation projects which should be included in the Long Range Capital Improvement Plan (CIP).

Asbestos Cement Pipe (ACP) – The fact that the majority of the sewers in Oceana Marin are ACP limits the rehabilitation options. ACP was a common sewer and water pipeline material in the 1960's and 1970's. However, in the last several decades there is increasing awareness that asbestos can be a serious public health concern when friable and air borne and its disposal is now regulated by the EPA.

When it is underground and in use ACP is not considered to pose any public health risk because it is non-friable. However, if AC pipe is crushed, pulverized or reduced to a powder it is then considered to be friable and becomes a regulated asbestos containing material (RACM) waste. In 1991 the EPA took the position that "crushing" AC pipe with mechanical equipment would cause the crushed material to become RACM and that pipe crushed and left in place would cause the location to be considered an active waste disposal site. Pipebursting could cause the AC pipe to be categorized as regulated waste. Inactive lines should be kept on the agency's maps and marked as a USA line so contractors don't dig through it and break it up or crush it.

The owner of every site where AC pipe was pipeburst would need to notify the EPA of the owner's intent to become an active asbestos landfill, meet deed restrictions, submit closure requirements and mapping documentation. In addition, future excavation work in the vicinity would require an additional 45 day notification of intent to disturb landfill material. Other Federal, State or local permit conditions may apply.

ACP Sewer Rehabilitation Methods – In order to avoid the regulatory issues described above ACP sewers should be rehabilitated by a method other than pipebursting such as replacement or with some type of lining such as cured-in-place-pipe (CIPP) lining. CIPP involves inserting a resin impregnated liner into an existing sewer. The liner takes the shape of the sewer and the pipe ends up slightly smaller in diameter than the original pipe. The lining thickness can be specified for a fully deteriorated pipeline where the liner must take the full external load. For 6" diameter sewers the CIPP lining is generally about 4.5

mm thick, which will only reduce the inside diameter by 3/8 of an inch. The resin impregnated liner can be cured with either steam or UV light depending on the product manufacturer. Laterals must be reconnected to the CIPP liner, which can become a point where infiltration/inflow can enter. CIPP lining is an appropriate trenchless technology for rehabilitation of ACP sewers because it leaves the ACP in place as the host pipe.

Inverting a CIPP liner in a 6" pipe is difficult because it tends to hang up on slight joint offsets. Consequently, contractors do not like to use CIPP lining on 6" pipe so the cost will be about the same as CIPP lining of an 8" or even 10" pipe.

2012 Sewer Rehabilitation Project – The District has rehabilitated three of the cross country sewers on steep gradients in Oceana Marin using the CIPP lining process totaling 2,850 feet of 6" and 8" pipe. The purpose of the project was to prevent further deterioration, eliminate potential separation at bell and spigot joints, reduce infiltration/inflow and minimize the potential for sewer spills. The three sewers which were lined ran from Kameha Way to Kailua Way, Kona Lane to Kailua Way and Waikiki Lane to Kailua Way. The greatest elevation difference from top to bottom of one of the sewers was 320 feet. The sewer laterals were not rehabilitated but re-connected to the CIPP liner.

Identified Rehabilitation Projects – Based on the CCTV results NMWD routinely undertakes maintenance and repairs as indicated such as cutting roots and digging down and repairing cracks and other isolated defects. Some lines have multiple defects and it is advisable to undertake a capital improvement project to rehabilitate one or more segments of sewers. The following is a list of recommended sewer rehabilitation projects, also shown on Figure 2, together with their estimated costs:

Project S-1 – Pump Station to Kailua Way: MH 1 through MH 3 to MH 10 Kailua Way (477') – The CCTV revealed several sags, infiltration and a separated joint. Part of this line crosses a gully in an above ground pipe. According to the original plans this is 10" diameter ACP except that 40' of ductile iron (DI) pipe was used to span the gully. The plans show a grade of 0.005 which should be adequate. It is unclear why there are sags; either the pipe was improperly laid originally or there has been some ground movement. This line is near the edge of the cliff above the ocean so ground movement is a possibility. If the ground is moving the line may need relocation away from the cliff, which would also probably mean relocating the pump station. A geotechnical investigation would be appropriate to check on the stability of the cliff. This also applies to Project S-2 described below. If the sag is not a major problem and the line is judged to be adequate then it could be CIPP lined. The estimated cost of the CIPP lining of this sewer is given below:

477 LF CIPP lining of 10" ACP	@$75/LF	$35,775
Contingencies and Incidentals (35%)		12,525
TOTAL ESTIMATED CONSTRUCTION COST		$48,300

Project S-2 – Kailua Way Ocean Side: MH 12 thru MH 13, MH 14, MH 15, MH 16, MH 17 to CO 8 (1,125') – This series of sewers runs along the top of the cliff behind the homes on the west side of Kailua Way. The cliff is covered with heavy ice plant so it is difficult to see if there are any cracks or ground movement. The CCTV revealed a number of sags and separated joints in this line. This line is noted as all 6" PVC so it should not be as fragile as ACP. CIPP lining or pipebursting using an HDPE liner would seal up this pipe but unless the sags are dug up and re-laid they will remain. The estimated cost of the CIPP lining of this sewer is given below:

1,125 LF CIPP lining of 6" PVC	@$75/LF	$84,375
Contingencies and Incidentals (35%)		29,625
TOTAL ESTIMATED CONSTRUCTION COST		$114,000

If the cliff becomes unstable and this sewer is threatened it might be necessary to abandon it and require the property owners to install pumps that pump to the existing sewer in Kailua Way. This could involve up to 15 homes. The cost of installing a high end duplex (2 pump) home pumping system can be $25,000. Sometimes the home service is inadequate to add a pump and needs to be upgraded. Even if NMWD pays for the pump installation it can be a difficult process to require home owners to take on the ongoing maintenance and electric cost.

Project S-2A – Kailua Way Segment Replacement: MH 12 to MH 13 and MH 16 to MH 17 (380') – The only pipe segments in Project S-2 with noted sags and joint offsets are between MH 12 to MH 13 and MH 16 to MH 17. These segments could be rehabilitated with a CIPP lining or pipeburst but the sags will remain unless they are dug up and re-laid. The estimated cost of digging up and replacing these two sewers is given below:

380 LF Replace 6" PVC	@$200/LF	$76,000
Contingencies and Incidentals (35%)		26,000
TOTAL ESTIMATED CONSTRUCTION COST		$102,000

Project S-3 – Oceana Drive CIPP Lining: MH 23 to MH 24 (Oceana Drive) thru MH 25, MH 26, to CO 6 (1,005') – This series of sewers are all 6"ACP and the CCTV notes many separated joints and roots with a comment "potential slip line". It is not clear why there are so many roots entering this line unless it was defective or if there has been ground movement. MH 23 is located in an easement behind 320 Oceana Drive and runs uphill to MH 24, which is in Oceana Drive. This series of lines could be rehabilitated with CIPP lining. The distance between MH 26 and CO 6 is almost 450 feet, which is longer than the industry standard of 200 feet and an intermediate manhole should be added. The estimated cost of the CIPP lining of this sewer plus an additional manhole is given below:

1,005 LF CIPP lining of 6" ACP	@$75/LF	$75,375
Manhole	@$5,000	5,000
Subtotal		$80,375
Contingencies and Incidentals (35%)		27,625
TOTAL ESTIMATED CONSTRUCTION COST		$108,000

Project S-4 – Ocean Drive Rear Easement: MH 28 thru MH 29, MH 30, to MH 31 (933') – This is a 6" ACP easement sewer behind homes #360 and #380 Oceana Drive. The CCTV inspection reported sags and joint separations in this line. There was also a note that there appeared to be I/I in this line even though it does not serve many homes. If the line is judged to be adequate then it could be CIPP lined. The estimated cost of the CIPP lining of this sewer is given below:

933 LF CIPP lining of 6" ACP	@$75/LF	$69,975
Contingencies and Incidentals (35%)		24,025
TOTAL ESTIMATED CONSTRUCTION COST		$94,000

PUMP STATIONS

Two sewage pump stations serve Oceana Marin. The smallest pump station on Ocean View Ave, the North Street Lift Station, serves a localized area of old Dillon Beach and the main pump station pumps sewage from Oceana Marin to the ponds at the top of the hill. The pump stations were inspected on April 13, 2015 which included an inspection of the electric equipment by Todd Beecher of Beecher Engineering. The Electrical System Assessment Report by Beecher Engineering is reproduced in Appendix E.

North Street Lift Station – The North Street lift station serves 9 homes in old Dillon Beach along Ocean View Ave. The lift station consists of two ¾ horsepower submersible pumps located inside a manhole at the intersection of Ocean View Ave and North Street. Sewage is pumped through a 2-inch diameter force main one block on North Street to the gravity sewer on Oceana Drive with a vertical rise of about 16 feet. The electric meter and control panel is located in a free standing enclosure facing Oceana Drive next to 21 North Street.

The reserve capacity of the North Street Lift Station is just the volume of the manhole containing the pumps. A 4' diameter manhole has a volume of 94 gallons per foot of depth. Assuming a 3' deep manhole the storage volume is 283 gallons, which is less than the daily discharge volume from two homes. If there is a prolonged power outage NMWD should be prepared to provide a gas driven pump or tanker truck to pump out the lift station manhole.

Oceana Marin Main Pump Station – The Oceana Marin main pump station is located between the cul-de-sacs of Tahiti Way and Lanai Way and pumps sewage from all of the Oceana Marin service area to the treatment ponds on the top of the hill. This is a vertical rise of over 380 feet and requires special high head pumps. The pump station consists of a below grade concrete structure and a small building housing a standby engine generator set. A flow meter is provided on the discharge force main.

The pump station is located at an elevation of approximately 66 feet and is near a cliff which leads down to the beach. The cliff is a type of sandstone and is eventually erodible, particularly as the sea level rises. At some point it may be necessary to relocate the pump station away from the cliff if it erodes to a point which is threatening the operation of the station. The incoming sewers, particularly from the north, should be monitored for damage from erosion.

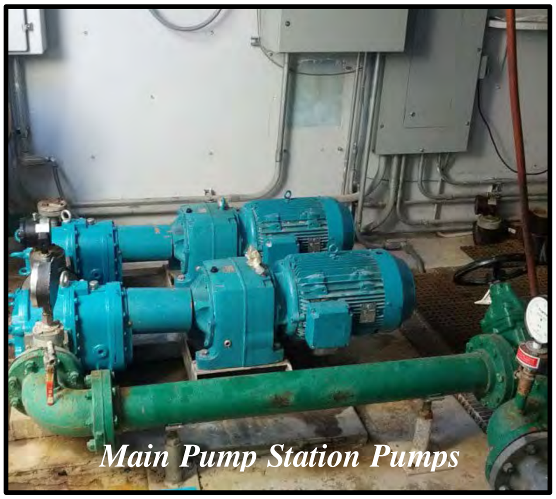
The pump station itself consists of a wet well which is separated from the dry well containing the pumps and electrical work by a wall. There is a grit catchment area in the wet well which is pumped out once a year. Aeration is provided for the sewage in the wet well to keep it fresh and reduce odors.


Oceana Marin Main Pump Station

The dry well part of the pump station contains two sets of rotary lobe pumps; four pumps total. Each set of two pumps are connected in series to be able to overcome the high pumping head. Each pump has a capacity of 100 gallons per minute (gpm) at a discharge pressure of 180 psi. Each set (Set A & B) have two pumps (Pump 1 & 2) the set of pumps (1 & 2) operate together. The lead pump 1 starts at 6' and stops at 2' The two sets of pumps A & B are in a lead lag operation and switch after every pump cycle. If one of the individual pumps (1 or 2) fails, that set automatically shuts off and the other set is called to run.


Doghouse Shed

The flowmeter is an Rosemont magnetic type with a 4" diameter flow tube, located in a pit outside the pump station. There is a single sump pump in the pump pit, which also contains the pump motors and critical electrical panels.



Main Pump Station Condition Assessment

The main pump station is one of the two most critical elements of the Oceana Marin system, the force main being the other critical element. Any overflow from a pump failure will flow directly down to the beach.

Most of the mechanical equipment appears to be well maintained and in good working order. The main concern with the existing pump station is that most of the electrical work and pump motors are all below grade so that if a pipe were to break or a leak were to occur and the sump pump could not handle the water all the major electrical equipment could become inoperable. In some cases a second sump pump has been installed to provide some redundancy. The assessment of the electrical equipment in the main Oceana Marin pump station is summarized in the Beecher Engineering report in Appendix E.

In order to improve the reliability against accidental flooding of the pump pit, which would damage the pump motors as well as any electrical work it is recommended that a second sump pump be installed as a backup to the existing sump pump.

Contingency Planning – In the event that the pumps and/or electrical work are flooded or otherwise fail or force main fails it will be necessary to transport the incoming sewage up the hill to the ponds. The very high static head from the pump station to the ponds precludes the use of conventional trash pumps as emergency pumps. The best method to deal with the sewage will be to hire tanker trucks to pump from the wet well and discharge to the ponds at the top of the hill. This contingency is addressed in the Sewer System Management Plan (SSMP) for Oceana Marin.

If a standby pump were to be used it would have to be a match of the existing pumps such as two dual rotary lobe pumps on a skid. However, the temporary pumps would have to be either connected to the electrical starters which are in the pump pit and difficult to work on or connected to the standby engine generator set with its own separate starter. The pumps are probably not readily available and this arrangement would not be easy to set up in an emergency. Consequently, use of tanker trucks would be the most expedient procedure.

The daily flow at Oceana Marin is estimated to be 15,000 gallons during dry weather. In wet weather the sewage flow could be much higher, even 30,000 gallons. The wet well if fully flooded has a storage capacity of around 12,000 gallons so it could hold almost 80% of a full day’s flow during dry weather. Tank truck capacities will range from 3,000 gallons to 5,000 gallons and higher. The large capacity trucks are difficult to maneuver so it is probably not convenient for the Oceana Marin streets.

Accordingly, in dry weather during an emergency the sewage can be held in the flooded wet well and be pumped out with a 3,000 gallon tank truck five times a day until the repair is made. It should not be necessary to set up an emergency pump unless the shutdown is going to be prolonged.

Recommended Pump Station Improvements

The recommended improvements to the main pump station mostly involve improving reliability by upgrading some of the electrical equipment and relocation of the existing electrical equipment out of the pump pit to a new building which is above grade.

Project PS 1 – Miscellaneous Reliability Upgrades – The following reliability upgrades to the pump station are recommended:

Install redundant sump pump	$12,000
Install low pressure alarm on discharge force main	5,000
Estimated miscellaneous improvements	15,000
Subtotal	32,000
Contingencies and Incidentals (35%)	11,000
TOTAL ESTIMATED CONSTRUCTION COST	$43,000

Project PS 2 – Oceana Marin Pump Station PG&E Meter/Main Replacement – The existing PG&E meter and main circuit breaker enclosures have deteriorated beyond repair and require replacement. It is recommended that an outdoor, 316 stainless steel "meter/main" pedestal, rated for outdoor use, be installed within the existing "Doghouse" shed location (e.g., Tesco pedestal). This replacement will not require any modification to the existing PG&E service entrance other than engagement of PG&E to disconnect the existing meter and re-connect the new pedestal meter once it is installed. The estimated installed cost for this replacement is as follows:

Demolition of Existing Metering and Main Breaker Enclosure	$3,000
316 Stainless Steel Pedestal Meter/Main Enclosure	15,000
PG&E Cost:	3,000
Subtotal	21,000
Contingencies and Incidentals (35%)	9,000
TOTAL ESTIMATED CONSTRUCTION COST	$30,000

Project PS 3 – Relocation of Electrical Equipment to Aboveground Block Building – The location of the sewage pump LCP, PLC control panel, bubbler panel and main panelboard are all prone to failure due to below grade structure flooding. During discussions with NMWD, there seemed to be a comfort level that keeping the flowmeter, grinder LCP and blower equipment in the below grade structure would be acceptable since the operation of this equipment is not as critical to overall pump station operability as the level control system and sewage pumping. To mitigate these vulnerabilities, it is recommended that the LCP/PLC/bubbler panel/main panelboard equipment be relocated to an above grade "add on" room, attached to the existing above grade block building. This new room could essentially become the "Electrical Equipment Room", constructed with block walls and an industrial type personnel door that provides a good seal from the outside elements. Based on preliminary measurements, existing equipment relocation to the interior of the existing standby generator room may not be possible due to National Electrical Code (NEC) clearance requirements. Additionally, the ventilation system within the generator room will expose the electrical panels to outside salt air on a regular basis (i.e., ventilation fan and louver system). Thus, an "add on" room to the existing building is recommended over using existing wall space within the existing standby generator room. Also included as part of this recommendation is the replacement of the existing ventilation louver and addition of flexible propane fuel piping connections for the existing engine generator. All motor control cabinets and hardware, even inside the building, should be type 314 stainless steel. Where possible items should be plastic.

The estimated installed cost for this recommendation is as follows:

Construct three sided block addition to engine generator building	$50,000
Relocate ATS from "Doghouse" to Electrical Room	25,000
New small panelboard to replace panelboard in "Doghouse"	5,000
Relocate Pump LCP's (Quantity 2)	15,000
Relocate PLC Control Panel	10,000
Relocate Bubbler Panel	10,000
Relocate Main Panelboard	15,000
Miscellaneous Electrical Costs	10,000
Subtotal	140,000
Contingencies and Incidentals (35%)	50,000
TOTAL ESTIMATED CONSTRUCTION COST	$190,000

FORCE MAIN

The force main from the main pump station to the ponds is 6" diameter epoxy lined ACP approximately 3,890 feet long. According to the plans the force main has two different pressure classes, Class 150 and Class 200 (rated at 150 and 200 psi respectively). The 380 foot elevation difference from the pump station to the ponds means that at the pump station end the static head is 164 psi, which together with friction losses when the pumps are pumping could approach the 200 psi rating of the pipe.

Although this force main has provided good service it is now some 50 years old. Also, since it is only a single pipe there is no redundancy in case something happens to the existing force main. Although isolated repairs can be made with full circle clamps any leakage will flow directly through the storm drainage system to the beach below. In order to provide redundancy it is recommended that a second force main be installed.

The route of the existing force main includes two easements as a short cut bypassing the large curve in Oceana Drive. However, this easement would be too crowded to accommodate a second new force main. The estimated cost of a new force main from the Oceana Marin pump station to the ponds, shown on Figure 2, assuming conventional trench restoration is given below.

Project FM-1 – Parallel Force Main (Entire force main)

4,610 LF 6" Force Main	@$200/LF	$922,000
Est. Connection at the pump station		5,000
Est. Connection at the ponds		3,000
Subtotal		$930,000
Contingencies and Incidentals (35%)		325,000
TOTAL ESTIMATED CONSTRUCTION COST		$1,255,000

It would be possible to stage the construction of this force main by connecting back to the existing force main in a couple of locations at the end of each phase. Starting at the pump station the force main could be constructed in three phases as follows:

Project FM-1A – Pump Station to 360 Oceana Drive

1,980 LF 6" Force Main	@$200/LF	$396.000
Est. Connection at the pump station		5,000
Est. Intermediate connection		5,000
Subtotal		406,000
Contingencies and Incidentals (35%)		142,000
TOTAL ESTIMATED CONSTRUCTION COST		$548,000

Project FM-1B – 360 Oceana Drive to Ocean View Blvd.

1,390 LF 6" Force Main	@$200/LF	$278,000
Est. Intermediate connection		5,000
Subtotal		283,000
Contingencies and Incidentals (35%)		99,000
TOTAL ESTIMATED CONSTRUCTION COST		$382,000

Project FM-1C – Ocean View Blvd to Treatment Ponds

1,240 LF 6" Force Main	@$200/LF	$248,000
Est. Connection at the ponds		3,000
Subtotal		251,000
Contingencies and Incidentals (35%)		89,000
TOTAL ESTIMATED CONSTRUCTION COST		$340,000

Recommendations – It is recommended that Project FM-1A be assigned a high priority. This initial segment will be located in streets and will provide a redundant force main to the existing segment which is located partially in easements and thus is more vulnerable to external damage. Furthermore, this segment has the highest internal pressure and the new replacement pipe will provide greater reliability.

The existing force mains paralleling the remaining two projects are subject to less internal pressure and are located in streets where they are less subject to external damage. Thus, Projects FM-1B and FM-1C should be assigned a lower priority.

POND TREATMENT AND STORAGE

The Oceana Marin treatment system consists of two ponds. The west pond is aerated and provides the treatment of the raw wastewater. The east pond is the storage pond and receives effluent from the treatment pond and provides storage of the treated wastewater prior to discharge to the effluent disposal field. Treated effluent is discharged from the north end of the storage pond and flows by gravity through a dosing siphon to disposal field leach lines.

A small chlorinator is used to disinfect the pond effluent prior to flowing to the disposal field. Since the effluent is disposed of underground, it is uncertain whether or not the chlorination has any adverse or beneficial effect on the biology in the disposal field. However, chlorination of effluent going to a leach filed is not a normal practice. The need to continue to disinfect should be brought up in discussions with the Regional Water Quality Control Board about renewing the waste discharge requirements.

The two ponds are constructed with dirt berms and are not lined. A gravel interceptor trench was installed for the length of the base of the southern berms of both ponds to intercept pond seepage and any surrounding groundwater. The intercepted water flows to a sump where a sump pump recycles it back to the east storage pond. Occasional gopher holes in the berms can be a problem that is monitored.

The date on the original plans for the ponds is 1972, which indicates they have been in service for over 40 years. There is no record of any cleaning of the ponds, so there will be some accumulation of undigestable sludge and algae.

Original Pond Design Characteristics – The original design characteristics of the treatment pond and storage pond from Table 1 of the 2005 Bracewell report are listed in Table 7 below.

TABLE 7 - OCEANA MARIN ORIGINAL POND DESIGN CHARACTERISTICS

Original Design	Treatment Pond (West Pond)	Storage Pond (East Pond)
Bottom width, feet	120	120
Bottom length, feet	240	240
Bottom area, sq. ft.	28,800	28,800
Side slopes	3:1	3:1
Surface area at 10' depth	54,000	54,000
Storage volume @ minimum (4') depth, gallons	997,000	997,000
Storage volume @ maximum (10') depth*, gallons	3,052,000	3,052,000
Aerators (3 hp each), number	2	0
Aeration capacity @ 2 lbs O_2/hp-hr	288	0

*Design freeboard when pond full = 2'

Pond Operation – The pond operation strategy involves using the disposal field during dry periods to lower the pond levels and maximize the available storage prior to rainy periods so the disposal field can rest and not become waterlogged.

If work has to be done on one of the ponds it should be possible to take it out of service by diverting the incoming flow to the other pond. Ideally this diversion should be done during dry weather when the incoming flows are low. This diversion would require installation of some temporary piping.

Treatment Pond Loading – Treatment ponds for domestic wastewater are generally designed to provide 30 day detention and a conservative organic loading of 35# to 50# BOD/acre/day. The pond detention times are much longer than 30 days as given in Table 8 below.

TABLE 8 - TREATMENT POND DETENTION TIMES VERSUS ANNUAL FLOWS

	Existing 229 homes	Build-out 300 homes
Dry year wastewater flow, gallons	6,475,000	8,074,000
Detention time, pond full (3,052,000 gal)	172 days	138 days
Detention time, pond half full	86 days	69 days
Wet year wastewater flow, gallons	7,475,000	9,074,000
Detention time, pond full (3,052,000 gal)	149 days	123 days
Detention time pond half full	75 days	62 days

The organic loading at full buildout of 300 homes with an assumed 44% occupancy and 2.5 persons per home and 0.17# BOD5/person calculates to be 56# BOD5/day. This represents a BOD5 loading of 45#/day when the pond is full, which is within the general design guidelines for a treatment pond. The aeration and excessively long detention times serve to further reduce the organic loading. The storage pond provides additional detention time which further reduces the organic loading with natural processes. This second pond provides polishing of the effluent prior to injection into the disposal field.

As a conclusion the treatment and storage ponds are well within design guidelines for the loading they receive now and at full buildout.

Berm Erosion – Some of the pond berms are eroding, probably from wind generated waves. The wind is primarily from the northwest which means that the southern and east berms are most eroded. The eroded soil has moved into the ponds and reduced their capacity.


Treatment Pond

If the ponds remain unlined at least the south and east berms should be stabilized. There are different ways to stabilize the banks. Stabilization can be "natural stabilization" by planting vegetation such as willows and cattails. However, this can make the ponds more difficult to maintain and control. An engineering bank stabilization approach can involve placing rip rap over a geofabric or geofabric placed over berms restored with compacted soil.

For budgeting purposes the cost of placing rip rap over stabilizing fabric on the upper 10 feet of all four berms around one pond, totaling 26,000 square feet, is given below.

P-1A & 1B - Pond Berm Repair using Rip Rap over Stabilization Fabric

Mobilization, bank preparation		$12,000
8 rolls Stabilization geofabric	@$500/roll	4,000
1,600 tons rock rip rap in place	@$125/ton	200,000
Labor		20,000
Miscellaneous		12,000
Subtotal		248,000
Contingencies and Incidentals (35%)		87,000
TOTAL ESTIMATED CONSTRUCION COST		$335,000

This cost is for stabilizing all four berms on one pond or stabilizing two berms on both ponds. Stabilization of all four berms on both ponds is estimated to cost $670,000.

An alternate, less expensive strategy which has been used on other ponds involves placing fabric and rip rap on the worst eroded sections. This can be done in sections over the years as the budget allows and would keep the protected berms from eroding to the point that threatens its structural integrity.

Pond Dredging – NMWD staff took soundings of the two ponds on May 20, 2015 and found that the ponds have silted in approximately a third of their depth. . This accumulated material will consist of the soil eroded from the eroded pond berms and accumulated sludge and dead algae. The pond soundings are shown in Appendix F and the depth and estimated volume of the sediment is given in Table 9 below.

TABLE 9 – ESTIMATED POND SEDIMENT DEPTH AND VOLUME

	Treatment pond	Storage pond
Average depth of sediment/sludge, feet	3.4	2.4
Est. volume of sediment/sludge, cubic yards	4,000	2,800

The minimum design water depth for the two ponds is 4' so the sediment/sludge has taken up most of this reserve. Although it appears that the ponds have lost storage volume the sediment eroded from the berms has settled in the pond bottom and the berm slopes have been reconfigured making the storage volume essentially the same when the pond is full. The storage volume is gone from the lower 2 to 3 feet of the ponds because of the sediment but there will be more storage volume available at the higher levels because of the eroded upper berms. However, to make use of the upper storage volume means that the water level in the ponds must be kept higher which will make the berms more vulnerable to further wind erosion.

The treatment pond appears to have about 1,200 cubic yards more of sediment/sludge than the storage pond, which could be caused by more erosion of the berms and/or an accumulation of undigested sludge and algae over its 40+ years of operation.

We contacted several companies which do pond dredging. Dredging can be done in several ways. One company would use a floating suction pump so the pond would need enough water in it to float the pump. The sludge slurry would either be pumped to another pond to eventually dry out or it can be mechanically dewatered so it can be trucked to a disposal site. Mechanical dewatering can involve a belt filter press using polymers or a large filter bag. If the dewatered sludge is to be trucked away it should be as dry as possible to minimize the trips and disposal costs. Mechanical dewatering may dewater the sludge to 25% solids, which means that 75% remains as water. Hauling to the Redwood Landfill together with their tipping fees would make this alternative even more expensive.

A local contractor, Poncia Fertilizer, cleans out small ponds for dairies and wineries and does work for the City of Santa Rosa. Without looking at the job site Andy Poncia estimated that if the ponds are dewatered as well as they can be he could use a long reach excavator and mud cat to load the sediment/sludge material to two on-site trucks to take it to a nearby disposal area, possibly on NMWD property adjacent to the existing ponds. His estimate for this work was $35,000 per pond. If the sludge/sediment had to be hauled to Redwood Landfill he estimates the trucking cost would be $125,000 per pond plus the tipping fees. He thought that the sediment/sludge from the pond would be too wet to be used to restore the eroded berms.

At Oceana Marin it may take several months to dry out the ponds so the sediment has a sufficiently low moisture level to allow it to be scooped up and trucked away without a lot of dripping and extra tipping fees. If the pond is going to be lined as described below it will need to be dried out so it can be graded smooth. During the drying period the storage pond will need to be used for treatment and it will be important that the effluent does not contain too much suspended material that might clog the leach lines in the disposal field.

Since this is a sewage pond, disposal of the sludge will need to conform to the requirements of EPA Part 503 Biosolids Rule (EPA/R-92/013). This rule is mainly concerned with heavy metals, stabilization of pathogens and attraction of vectors. Tests will need to be made for heavy metals, but since the sludge is from a residential area there should not be a problem. Stabilization of pathogens can be achieved by holding the sludge for a matter of time and vector attraction relates to how the sludge is handled.

In West Marin there is a lot of agricultural land and a land owner might want to accept the dredged material from the ponds. This will require permitting. If the sludge must be hauled to an appropriately permitted landfill it will probably have to go to the Redwood Landfill north of Novato. This is at least a 2 hour round trip. Per an email dated 6/29/15 from Waste Management the disposal cost pricing for this project will be $21.00 per ton with taxes and fees included if the soil qualifies for daily cover and $47.00 per ton with taxes and fees included if it is approved for disposal. If the sludge is not dewatered very well the total tipping fee will be high because the tonnage will include the water.

In order to dispose of the sediment/sludge on-site it will be necessary to excavate another pond nearby or find a local farmer who could accept the material. Both of these will require appropriate permits. Even disposal at the Redwood landfill will require testing of the material to make sure it does not contain heavy metals or other hazardous materials.

An onsite sediment holding pond could be constructed on NMWD property north of the existing ponds. The volume of this new pond will depend on the method of dewatering and whether or not the sediment will have a high water content. For the purpose of the cost estimate it is assumed that the holding pond will have a volume of 8,000 cubic yards which will hold an estimated 4,000 cubic yards of sediment from the treatment pond initially and then an additional 2,800 cubic yards from the storage pond. After the passage of time this material could be removed and spread out on adjacent land to make room for the next pond dredging if necessary.

The 8,000 cubic yard sediment holding pond would have the dimensions of approximately 140' x 200' x 8' deep with 1:1 or 1.5:5 sloping banks. The top 12" of soil which contains the organic material would be scarified, stripped off and placed on adjacent land. The lower material would be reserved in a separate pile to be used to reconstruct the slope of the pond berms.

As a caution the original 1972 plans for the pond construction show a "3" PVC and cables" running through the southwest corner of the west pond (treatment pond). The plans show a shallower excavation over these utilities to provide 30" of cover. According to the assessor's maps these utilities may run between two wells owned by the Estero Mutual Water Co. Any excavation work to clean out this pond will need to be careful not to damage these utilities or they should be relocated out from under the pond. In the estimate below it is assumed that the 3" PVC and cables will be relocated out of NMWD property, which may require a new easement on the adjacent private property.

Alternative A – Pond dredging using a holding pond for onsite disposal of the sediment

Project P-2A – Dredging of Treatment Pond (first pond)

Mobilization			$15,000
Relocation of 3" PVC and cables	630 LF	@ $80/LF	50,400
Construct sediment holding pond	8,000 cy	@ $6/cy	48,000
Dredge pond			35,000
Wooden Pier for support of instrumentation			15,000
Subtotal			163,400
Permitting cost			50,000
Contingencies and Incidentals (35%)			57,600
TOTAL ESTIMATED CONSTRUCTION COST			$271,000

Project P-2B - Dredging of Storage Pond (second pond)

Mobilization	$5,000
Dredge pond	35,000
Wooden piers for access to the valve and instrument support	20,000
Subtotal	60,000
Contingencies and Incidentals (35%)	21,000
TOTAL ESTIMATED CONSTRUCTION COST	$81,000

The total estimated cost for dredging the two ponds including construction of a nearby holding pond for the sediment is $352,000.

As an alternative project the sediment/sludge could be hauled to the Redwood landfill for disposal so that the sediment holding pond would not need to be constructed. However, there will be trucking costs and tipping fees. The estimated cost for pond dredging, hauling and disposal at the Redwood Landfill, assuming an average tipping fee of $47/ton, is given below.

Alternative B – Pond dredging with sediment disposal at the Redwood Landfill

Relocation of 3" PVC and cables	630 LF	@ $80/LF	$50,400
Dredge and haul sludge from the treatment pond (est. 4,000 cy)			125,000
Dredge and haul sludge from the storage pond (est. 2,800 cy)			125,000
Redwood landfill tipping fees	11,000 tons	@ $47/ton	517,000
Subtotal			817,400
Contingencies and Incidentals (35%)			286,600
TOTAL ESTIMATED CONSTRUCTION COST			$1,104,000

The hauling of the sediment and tipping fees at the Redwood Landfill make this alternative very expensive. Furthermore, if the ponds are dredged and the sludge/sediment is hauled to the Redwood landfill there will be no stockpile of excavated material from the holding pond excavation to be used to restore the pond berms. This soil would need to come from a separate excavation unless new soil is hauled in, which would be an added cost.

Pond Lining – The existing treatment and storage ponds are unlined. Ponds can be lined with a plastic material which can extend up the slope of the surrounding berms. A liner will prevent any exfiltration of water from the ponds and also prevent erosion of the berms.

In order to restore the berm slope so that the pond liner can be installed the pond will need to be dewatered and the sludge and sediment will need to be removed as described above. Before installing the liner the pond will need to be dry with smooth sides and no angular rock that may puncture the liner. A geofabric under the liner will provide some protection against rocks.

The various types of liners available include reinforced polypropylene, hypalon, low density or high density polyethylene and PVC. Reinforced polypropylene and hypalon have the best resistance to UV degradation. Reinforced polypropylene is seamed together with a hot wedge welder. The estimated cost of installing a pond liner in one of the ponds, assuming dimensions of the top of the berms are 300' x 180' is given below.

Pond Lining (300' x 180') – one pond

Mobilization			$10,000
Bank restoration and fine grading	3,000 cy	@ $15/cy	45,000
Geofabric			15,000
Polypropylene liner			42,000
Installation			18,000
Miscellaneous			10,000
Subtotal			140,000
Contingencies and Incidentals (35%)			50,000
TOTAL ESTIMATED CONSTRUCTION COST			$190,000

The estimated cost for lining both ponds will be around $380,000. As a practical matter, in order to dry out the pond bottom and keep one pond in service during the lining process, probably only one pond could be lined in a season. This work should be done during the summer months when there is no I/I. (Reference: Carson Manufacturing Co., P.O. Box 549, Cotati, CA 94931, 1-800-423-2380, Curtis 707-795-3141; (www.carsonliners.com).

It should be noted that a percentage of the sediment in the ponds probably comes from erosion of the pond berms. A liner extending onto the berms will prevent berm erosion but sludge will still accumulate. As determined above it took 40 years for the unlined ponds to fill in by 23% with a combination of sediment from the berms and sludge. If the ponds are lined the rate of deposition of sludge only should be much lower.

A pond liner should last 30 – 40 years. The unlined ponds have gone 40 years without major repair work except for the erosion of the berms and accumulation of sediment/sludge, which is now taking up space. A major problem with a pond liner is that it makes cleaning the ponds more difficult, although there should be less sediment because the berms would not be eroding. According to Andy Poncia the usual pond cleaning methods he uses tend to tear up plastic liners, which would need to be restored after cleaning. It may be necessary to use a floating suction dredge for the cleaning of a lined pond.

Electrical Equipment – The electrical equipment at the ponds is likely 30+ years old and is obsolete. Despite this obsolescence the equipment has been well maintained. Additionally, the motor controller panel construction is quite simple and future retrofitting of failed components within the existing controller compartments can likely be performed without too much difficulty. NMWD personnel reported that reliability of the electrical equipment at this site has been very good and no operational issues currently exist.

The PLC panel at this site is essentially new and in very good condition. NMWD personnel stated that this equipment is working well and no operational issues exist at this time.

Project P-3 – Electrical Equipment Replacement at Treatment Ponds – Due to the age of the motor controller equipment at the Treatment Ponds, it is recommended that NMWD plan for upgrading the existing electrical equipment with new components within the next 5-year time frame. The estimated cost of motor control equipment replacement at the treatment ponds is given below:

Electrical equipment replacement	$50,000
Contingencies and Incidentals (35%)	18,000
TOTAL ESTIMATED CONSTRUCTION COST	$68,000

Recommendations – It is recommended that the two ponds be dredged out and lined with a plastic liner. The most economical dredging method requires on site storage of the dredged material in an excavated holding pond. The excavated material from the holding pond will provide the necessary dirt for rebuilding the berm slopes prior to lining. Hauling the dredged out sludge to the Redwood Landfill would be very expensive.

A more expedient alternative would be to repair the eroded pond berms with rock rip-rap placed over geofabric. This could be done on an as needed basis. However it would not address the accumulated sediment and loss of storage volume in the ponds. Eventually the ponds should be dredged out and possibly lined.

The electrical equipment at the ponds is old and becoming obsolete so at some point it will need to be replaced.

EFFLUENT DISPOSAL SYSTEM

The Oceana Marin effluent disposal system consists of a pressure distribution/shallow gravel trench system. This type of system is suited for areas with high groundwater, steep slopes and low infiltration rates. Treated effluent is spread out over a wide area to enhance the infiltration and minimize the seepage to the surface. An automatic dosing siphon provides flow to the pressure distribution pipe network.

The disposal system was inspected on April 16, 2015 by Troy Pearce of AYS Engineering Group, Inc. The AYS report is included in Appendix G.


Dosing Siphon Tank

Automatic Disposal Field Valves

<u>Disposal Field Description</u> – The disposal field consists of 7 shallow pressure distribution leach lines located in moderately sloping terrain with shallow soils and perched seasonal ground water due to the underlying less permeable clay soils. The disposal trenches are fed by a dosing siphon with an average dose of approximately 2,200 gallons at a rate of around 25 gallons per minute. Effluent is conveyed to each of the 7 operating drain lines over 24 hours and is controlled via an irrigation control panel and automated valves. The individual drain lines average 530 feet long in trenches 1.5 feet wide with 24 inches of gravel and 8 inches of soil cover.

According to AYS the soils found in the area of the disposal field are not ideal for use as a drain field. However, with proper management this system could last for a very long time, although disposal fields can start to develop issues over time that will need to be addressed.

Disposal Field

The AYS report includes two tables of piezometer readings, one for 2003-04 and the other for 2014-15. The winter of 2003-04 was relatively wet and the winter of 2014-15 was a drought year. For 2003-04 the piezometer readings showed a relatively saturated field, whereas in 2014-15 the field was not saturated. With only two years of data there is insufficient information to make an evaluation of the capacity of the disposal field to dispose of effluent. AYS recommends that additional monitoring data be collected at more frequent intervals over a year so an evaluation can be made. It is proposed that most of this work be done by NMWD staff. The estimated cost for AYS to oversee this work is around $3,000.

Recommendations – Based on the AYS Report the following are recommendations for improvements to the disposal field and its operation.

1. Undertake additional monitoring of the piezometer levels and rainfall data which will provide insight to the operation of the system and provide data to establish the disposal capacity of the existing disposal system. The estimated cost for AYS to oversee this effort is $3,000.

2. Continue to maintain the fencing to keep the cows out of the disposal field area so the trenches don't get compacted.

3. Have a geotechnical engineer review the slide downslope of Line #1 to determine if the slide may have been caused by the use of the area above as a drain field.

4. Make the minor corrective work to the boxes that have been damaged by the cattle.

5. Undertake a trial to reduce the time each line is in service from 24 hours to 12 hours while increasing the monitoring to twice weekly. During this time take one of the lines out of service for a month to allow it to rest while monitoring the remaining field to see how the increase in effective loading is being tolerated.

6. Begin to prepare a system upgrade/failure plan for the disposal field in which new lines would be installed between the existing lines, which have wide spacing. The spreadsheet monitoring of the piezometers will be very useful in developing this plan. The cost for this project would have to be determined at a later date.

Although the existing effluent disposal system has functioned well there are some minor corrective actions which should be undertaken. It is recommended that the frequency of monitoring of the piezometers be increased to provide insight to the operation of the system and provide data to establish the disposal capacity of the existing disposal system.

It is also recommended that NMWD begin preparation of a system upgrade/failure plan for the disposal field in which new lines would be installed between the existing lines, which have wide spacing. The cost of this upgrade plan is yet to be determined.

RECOMMENDED ADDITIONAL STUDIES

In addition to the capital improvement projects described above it is recommended that NMWD undertake the following additional studies:

Project ST-1 – Electrical Power System Arc Flash Hazard Study – Arc flash hazard warning labels are required by NFPA 70E for power distribution equipment to enhance maintenance personnel safety. Modeling the existing power distribution systems at the Oceana Marin Pump Station and Treatment Pond sites will involve comprehensive field investigation to determine existing power system equipment ratings, connections, conductor sizes and conductor lengths. Once the systems are modeled within the software, short circuit analyses are performed to determine if the existing, installed equipment is adequately rated to withstand a fault condition at any point in the power system. After the short circuit analyses are completed, protective device coordination studies and arc flash hazard studies will be performed simultaneously to optimize system protection while minimizing arc flash hazard at all points in each system. Arc flash hazard warning labels are a code requirement. It is recommended that the District initiate the development of this labeling immediately to warn maintenance personnel about potentially dangerous locations within each facility with respect to electrical equipment arc flash hazard. The estimated cost for the Project ST-1 electrical power system studies is $25,000.

Project ST-2 – Site Reconnaissance of Geologic Hazard Along Ocean Bluff and Slide Below Effluent Disposal Field – It is recommended that NMWD undertake a preliminary study of the geologic hazard along the ocean bluff in the vicinity of the backyard sewer along Kailua Way and the main pump station. This would be a preliminary evaluation to determine if there is need for further investigations. Scott Stephens of Miller Pacific Engineering Group in Novato provided a budget for a geologic and geotechnical evaluation pand opinions on a conceptual level for these two features of $3,300.

Project ST-3 – Oversee Monitoring of the Disposal Field Piezometers – Oversee additional piezometer monitoring by AYS for an estimated cost of $3,000.

LONG RANGE IMPROVEMENT MASTER PLAN

The recommended Long Range Improvement Master Plan for the Oceana Marin wastewater system is shown in Figure 2 and includes an estimated $3.12 million dollars of improvements to the following facilities:

- Sewer collection system improvements primarily to reduce I/I
- Improvements to the main Oceana Marin pump station to improve its reliability and redundancy

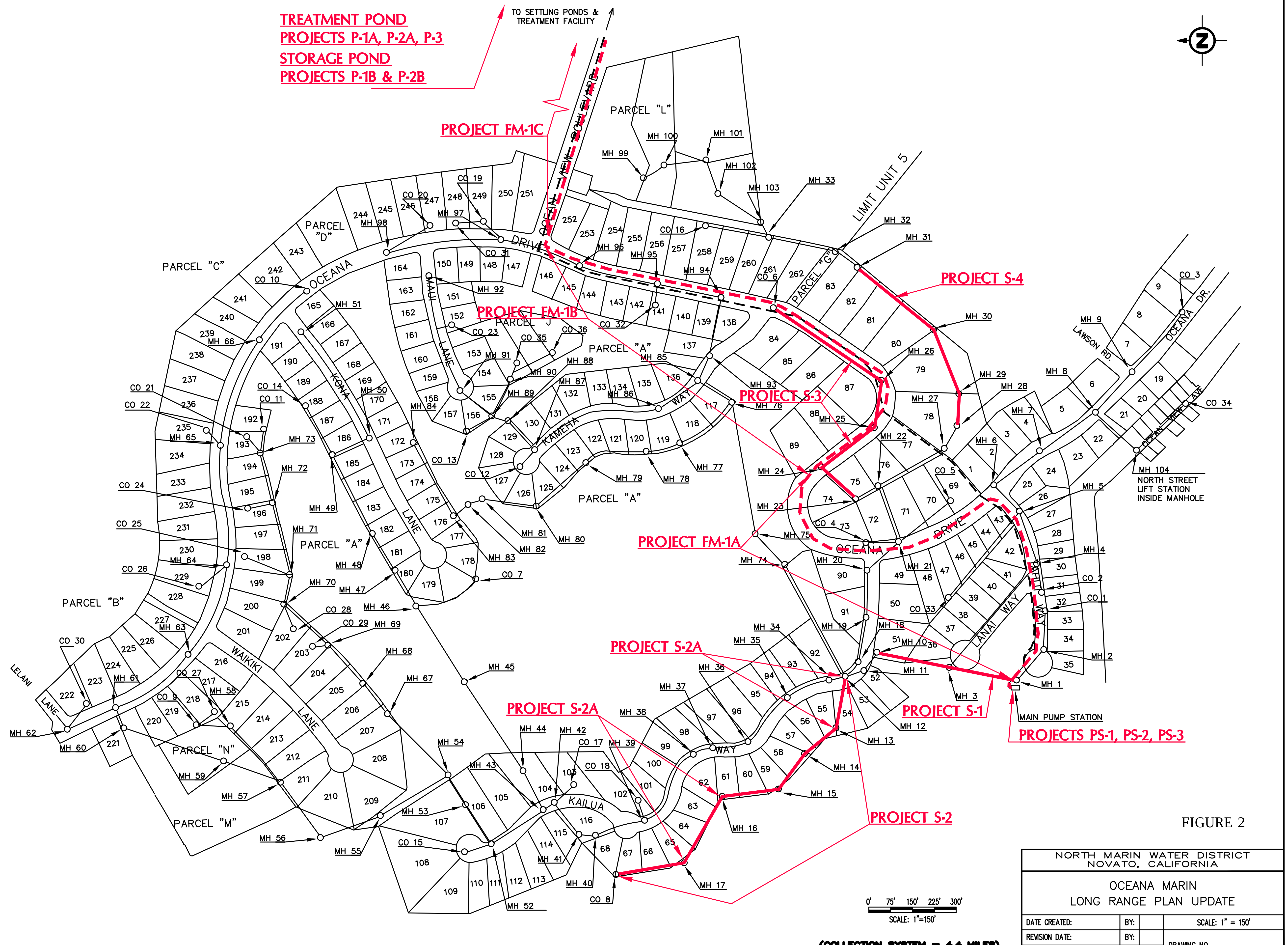


FIGURE 2

NORTH MARIN WATER DISTRICT
NOVATO, CALIFORNIA

OCEANA MARIN
LONG RANGE PLAN UPDATE

DATE CREATED:	BY:	SCALE: 1" = 150'
REVISION DATE:	BY:	DRAWING NO.
APPROVED DATE:	BY:	

Jan 19, 2016 – 2:04pm L:\District\NMWD\8464 Oceana Marin Long Range Plan\OM Sewer System CCTV Map.dwg User: PRISCILLA

- Force main improvements consisting of construction of a second force main to provide redundancy
- Dredging and possibly lining of the treatment and storage ponds to eliminate berm erosion
- Electrical power system arc flash hazard study
- Study of the effluent disposal system to assess its ability to dispose of the treated effluent
- Site reconnaissance of geologic hazard of ocean bluff and slide below effluent disposal field
- Additional studies of different aspects of the wastewater system

Priorities have been assigned to these projects in the following order:

- Improve unit process functioning
- Improve critical reliability and redundancy
- Reduce I/I from the sewer system

The list of improvement projects and their assigned priorities is given in Table 10 below.

It is recommended that NMWD begin to budget for these improvements to the Oceana Marin sewer system.

TABLE 10 – CAPITAL IMPROVEMENT PROGRAM PRIORITIES AND ESTIMATED PROJECT COSTS

Project Desig.	Description	Priority		
		High	Medium	Low
SEWER IMPROVEMENT PROJECTS				
S-1	Pump Station to Kailua Way: MH through MH 3 to MH 10 Kailua Way (477 feet)		$48,300	
S-2	Kailua Way Ocean Side: MH 12 thru MH 13, MH 14, MH 15, MH 16, MH 17 to CO 8 (1125')		$114,000	
S-2A Optional	Kailua Way Segment Replacement: MH 12 to MH 13 and MH 16 to MH 17 (380')			$102,000

Project Desig.	Description	Priority		
		High	Medium	Low
S-3	Ocean Drive CIPP Lining: MH 23 to MH 24 (Oceana Drive) thru MH 25, MH 26, to CO 6 (1,005’)		$108,000	
S-4	Ocean Drive Rear Easement: MH 28 thru MH 29, MH 30, to MH 31 (933’)		$94,000	
PUMP STATION IMPROVEMENT PROJECTS				
PS-1	Miscellaneous Reliability Upgrades	$43,000		
PS-2	Oceana Marin Pump Station PG&E Meter/Main Replacement	$30,000		
PS-3	Relocation of Electrical Equipment to Aboveground Block Building	$190,000		
FORCE MAIN IMPROVEMENT PROJECTS				
FM-1A	Pump Station to 360 Oceana Drive	$548,000		
FM-1B	360 Oceana Drive to Ocean View Blvd.		$382,000	
FM-1C	Ocean View Blvd to Treatment Ponds			$340,000
POND IMPROVEMENTS				
P-1A	Treatment Pond Berm Repair with Riprap	$335,000		
P-1B	Storage Pond Berm Repair with Riprap		$335,000	
P-2A	Dredging of Treatment Pond (first pond)	$271,000		
P-2B	Dredging of Storage Pond (second pond)		$81,000	
P-3	Electrical Equipment Replacement at Treatment Ponds		$68,000	
DISPOSAL FIELD IMPROVEMENTS			TBD	
STUDIES				
ST-1	Electrical Power System Arc Flash Hazard Studies	$25,000		
ST-2	Site Reconnaissance of Geologic Hazard along Ocean Bluff and Slide Below Effluent Disposal Field	$3,300		
ST-3	Disposal field piezometer Study	$3,000		
	TOTAL ESTIMATED COSTS	**$1,448,300**	**$1,230,300**	**$442,000**

APPENDIX A

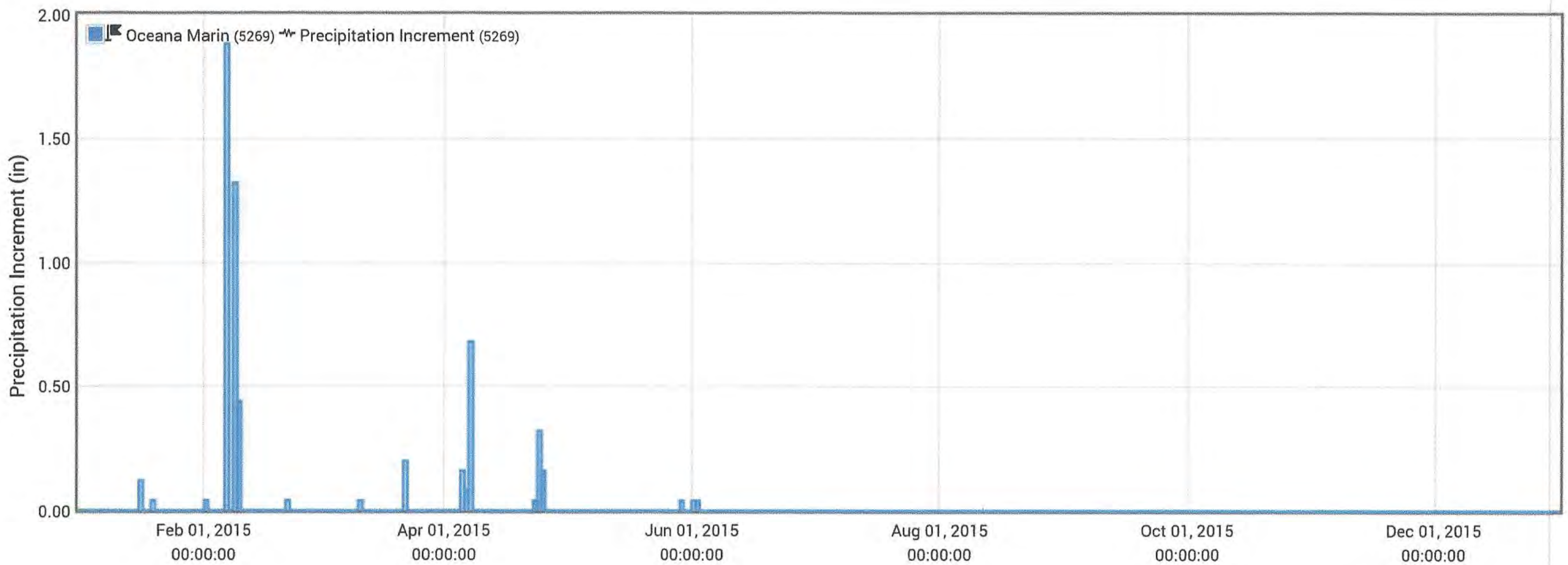
COUNTY OF MARIN
Rainfall Data 2010-2015

COUNTY OF MARIN

Home / Sites / Oceana Marin (5269) / Precipitation Increment (5269) / Graph

Precipitation Increment (5269)

January 1, 2015 - December 31, 2015

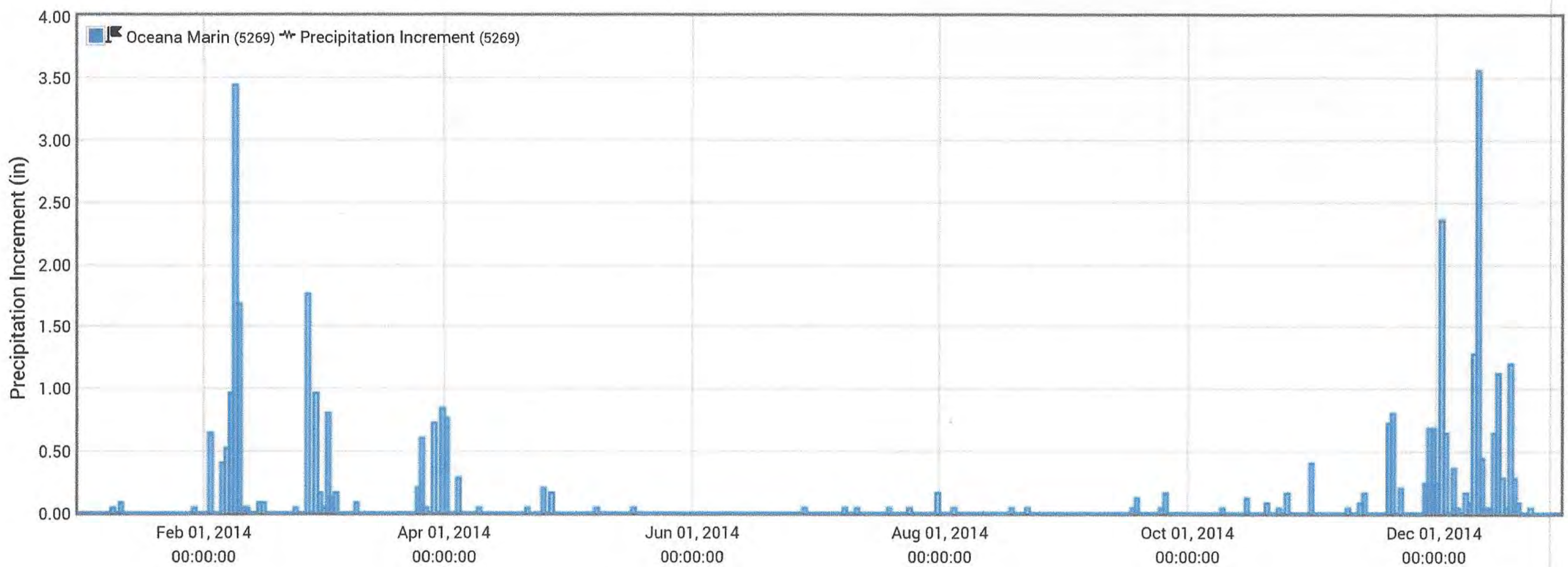


COUNTY OF MARIN

Home / Sites / Oceana Marin (5269) / Precipitation Increment (5269) / Graph

Precipitation Increment (5269)

January 1, 2014 - December 31, 2014

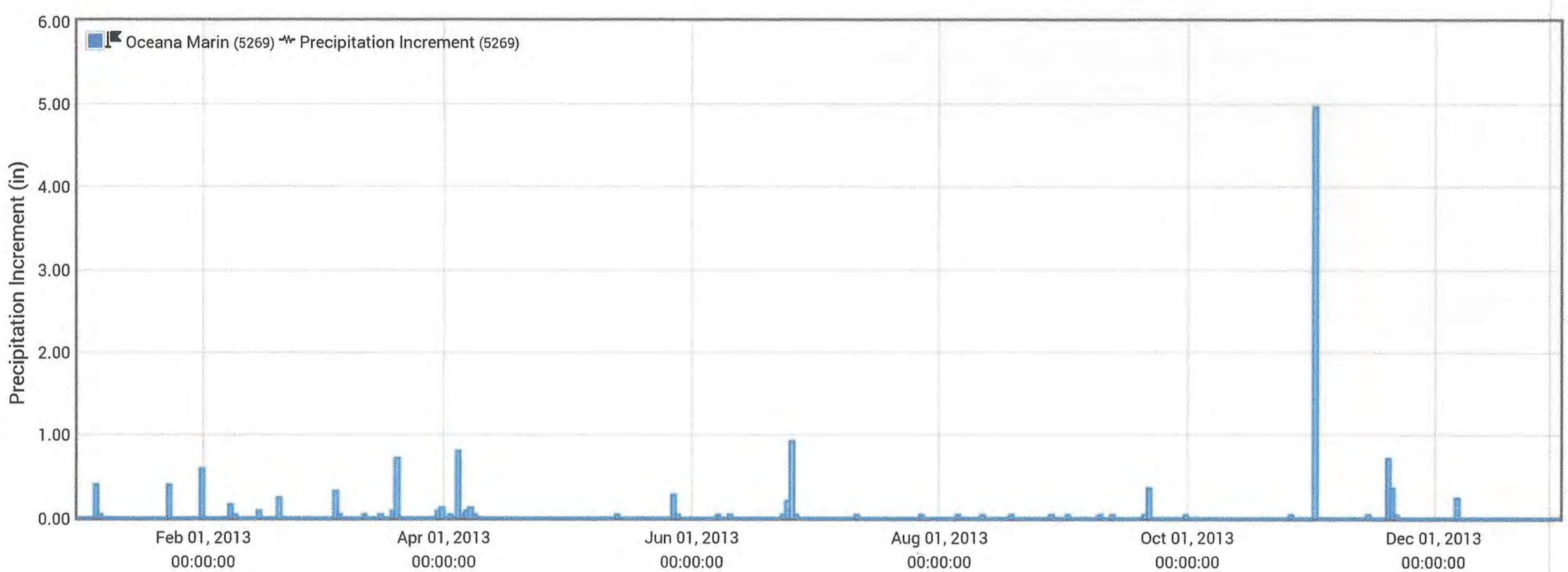


COUNTY OF MARIN

Home / Sites / Oceana Marin (5269) / Precipitation Increment (5269) / Graph

Precipitation Increment (5269)

January 1, 2013 - December 31, 2013

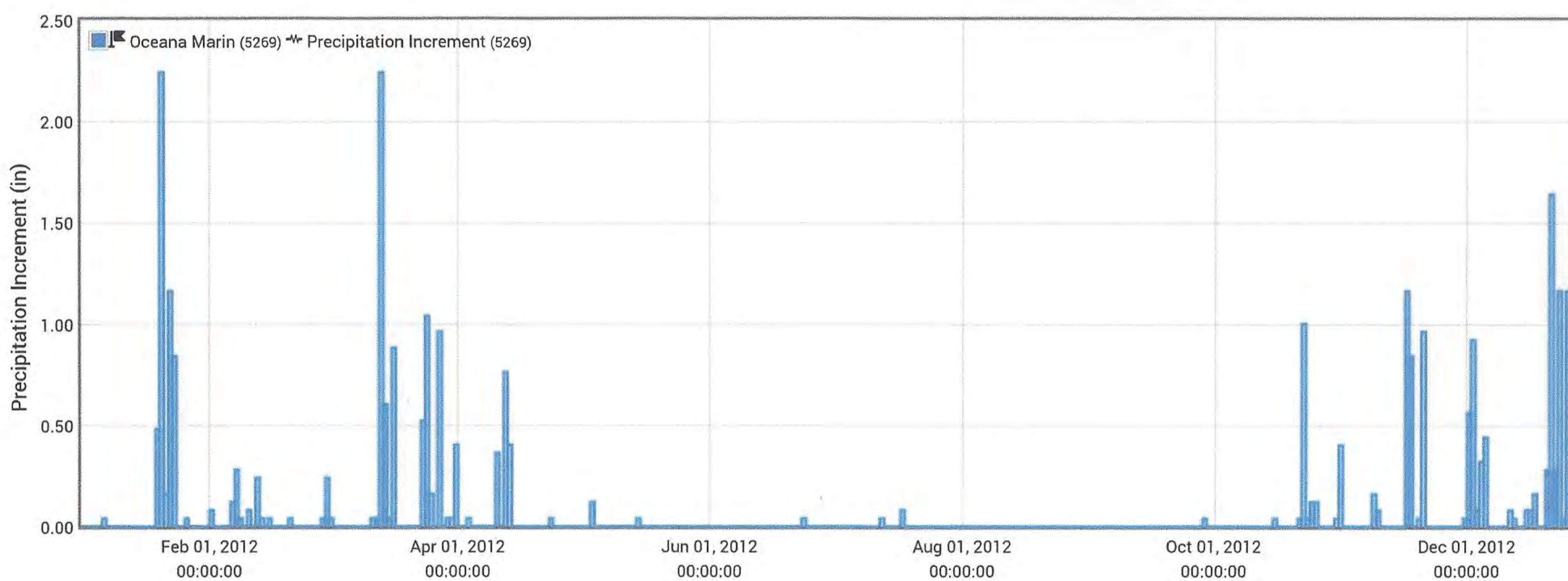


COUNTY OF MARIN

Home / Sites / Oceana Marin (5269) / Precipitation Increment (5269) / Graph

Precipitation Increment (5269)

January 1, 2012 - December 31, 2012

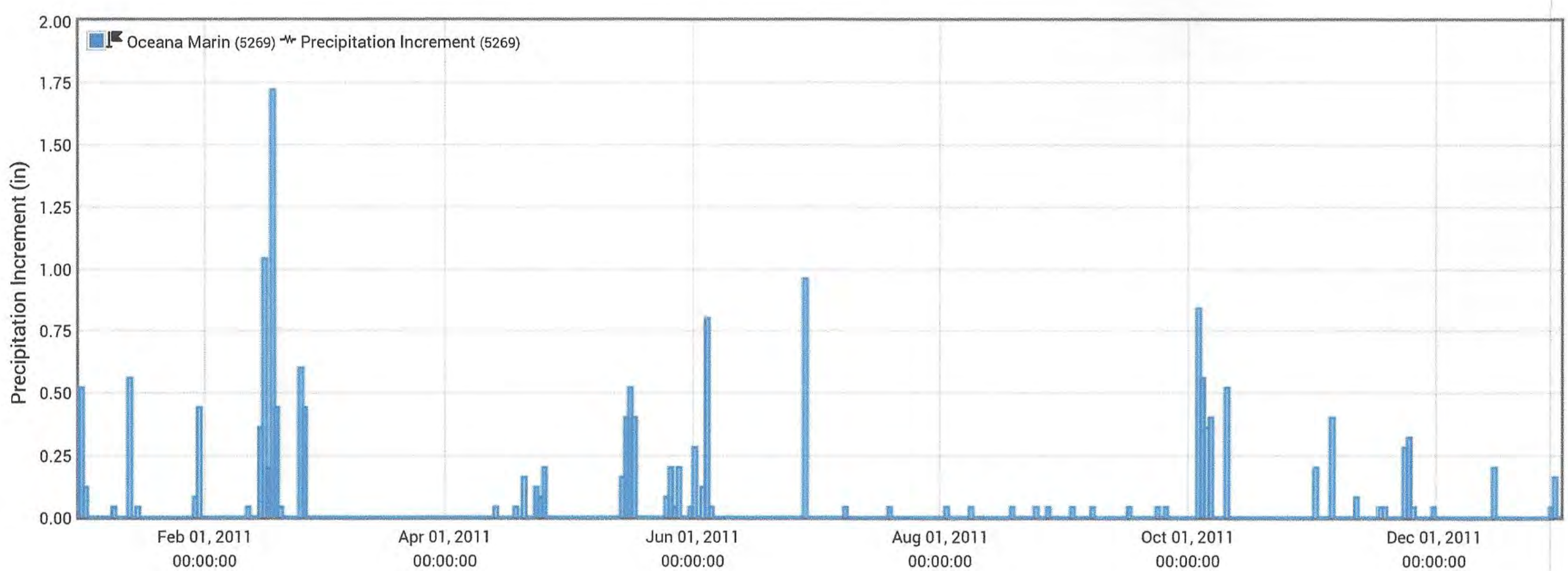


COUNTY OF MARIN

Home / Sites / Oceana Marin (5269) / Precipitation Increment (5269) / Graph

Precipitation Increment (5269)

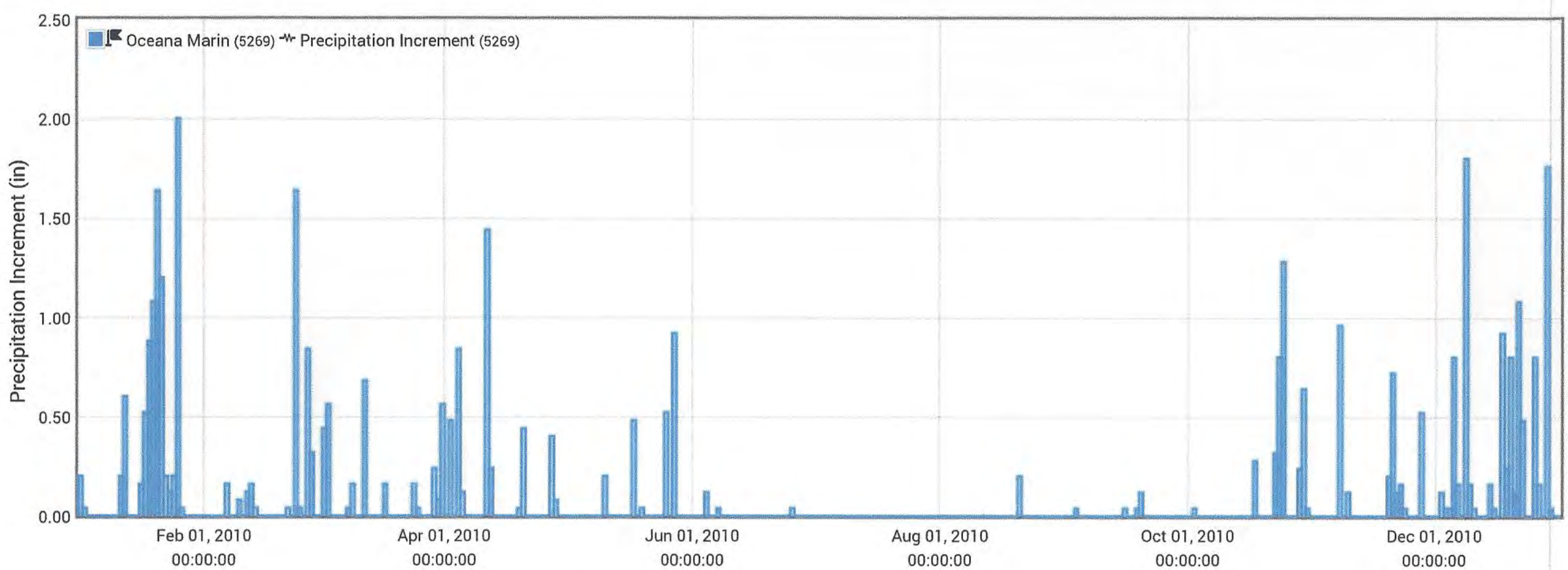
January 1, 2011 - December 31, 2011



COUNTY OF MARIN

Precipitation Increment (5269)

January 1, 2010 - December 31, 2010



APPENDIX B

WASTE DISCHARGE REQUIREMENTS
FOR OCEANA MARIN
Order No. 92-57

California Regional Water Quality Control Board
North Coast Region

ORDER NO. 92-57
ID NO. 1B80173MAR

WASTE DISCHARGE REQUIREMENTS

FOR

NORTH MARIN WATER DISTRICT
OCEANA MARIN

Marin County

The California Regional Water Quality Control Board, North Coast Region (hereinafter the Board), finds that:

1. The North Marin Water District (hereinafter referred to as the discharger) submitted a report of waste discharge on March 21, 1991. The report of waste discharge was considered complete after the discharger submitted additional information on November 20, 1991.

2. The discharger owns and operates the wastewater treatment and disposal facilities for the Oceana Marin Subdivision in the SE 1/4 of Section 21, T5N, R10W, MDB&M near the community of Dillon Beach in Marin County as shown on Figure 1. The effluent disposal facilities lie within the watershed of the Estero de San Antonio.

3. The treatment and disposal facilities at Oceana Marin consist of an aerated pond followed by a storage pond. Solids are retained and reduced in the aerated pond. This facility has no sludge handling facility. Disinfected secondary effluent is disposed using a shallow trench, pressure distribution system. The majority of the wastewater is discharged to the disposal system during the dry summer months. Additional disposal may occur during dry periods in the winter. The projected maximum rate of effluent disposal to the pressure distribution system is 53,000 gallons per day.

4. The Board adopted Water Quality Control Plans for the Klamath River Basin (1A) and the North Coastal Basin (1B) on March 20, 1975. The Klamath River Basin Plan (1A) was combined with the North Coastal Basin Plan (1B) to form the Water Quality Control Plan for the North Coast Region. The Plan for the North Coast Region was adopted by the Board on April 28, 1988 and approved by the State Water Resources Control Board on November 15, 1988. The Plan includes water quality objectives and receiving water limitations.

5. The beneficial uses of the Estero de San Antonio and its tributaries include:

   a. municipal and domestic supply

b. agricultural supply
c. water contact recreation
d. noncontact water recreation
e. ocean commercial and sport fishing
f. wildlife habitat
g. marine habitat
h. fish spawning
i. shellfish harvesting

6. The beneficial uses of areal groundwaters include:

a. domestic water supply
b. agricultural water supply

7. The discharge is presently governed by Waste Discharge Requirements, Order No. 86-49, adopted by the Board on April 10, 1986.

8. This project consists of the operation or minor alteration of an existing facility which involves minimum change in use beyond that previously existing. Furthermore, a negative declaration for construction and operation of the disposal facilities was prepared and approved by the North Marin Water District on September 18, 1990. The Board has determined that compliance with this Order will mitigate any potential adverse water quality impact.

9. The Board has notified the discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the discharge and has provided them with an opportunity to submit their written comments and recommendations.

10. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

THEREFORE, IT IS HEREBY ORDERED that Waste Discharge Requirements, Order No. 86-49 are rescinded and the discharger, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, shall comply with the following:

A. DISCHARGE PROHIBITIONS

1. The discharge of waste to land that is not under the control of the discharger is prohibited.

2. The discharge of any waste not specifically regulated by this Order is prohibited.

3. Creation of a pollution, contamination, or nuisance, as defined by Section 13050 of the California Water Code (CWC), is prohibited. [Health and Safety Code, Section 5411]

4. The discharge of untreated waste from anywhere within the collection, treatment, or disposal facility is prohibited.

5. The discharge of waste from the Oceana Marin Wastewater Treatment and Disposal Facilities to the Estero de San Antonio or its tributaries is prohibited.

6. The discharge of waste to the surface of the ground is prohibited.

B. DISCHARGE SPECIFICATIONS

1. The maximum daily discharge to the disposal system shall not exceed 53,000 gallons per day.

2. Wastes discharged to the disposal system shall not contain constituents in excess of the following limits:

Constituent	Units	Mean	Maximum
BOD (20°C, 5-day)	mg/1	50*	80
Nonfilterable Residue	mg/1	50*	80
Coliform Organisms	MPN/100 ml	--	230

3. The discharge shall not impart taste, odor, or color to areal groundwater.

* The arithmetic mean of the values for effluent samples collected in a period of 30 consecutive days.

C. PROVISIONS

1. A copy of this Order shall be maintained at the discharge facility and be available at all times to operating personnel.

2. Severability

   Provisions of these waste discharge requirements are severable. If any provision of these requirements is found invalid, the remainder of these requirements shall not be affected.

3. Operation and Maintenance

   The discharger must maintain in good working order and operate as efficiently as possible any facility or control system installed by the discharger to achieve compliance with these waste discharge requirements.

4. Change in Discharge

The discharger must promptly report to the Board any material change in the character, location, or volume of the discharge.

5. Change in Ownership

In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the discharger, the discharger must notify the succeeding owner or operator of the existence of this Order by letter, a copy of which must be forwarded to the Board.

6. Vested Rights

This Order does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to persons or property, nor protect the discharger from his liability under federal, State, or local laws, nor create a vested right for the discharger to continue the waste discharge.

7. Monitoring

The discharger must comply with the Contingency Planning and Notification Requirements Order No. 74-151 and the Monitoring and Reporting Program No. 92-57 and any modifications to these documents as specified by the Executive Officer. Such documents are attached to this Order and incorporated herein. Chemical, bacteriological, and bioassay analyses must be conducted at a laboratory certified for such analyses by the State Department of Health Services. In the event a certified laboratory is not available to the discharger, analyses performed by a noncertified laboratory will be accepted provided:

a. A quality assurance/quality control program is instituted by the laboratory. A manual containing the steps followed in this program must be kept in the laboratory and available for inspection by staff of the Board. The quality assurance/quality control program must conform to EPA guidelines or procedures approved by the Board.

b. The laboratory will become certified within the shortest practicable time if the State Certification Program is resumed.

8. Inspections

The discharger shall permit authorized staff of the Board:

a. entry upon premises in which an effluent source is located or in which any required records are kept;

b. access to copy any records required to be kept under terms and conditions of this Order;

c. inspection of monitoring equipment or records; and

d. sampling of any discharge.

9. Noncompliance

In the event the discharger is unable to comply with any of the conditions of this Order due to:

a. breakdown of waste treatment equipment;
b. accidents caused by human error or negligence; or
c. other causes such as acts of nature;

the discharger must notify the Executive Officer by telephone as soon as he or his agents have knowledge of the incident and confirm this notification in writing within two weeks of the telephone notification. The written notification shall include pertinent information explaining reasons for the noncompliance and shall indicate what steps are being taken to prevent the problem from recurring.

10. Revision of Requirements

The Board requires the discharger to file a report of waste discharge at least 120 days before making any material change or proposed change in the character, location, or volume of the discharge.

11. Operator Certification

Supervisors and operators of municipal wastewater treatment plants shall possess a certificate of appropriate grade in accordance with Title 23, California Code of Regulations, Section 3680. The State Board may accept experience in lieu of qualification training. In lieu of a properly certified wastewater treatment plant operator, the State Board may approve use of a water treatment plant operator of appropriate grade certified by the State Department of Health Services where reclamation is involved.

12. Adequate Capacity

Whenever a publicly owned wastewater treatment plant will reach capacity within four years, the discharger shall notify the Board. A copy of such notification shall be sent to appropriate local elected officials, local permitting agencies, and the press. The discharger must demonstrate that adequate steps are being taken to address the capacity problem. The discharger shall submit a technical report to the Board showing how flow volumes will be prevented from exceeding capacity, or how capacity will be increased, within 120 days after providing notification to the Board, or within 120 days after receipt of Board notification, that the POTW will reach capacity within four years. The time for filing the required technical report may be extended by the Board. An extension of 30 days may be granted by the Executive Officer, and longer extensions may be granted by the Board itself. (CCR Title 23, Section 2232)

13. The discharger shall comply with the following time schedule to assure compliance with the terms and conditions of this Order:

	Task	Date
a.	Implement a study program to develop a long-term wastewater treatment and disposal plan for the Oceana Marin Subdivision.	August 1, 1992
b.	Select and complete a long-term master plan for wastewater treatment and disposal. This plan shall include a time schedule for implementation of the long-term master plan.	May 1, 1994

Certification

I, Benjamin D. Kor, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, North Coast Region, on June 25, 1992.

Ben Kor

Benjamin D. Kor
Executive Officer

(wdromarin)

California Regional Water Quality Control Board
North Coast Region

MONITORING AND REPORTING PROGRAM NO. 92-57

FOR

NORTH MARIN WATER DISTRICT
OCEANA MARIN SUBDIVISION

Marin County

INFLUENT MONITORING

Constituent	Units	Sampling Frequency
Average Daily Flow	Gallons per Day	Continuously

DISPOSAL FIELD MONITORING

During periods when wastes are discharged from the Oceana Marin Treatment System to the effluent disposal field, water level measurements shall be taken weekly in monitoring wells located in the disposal field. The monitoring well locations shall be approved by the Executive Officer.

EFFLUENT MONITORING

During periods when wastes are discharged fromthe Oceana Marin Treatment System to the effluent disposal field, the following monitoring shall be conducted:

Constituent	Units	Type of Sample	Sampling Frequency
BOD (20°C, 5-Day)[1]	mg/l	Grab	Monthly
Nonfilterable Residue	mg/l	Grab	Monthly
Coliform Organisms	MPN/100ml	Grab	Monthly
Chlorine Residual	mg/l	Grab	Weekly
Average Daily Flow	gpd	--	Continuously

REPORTING

Monitoring reports shall be submitted monthly by the 15th day of the following month. In reporting the monitoring data, the discharger shall arrange the data in tabular form to clearly illustrate compliance with the waste discharge requirements. In any month that no waste is discharged to the effluent disposal field, the monthly monitoring report shall specify no discharge.

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[1] COD monitoring may be substituted for BOD monitoring if the discharger can demonstrate a correlation between these parameters. This change must be approved, in writing, by the Executive Officer.

In addition to the above, the discharger shall have all flow measuring devices tested annually and their accuracy certified. This certification shall be submitted annually with the monitoring report for the month of October.

Ordered by Ben Kor
Benjamin D. Kor
Executive Officer

June 25, 1992

(omarin.m&r)

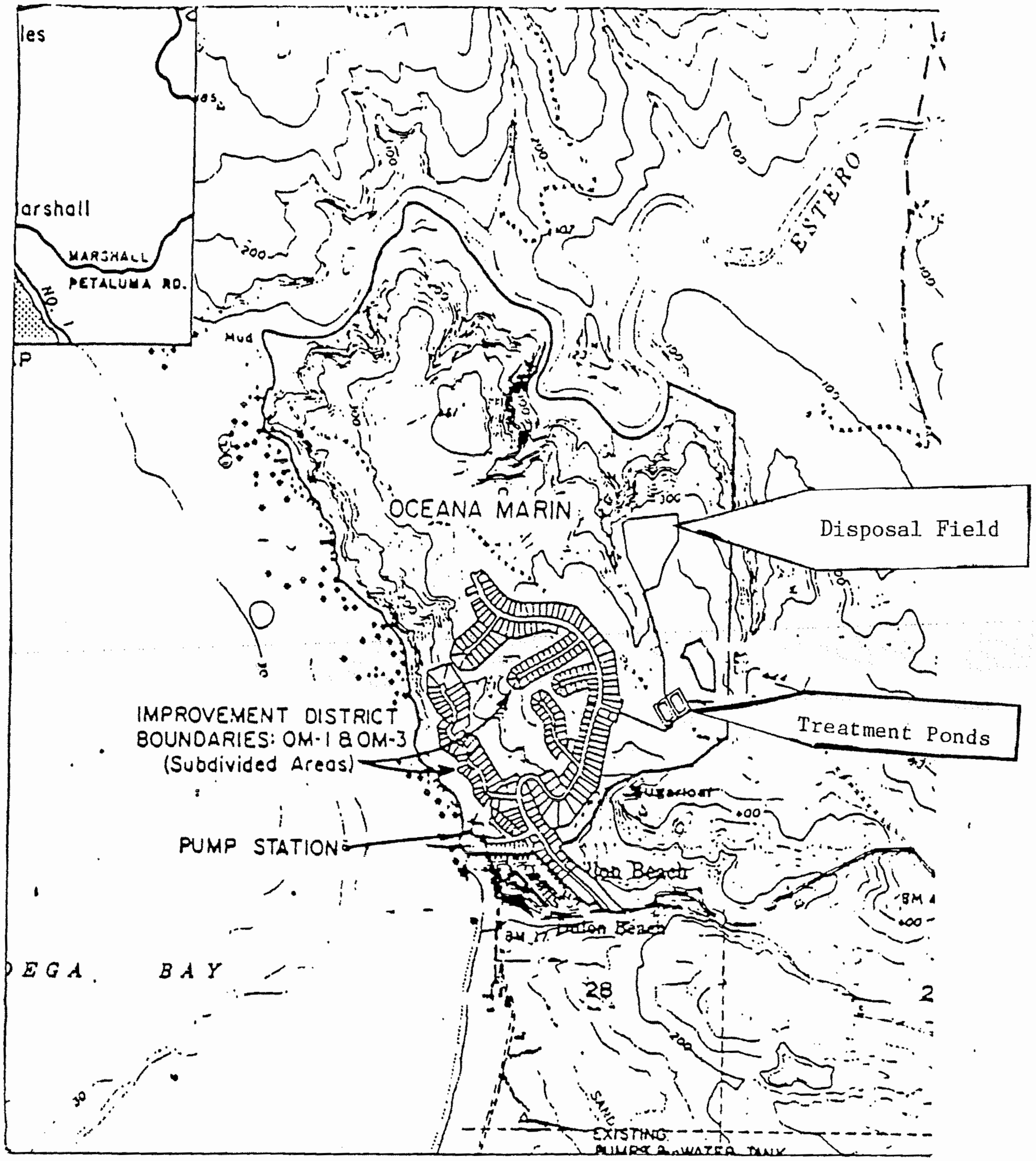

FIGURE 1

Location of Oceana Marin Wastewater Treatment and Disposal Facilities

California Regional Water Quality Control Board
North Coast Region

CONTINGENCY PLANNING AND NOTIFICATION REQUIREMENTS

FOR

ACCIDENTAL SPILLS AND DISCHARGES

ORDER NO. 74-151

The California Regional Water Quality Control Board, North Coast Region, finds that:

1. Section 13225 of the Porter-Cologne Water Quality Act requires the Regional Board to perform general duties to assure positive water quality control.

2. The Regional Board has been advised of situations in which preparations for, and response to accidental discharges and spills have been inadequate.

3. Persons discharging waste or conveying, supplying, storing, or managing wastes or hazardous materials have the primary responsibility for contingency planning, incident reporting and continuous and diligent action to abate the effects of such unintentional or accidental discharge.

THEREFORE, IT IS HEREBY ORDERED THAT:

I. All persons who discharge wastes or convey, supply, store, or otherwise manage wastes or other hazardous material shall:

   A. Prepare and submit to this Regional Board, according to a time schedule prescribed by the Executive Officer, a contingency plan defining the following:

      1. Potential locations and/or circumstances under which accidental discharge incidents might be expected to occur,

      2. Possible water quality effects of accidental discharges,

      3. The conceptual plan for cleanup and abatement of accidental discharge incidents, including:

         a. The individual who will be in charge of cleanup and abatement activities on behalf of the discharger,

         b. The equipment and manpower available to the discharger to implement the cleanup and abatement plans,

   B. Immediately report to the Regional Board any accidental discharge incidents. Such notification shall be made by telephone as soon as the responsible person or his agent has knowledge of the incident.

   C. Immediately begin diligent and continuous action to cleanup and abate the effects of any unintentional or accidental discharge. Such action shall include temporary measures to abate the discharge prior to completing permanent repairs to damaged facilities.

D. Confirm the telephone notification in writing within two weeks of the telephone notification. The written notification shall include: reasons for the discharge, duration and volume of the discharge, steps taken to correct the problem and steps being taken to prevent the problem from recurring.

II. Upon original receipt of phone report (I.B.), the Executive Officer shall immediately notify all affected agencies and known users of waters affected by the unintentional or accidental discharge.

III. Provide updated information to the Regional Board in the event of change of staff, size of the facility, or change of operating procedures which will affect the previously established contingency plan.

IV. The Executive Officer or his employees shall maintain liaison with the discharger and other affected agencies and persons to provide assistance in cleanup and abatement activities.

V. The Executive Officer shall transmit copies of this Order to all persons whose discharges of waste handling activities are governed by Waste Discharge Requirements or an NDPES permit. Such transmittal shall include a current listing of telephone numbers of the Executive Officer and his key employees to facilitate compliance with Item I.B of this Order.

Ordered by

Benjamin D. Kor
Executive Officer

July 24, 1974
(Retyped February 15, 1990)

Your primary notification should be to the Regional Board office in Santa Rosa at (707) 576-2220. During off hours, you will be able to leave a recorded message at that number and, if you have a spill or discharge emergency, you will also be referred to the State Office of Emergency Services (OES) at (800) 852-7550. OES maintains a roster of key employees and will relay your notification to Regional Board staff.

California Regional Water Quality Control Board
North Coast Region

GENERAL MONITORING AND REPORTING PROVISIONS

February 3, 1971
(Retyped June 13, 1989)

GENERAL PROVISIONS FOR SAMPLING AND ANALYSIS

Unless otherwise noted, all sampling, sample preservation, and analyses shall be conducted in accordance with the current edition of "Standard Methods for the Examination of Water and Waste Water" or approved by the Executive Officer.

All analyses shall be performed in a laboratory certified to perform such analyses by the California State Department of Health or a laboratory approved by the Executive Officer.

All samples shall be representative of the waste discharge under the conditions of peak load.

GENERAL PROVISIONS FOR REPORTING

For every item where the requirements are not met, the discharger shall submit a statement of the actions undertaken or proposed which will bring the discharge in full compliance with requirements at the earliest time and submit a timetable for correction.

By January 30 of each year, the discharger shall submit an annual report to the Regional Board The report shall contain both tabular and graphical summaries of the monitoring data obtained during the previous year. In addition, the discharger shall discuss the compliance record and the corrective actions taken or planned which may be needed to bring the discharge into full compliance with the waste discharge requirements.

The discharger shall file a written report within 90 days after the average dry weather flow for any month that equals or exceeds 75 percent of the design capacity of the waste treatment or disposal facilities. The report shall contain a schedule for studies, design, and other steps needed to provide additional capacity or limit the flow below the design capacity prior to the time when the waste flow rate equals the capacity of the present units.

APPENDIX C

OCEANA MARIN
Master Sewer List

OCEANA MARIN SEWER SYSTEM (Pipe Segments)

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PIPE SEGMENT				PHYSICAL LOCATION						PROBLEMS?							REPAIRS?	
FROM	TO	# of Upstream Services	Service rating	FROM	TO	PIPE SIZE	TYPE OF PIPE	LENGTH OF SECTION (in feet)	YEAR(s) T.V.'d	Date rating	Distance (in feet)	Direction (From MH/CO to MH/CO)	Problem Found	Wt. of Problem	Priority	Recommended Action & Date	Date	Work Done
MH 1	MH2	4	1	Approx. 38' NW from end of cul-de-sac on Tahiti Way, adjacent to lift station	Between 21 and 23 Tahiti Way, near end of cul-de-sac	6"	PVC	126.0	1-2012	2			No issues to report	0	2	TV	2019	
MH 1	MH 3	257	5	Approx. 38' NW from end of cul-de-sac on Tahiti Way, adjacent to lift station	Approx. 20' past end of cul-de-sac on Lanai Way	6"	ACP	239.5	2-2012	0	37.7	MH3 - MH1	Sag in the pipe	2	10	TV	2019	
			5							0	68.1		Infiltration in the pipe	3	15	Patch	FY13	
			5							0	116.2		Sag in the pipe	2	10	TV	2019	
			5							0	149.4		Grease in the pipe	2	10	Clean	FY13	
			5							0	181.2		Sag in the pipe	3	15	TV	2019	
MH 2	CO 1	3	1	Between 21 and 23 Tahiti Way, near end of cul-de-sac	Between 17 and 19 Tahiti Way	6"	PVC	128.0	1-2012	1	125.7	MH2 - CO1	Dirt and Rocks -- pipe has dirt and rocks at bottom	3	4	Clean	FY13	
MH 3	MH 4	43	1	Approx. 20' past end of cul-de-sac on Lanai Way	NE corner of 11 Tahiti Way	6"	PVC	449.7	1-2012	1			No issues observed	0	1	TV	2019	
MH 3	MH 10	219	5	Approx. 20' past end of cul-de-sac on Lanai Way	NW corner of 5 Kailua Way	6"	ACP	237.5	2-2012	1	59.6	MH10 - MH3	Sag in the pipe	2	11	TV	2019	
			5							1	117.3		Sag in the pipe	2	11	TV	2019	
			5							1	119.1		Joint separated in the pipe	4	21	Patch	FY13	
			5							1	151.6		Sag in the pipe	2	11	TV	2019	
MH 4	CO 2	2	1	NE corner of 11 Tahiti Way	NW corner of 15 Tahiti Way	6"	PVC		10-97, 2-12	12			No issues observed	0	12	TV	2013	
MH 4	MH5	28	2	NE corner of 11 Tahiti Way	In front of 3 Tahiti Way	6"	PVC	167.1	1-2012	1			No issues observed	0	1	TV	2019	
MH 5	MH 6	25	1	In front of 3 Tahiti Way	In front of 200 Oceana Drive	6"	PVC	146.9	1-2012	1	145.7	MH6 - MH5	Root problem in joint	3	4	Cut	FY13	
MH 5	CO 33	6	1	In front of 3 Tahiti Way	Rear of property, 267 Oceana Drive	6"	PVC	373.4	1-2012	1	315.7	MH5 - CO33	Joint Offset in the Pipe	3	4	TV	2019	
MH 6	MH 7	24	1	In front of 200 Oceana Drive	Middle of street, between 150 and 170 Oceana Drive					15			No issues observed	0	15	TV	2019	
MH 7	MH 8	19	1	Middle of street, between 150 and 170 Oceana Drive	Between 100 and 130 Oceana Drive, @ entrance to lift station	6"	PVC	238.3	1-2012	1			No issues observed	0	1	TV	2019	
MH 8	MH 9	4	1	Between 100 and 130 Oceana Drive, @ entrance to lift station	Intersection of Oceana Drive and Lawson Rd.	6"	PVC	183.8	1-2012	1			No issues observed	0	1	TV	2019	
MH 8	MH 104	12	1	Between 100 and 130 Oceana Drive, @ entrance to lift station	Intersection of Ocean View and North St Dillon Beach					15				0	15	TV	2013	
MH 104	CO34	12		Intersection of Ocean View and North St Dillon Beach	In front of 42 Ocean View Dillon Beach	6"	PVC	341.8	1-12	1			No issues observed	0	1	TV	2019	
MH 9	CO 3	2	1	Intersection of Oceana Drive and Lawson Rd.	Front of 50 Oceana Drive					15				0	15	TV	2013	
MH 10	MH 11	217	5	NW corner of 5 Kailua Way	Front of 7 Kailua Way	6"	ACP	119.0	2-2012	1			No issues observed	0	1	TV	2019	
MH 11	MH 12	216	5	Front of 7 Kailua Way	Near SW corner of 12 Kailua Way	6"	ACP	34.8	2-2012	1			No issues observed	0	1	TV	2019	
MH 12	MH 13	15	1	Near SW corner of 12 Kailua Way	On lot line, between 11 and 15 Kailua Way, near rear of properties	6"	PVC	145.8	12/08	1	128.3	MH13 - MH12	Sag in the pipe	1	2	TV	2015	
MH 12	MH 34	99	3	Near SW corner of 12 Kailua Way	In front of 12 Kailua Way	6"	ACP	60.0	2-2012	1	54.8	MH34 - MH12	Joint Offset in the Pipe	3	10	TV	2019	
											7.1		Joint separated in the pipe		7	CIP	2013	Repair with liner FY13
											110.8		~~Root problem in joint~~		0	CIP	2013	Repair with liner FY13

OCEANA MARIN SEWER SYSTEM (Pipe Segments)

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PIPE SEGMENT				PHYSICAL LOCATION						PROBLEMS?						REPAIRS?		
FROM	TO	# of Upstream Services	Service rating	FROM	TO	PIPE SIZE	TYPE OF PIPE	LENGTH OF SECTION (in feet)	YEAR(s) T.V.'d	Date rating	Distance (in feet)	Direction (From MH/CO to MH/CO)	Problem Found	Wt. of Problem	Priority	Recommended Action & Date	Date	Work Done
MH 12	MH 74	71	2	Near SW corner of 12 Kailua Way	Northern end of "vacant" lot between 6 @ 12 Kailua Way	8"	ACP	433.6	12/08	1	280.6	MH74 - MH12	~~Root problem in joint~~	3	0	CIP	2013	Repair with liner FY13
											293.6		~~Root problem in joint~~		0	CIP	2013	Repair with liner FY13
											320.3		Joint separated in the pipe		0	CIP	2013	Repair with liner FY13
											346.5		~~Root problem in joint~~		0	CIP	2013	Repair with liner FY13
											386.3		~~Root problem in joint~~		0	CIP	2013	Repair with liner FY13
											428.7		Sag in the pipe		0	CIP	2013	Repair with liner FY13
MH 13	MH 14	14	1	On lot line, between 11 and 15 Kailua Way, near rear of properties	On lot line, between 19 and 21 Kailua Way, near rear of properties	6"	PVC	165.6	12/08	1	165.6	MH14 - MH13		0	1	TV	2015	
MH 14	MH 15	11	1	On lot line, between 19 and 21 Kailua Way, near rear of properties	Rear of property, 23 Kailua Way	6"	PVC	142.8	12/08	1	57.8	MH15 - MH14	Root in lateral	2	3	TV	2015	
MH 15	MH 16	9	1	Rear of property, 23 Kailua Way	NW corner, rear of property, 27 Kailua Way	6"	PVC	189.9	12/08	1	189.9	MH16 - MH15		0	1	TV	2015	

OCEANA MARIN SEWER SYSTEM (Pipe Segments)

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PIPE SEGMENT				PHYSICAL LOCATION						PROBLEMS?							REPAIRS?	
FROM	TO	# of Upstream Services	Service rating	FROM	TO	PIPE SIZE	TYPE OF PIPE	LENGTH OF SECTION (in feet)	YEAR(s) T.V.'d	Date rating	Distance (in feet)	Direction (From MH/CO to MH/CO)	Problem Found	Wt. of Problem	Priority	Recommended Action & Date	Date	Work Done
MH 16	MH 17	7	1	NW corner, rear of property, 27 Kailua Way	Rear of property, 35 Kailua Way	6"	PVC	233.9	12/08	1	109.5	MH17 - MH16	Crack in the pipe	4	5	TV	2015	
											113.0		Joint gasket exposed		0	TV	2015	
											233.9		Joint offset in pipe		0	TV	2015	
											233.9		Camera unable to get thru		0	TV	2015	
MH 17	CO 8	3	1	Rear of property, 35 Kailua Way	Westernmost corner of property @ 53 Kailua Way	6"	PVC	246.6	12/23/08	1				0	1	TV	2015	
MH 12	MH 18	32	1	Near SW corner of 12 Kailua Way	Front of vacant (?) lot across from 7 Kailua Way	6"	ACP	77.0	10-97,12-09	5	69.7'	18-12	Root in joint	3	8	CUT	FY13	TV in 2014
MH 18	MH 19	32	1	Front of vacant (?) lot across from 7 Kailua Way	Front of 6 Kailua Way	6"	ACP	169.6	10-97,12-09	5	25'-28'	19-18	Pipe type change at lateral	0	5	TV	2014	
MH 19	MH 20	30	1	Front of 6 Kailua Way	Front of 2 Kailua Way	6"	ACP	180.5	10-97,12-090	5	95'-98'	20-19	Pipe type change at lateral	0	5	TV	2014	
MH 20	MH 21	28	1	Front of 2 Kailua Way	SW corner, front of 298 Oceana Drive	6"	ACP	130.1	10-97,12-09	5			None to report	0	5	TV	2014	
MH 21	MH 22	24	1	SW corner, front of 298 Oceana Drive	SW corner, near lot line between 320 & 330 Oceana Drive	6"	ACP	215.1	12-09	5	158.5	22-21	Root in Joint	2	7	TV	2014	Cut at next inspection
MH 21	CO 4	2	1	SW corner, front of 298 Oceana Drive	SW end of 310 Oceana Drive, close to #298					15				0	15	TV	2013	
MH 21	CO 5	2	1	SW corner, front of 298 Oceana Drive	At 220 Oceana Drive, approx. 40' from street	6"	ACP	214.8	10-97,12-09	5	58.4	21-CO5	Root in joint	2	7	TV	2014	Cut at next inspection
MH 22	MH 23	8	1	SW corner, near lot line between 320 & 330 Oceana Drive	NW corner, rear of property, 320 Oceana Drive	6"	ACP	96.5	06-07	2	2.0	MH23 - MH22	Root in joint	4	6	CUT	FY13	
											19.7		Root in joint		0	CUT	FY13	
MH 22	MH 27	17	1	SW corner, near lot line between 320 & 330 Oceana Drive	NW corner, rear of property, 360 Oceana Drive				06-07	2				0	2	TV	2014	
MH 23	MH 24	7	1	SW corner, rear of property, 320 Oceana Drive	Front of 325 Oceana Drive	6"	ACP	166.0	06-07	0	30.6	MH24 - MH23	Joint separated in the pipe	11	11	`	2019	(Potential reline)
			1							0	99.9		Joint separated in the pipe	11	11	TV	2019	(Potential reline)
			1							0	113.4		Joint separated in the pipe	11	11	TV	2019	(Potential reline)
			1							0	126.4		Joint separated in the pipe	11	11	TV	2019	(Potential reline)
			1							0	133.6		Root in joint	11	11	TV	2019	Cut 6-13
			1							0	138.8		~~Pipe collapsed; can't get camera through; joint separated in pipe~~	11	11	TV	2019	Repaired offset 10/07
			1							0	2.0	MH23 - MH24	Root in joint	11	11	TV	2019	Cut 6-13
			1							0	28.1		~~Joint separated; can't get through~~	11	11	TV	2019	(see repair for 138.8, above)
			1						13-14	0	34		Grease in sag	1	1	TV	2019	Roots cut & Grease washed out 6-14 (Potential reline)
MH 24	MH 25	6	1	Front of 325 Oceana Drive	Front of 350 Oceana Drive	6"	ACP	231.1	06-07	0	88.0	MH25 - MH24	Joint separated in the pipe	3	3	TV	2019	
			1								185.0		Joint separated in the pipe		0	TV	2019	
			1								223.0		Joint separated in the pipe		0	TV	2019	
			1						13-14	0		MH25 - MH24	Root in joint	2	2	TV	2019	Roots cut 6-14 (Potential reline)
			1						13-14	0			Root in joint	2	2	TV	2019	Roots cut 6-14 (Potential reline)
			1						13-14	0			Root in joint	2	2	TV	2019	Roots cut 6-14 (Potential reline)
			1						13-14	0		MH25 - MH24	Root in joint	2	2	TV	2019	Roots cut 6-14 (Potential reline)
			1						13-14	0			Root in joint	2	2	TV	2019	Roots cut 6-14 (Potential reline)
			1						13-14	0			Root in joint	2	2	TV	2019	Roots cut 6-14 (Potential reline)
			1						13-14	0			Root in joint	2	2	TV	2019	Roots cut 6-14 (Potential reline)

OCEANA MARIN SEWER SYSTEM (Pipe Segments)

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PIPE SEGMENT				PHYSICAL LOCATION						PROBLEMS?							REPAIRS?	
FROM	TO	# of Upstream Services	Service rating	FROM	TO	PIPE SIZE	TYPE OF PIPE	LENGTH OF SECTION (in feet)	YEAR(s) T.V.'d	Date rating	Distance (in feet)	Direction (From MH/CO to MH/CO)	Problem Found	Wt. of Problem	Priority	Recommended Action & Date	Date	Work Done
			1						13-14	0		MH25 - MH24	Root in joint	2	2	TV	2019	Roots cut 6-14 (Potential reline)
			1						13-14	0			Root in joint	2	`	TV	2019	Roots cut 6-14 (Potential reline)
MH 25	MH 26	4	1	Front of 350 Oceana Drive	Front of 365 Oceana Drive	6"	ACP	160.3	06-07	0	132.5	MH26 - MH25	Joint separated	1	1	TV	2019	None
									13-14	0	26.1	MH26 - MH25	Roots in joint	2	0	TV	2019	Roots cut 6-14 (Potential reline)
									13-14	0	39.0	MH26 - MH25	Roots in joint	2	0	TV	2019	Roots cut 6-14 (Potential reline)
									13-14	0	52.3	MH26 - MH25	Roots in joint	2	0	TV	2019	Roots cut 6-14 (Potential reline)
									13-14	0	65.2	MH26 - MH25	Roots in joint	2	0	TV	2019	Roots cut 6-14 (Potential reline)
									13-14	0	91.7	MH26 - MH25	Roots in joint	2	0	TV	2019	Roots cut 6-14 (Potential reline)
											104.8	MH26 - MH25	Roots in joint	2	0	TV	2019	Roots cut 6-14 (Potential reline)
											144.4	MH26 - MH25	Roots in joint	2	0	TV	2019	Roots cut 6-14 (Potential reline)
									13-14	0	156.7	MH26 - MH25	Joint offset med	1	0	TV	2019	None
MH 26	CO 6	3	1	Front of 365 Oceana Drive	In street in front of 416 Oceana Drive	6"	ACP	447.9	06-07	8	9.1	MH26 - CO6	Joint separated	1	9	TV	2019	
			1							8	22.4			1	9	TV	2019	
			1							8	443.9			1	9	TV	2019	
			1							8	446.4			1	9	TV	2019	
			1						13-14	8	60.0	MH26 - CO6	Camera unable to get up hill	1	9	TV	2019	
MH 27	MH 28	15	1	NW corner, rear of property, 360 Oceana Drive	Rear of property, 360 Oceana Drive, approx. 75' E of MH #27	6"	ACP	89.6	06-07	2	84.5		Joint separated	1	3	TV	2019	
MH 28	MH 29	14	1	Rear of property, 360 Oceana Drive, approx. 75' est of MH #27	On lot line, between 360 & 370 Oceana Drive, near rear of properties	6"	ACP	129.4	06-07	2	99.7		Root in joint	2	4	CUT	FY13	
											129.4		~~Joint offset; root in joint. Camera not able to get through~~	4	0	TV	2014	Offset repaired
MH 28	MH 30			Rear of property, 360 Oceana Drive, approx. 75' est of MH #27	On lot line, between 370 and 380 Oceana Drive, rear of properties	6"	ACP	361	Inspection by Dan Garrett and Jeff Corda 2/28/2014				Even though MH29 is in this group, and the main culprit, I believe there is more intrusion in this area. It cannot be seen from a parrticular manhole, but I do vbelieve that this area should be tv'd in our nextg TW sewer line inspection sequence.					
MH 29	MH 30	14	1	On lot line, between 360 & 370 Oceana Drive, near rear of properties	On lot line, between 370 and 380 Oceana Drive, rear of properties	6"	ACP	231.2	06-07	2	12.3	MH30 - MH29	Joint separated	4	6	TV	2014	
											54.0		Sag		0	TV	2014	
											99.3		Sag		0	TV	2014	
											168.1		Sag		0	TV	2014	

OCEANA MARIN SEWER SYSTEM (Pipe Segments)

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PIPE SEGMENT				PHYSICAL LOCATION						PROBLEMS?							REPAIRS?	
FROM	TO	# of Upstream Services	Service rating	FROM	TO	PIPE SIZE	TYPE OF PIPE	LENGTH OF SECTION (in feet)	YEAR(s) T.V.'d	Date rating	Distance (in feet)	Direction (From MH/CO to MH/CO)	Problem Found	Wt. of Problem	Priority	Recommended Action & Date	Date	Work Done
MH 30	MH 31	13	1	On lot line, between 370 & 380 Oceana Drive, rear of properties	SE corner, rear of property, 410 Oceana Drive	6"	ACP	340.7	06-07	2	6.3	MH31 - MH30	Root in joint	14	16	CUT	FY13	
											33.2		Joint separated		0	TV	2014	
											47.1		Joint separated		0	TV	2014	
											85.9		Lateral separated		0	TV	2014	
											106.5		Root in joint		0	CUT	FY13	
											153.8		Joint separated		0	TV	2014	
											180.5		~~Lateral separated~~		0	TV	2014	Offset repaired
											204.8		Root in joint		0	CUT	FY13	
											211.0		Root in joint		0	CUT	FY13	
											310.6		Joint separated		0	TV	2014	
MH 31	MH 32	10	1	At rear of property of 410 Oceana Drive, near lot line of #400	Rear of "Parcel G", between 410 & 416 Oceana Drive	6"	ACP	84.7	06-07	2	180.5	MH32 - MH31	~~Lateral separation~~	1	3	TV	2014	Repaired 10/09
MH 32	MH 33	9	1	At rear of Parcel "G"	SE corner, rear of property, 424 Oceana Drive	6"	ACP	238.0	06-07	2	78.9	MH33 - MH32	Root in joint	2	4	CUT	FY13	
											121.6		Lateral separation; crack	5	0	TV	2014	
MH 33	MH 104	4	1							15				0	15	TV	2014	
MH 33	CO 16	2	1	At rear of property of 424 Oceana Drive, near lot line of #420	Rear of property @ 432 Oceana Drive				06-07	2				0	2	TV	2014	
MH 34	MH 35	98	3	In front of 12 Kailua Way	In front of 16 Kailua Way	6"	ACP	148.8	2-2012	1			None to report	0	1	TV	2019	
MH 35	MH 36	96	3	In front of 16 Kailua Way	In front of 24 Kailua Way (near lot line of 22 Kailua Way)	6"	ACP	200.6	2-2012	1	8.9	MH36 - MH35	Joint separated in the pipe	3	10	TV	2019	
			3							1	30.3		Sag in the pipe	2	7	TV	2019	
			3							1	96.9		Sag in the pipe	2	7	TV	2019	
MH 36	MH 37	94	3	In front of 24 Kailua Way (near lot line of 22 Kailua Way)	In front of 28 Kailua Way (near "vacant" lot)	6"	ACP	135.1	2-2012	1	114.2	MH37 - MH36	Joint separated in the pipe	3	10	TV	2019	
MH 37	MH 38	93	3	In front of 28 Kailua Way (near "vacant" lot)	Between 28 & 30 Kailua Way	10"	ACP	70.0	10-97,12-09	3			None to report	0	3	TV	Dec-16	
MH 38	MH 39	92	3	Between 28 & 30 Kailua Way	In front of 38 Kailua Way (before street swings to the R)	10"	ACP	304.3	10-97,12-09	3			None to report	0	3	TV	Dec-16	
MH 39	MH 40	88	3	In front of 38 Kailua Way (before street swings to the R)	SW side of 45 Kailua Way, along lot line between 45 & 41, approx. 40' from street	10"	ACP	182.9	10-97,12-09	3			None to report	0	3	TV	Dec-16	
MH 39	CO 18	1	1	In front of 38 Kailua Way (before street swings to the R)	On property @ 38 Kailua Way, approx. 75' from MH #39					15				0	15	TV	2013	
MH 40	MH 41	88	3	SW side of 45 Kailua Way, along lot line between 45 & 41, approx. 40' from street	NW side of 45 Kailua Way, near rear of property, approx. 40' N of #40	10"	ACP	55.5	10-97, 12-09	3			None to report	0	3	TV	Dec-16	
MH 41	MH 42	87	3	NW side of Kailua Way, near rear of property, approx. 40' N of #40	In front of 48 Kailua Way	10"	ACP	123.2	10-97, 12-09	3			None to report	0	3	TV	Dec-16	
MH 42	MH 43	85	3	In front of 48 Kailua Way	In front of 49 Kailua Way	8"	ACP	52.0	10-97, 12-09	3			None to report	0	3	TV	Dec-16	
MH 42	CO 17	1	1	In front of 48 Kailua Way	Near front of property @ 44 Kailua Way				6/00	12				0	12	TV	2013	
MH 43	MH 52	63	2	In front of 49 Kailua Way	In front of 56 Kailua Way	8"	ACP	214.7	10-97,12-09	3			None to report	0	3	TV	Dec-16	
MH 43	MH 44	22	1	In front of 49 Kailua Way	Middle of property @ 48 Kailua Way, approx. 125' from street	6"	DIP	148.9	06-00, 02-08	1				0	1	CIP	2013	Repair with liner FY13
MH 44	MH 45	21	1	Middle of property @ 48 Kailua Way, approx. 125' from street	NW side of Parcel "A", approx. 300' from rear of "vacant" lot between 53 & 54 Kona Lane	6"	DIP	384.5	06-00, 02-08	1	309.5	MH45 - MH44	Joint pulled apart; MH 45 needs replacement	5	6	CIP	2013	Repair with liner FY13
MH 45	MH 46	21	1	NW side of Parcel "A", approx. 300' from rear of "vacant" lot between 53 & 54 Kona Lane	Behind 54 Kona Lane, approx. 30' front lot line	6"	DIP	330.0	06-00, 02-08	1	309.5	MH46 - MH45	Root in joint (RSS indicates that MH #45 needs to be replaced)	7	8	CIP	2013	10' section replaced 20 above MH45 with PVC. Repair with liner FY13
MH 46	MH 47	19	1	Behind 54 Kona Lane, approx. 30' front lot line	Rear of 50 Kona Lane, NE corner, adjacent to lot line of #46	6"	DIP	109.2	1-2012	1			None to report	0	1	CIP	2013	Repair with liner FY13

OCEANA MARIN SEWER SYSTEM (Pipe Segments)

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PIPE SEGMENT				PHYSICAL LOCATION						PROBLEMS?							REPAIRS?	
FROM	TO	# of Upstream Services	Service rating	FROM	TO	PIPE SIZE	TYPE OF PIPE	LENGTH OF SECTION (in feet)	YEAR(s) T.V.'d	Date rating	Distance (in feet)	Direction (From MH/CO to MH/CO)	Problem Found	Wt. of Problem	Priority	Recommended Action & Date	Date	Work Done
MH 46	CO 7	2	1	Behind 54 Kona Lane, approx. 30' front lot line	At rear of property @ 53 Kona Lane, on lot line	6"	ACP	236.5	06-00	9	6.5	MH46 - CO7	Lateral & roots	4	13	CUT	FY 13	
											183.0		Unable to push camera any more		0	TV	2013	
											73.5	CO7 - MH46	Lateral - overlapped line		0	TV	2013	
MH 47	MH 48	18	1	Rear of 50 Kona Lane, NE corner, adjacent to lot line of #46	Rear of 42 Kona Lane, approx. 30' W of lot line of #38	6"	ACP	212.1	1-2012	1			None to report	0	1	TV	2019	
MH 48	MH 49	16	1	Rear of 42 Kona Lane, approx. 30' W of lot line of #38	Rear of 26 Kona Lane, adjacent to lot line of #30	6"	ACP	168.6	1-2012	1			None to report	0	1	TV	2019	
MH 49	MH 50	10	1	Rear of 26 Kona Lane, adjacent to lot line @ #30	Middle of street between 26 & 27 Kona Lane	6"	ACP	134.7	1-2012	1	131.8	MH50 - MH49	Root problem in joint	3	4	Cut	2013	
MH 49	CO 14	2	1	Rear of 26 Kona Lane, adjacent to lot line @ #30	Rear of property @ 14 Kona Lane	3"	ABS	112.7	1-2012	1			None to report	0	1	TV	2019	
MH 50	MH 51	10	1	Middle of street between 26 & 27 Kona Lane	In front of 511 Oceana Drive, near entrance to Kona Lane	6"	ACP	434.8	1-2012	1	17.4	MH51 - MH50	Crack in the pipe	4	5	Patch	2013	
			1							1	353.4		Joint Offset in the Pipe	4	5	TV	2019	
MH 52	MH 53	54	2	In front of 56 Kailua Way	On lot line between 56 & 60 Kailua Way, approx. 175' from street	8"	ACP	186.0	06-00	9	16.0	MH53 - MH52	~~Pipe blocked by roots~~	2	13	CIP	2013	Repair with liner FY13
											18.7		Fish mouth rubber		0	CIP	2013	Repair with liner FY13
											87.6		Offset joint		0	CIP	2013	Repair with liner FY13
MH 52	CO 15	3	1	In front of 56 Kailua Way	End of cul-de-sac on Kailua Way, in front of #65	6"	ACP	105.3	12-09	3			None to report	0	3	TV	Dec-16	
MH 53	MH 54	53	2	On lot line between 56 & 60 Kailua Way, approx. 175' from street	On lot line between 56 & 60 Kailua Way, just past rear lot line	8"	ACP	131.0	06-00,12-09	3			None to report	0	3	CIP	2013	Repair with liner FY13
MH 54	MH 55	37	1	On lot line between 56 & 60 Kailua Way, just past rear lot line	Small NW section of Parcel "A", just past center of rear lot line of 30 Waikiki Lane	6"	ACP	305.0	06-00, 12-09	3	49.2	55-54	crack in line	3	6	TV	Dec-16	Repair at next inspection
									06-00,12-09	3	279.1	55-54	crack in line	3	6	TV	Dec-16	Repair at next inspection
									06-00,12-09	3	302.4	55-54	Small separation	3	6	TV	Dec-16	Repair at next inspection
MH 55	MH 56	34	1	Small NW section of Parcel "A", just past center of rear lot line of 30 Waikiki Lane	Approx. 75' behind rear lot line of 26 Waikiki Lane	6"	ACP	200.5	06-00, 12-09	3	164.0	55-56	Small Seperation	3	6	TV	Dec-16	Repair at next inspection
MH 56	MH 57	34	1	Approx. 75' behind rear lot line of 26 Waikiki Lane	On lot line at rear of properties @ 18 & 22 Waikiki Lane	6"	ACP	239.6	06-00, 12-09	3	118.6	MH57-MH56	root in joint	5	8	TV	Dec-16	Cut and repair at next inspection
MH 57	MH 58	7	1	On lot line at rear of properties @ 18 & 22 Waikiki Lane	Rear of property @ 6 Waikiki Lane	6"	ACP	263.2	06-00, 12-09	3	943.2	MH58 - MH57	Top of pipe damaged; roots growing through joint	5	8	TV	Dec-16	Cut and repair at next inspection
											181.7	MH58 - MH57	Top of pipe damaged; roots growing through joint	5	8	TV	Dec-16	Cut and repair at next inspection
											260.5	MH58 - MH57	root in joint	5	8	TV	Dec-16	Cut and repair at next inspection
MH 57	MH 59	26	1	On line at rear of properties @ 18 & 22 Waikiki Lane	Approx. 85' behind 10 Waikiki Lane, on Parcel "N"	6"	ACP	213.0	06-00,12-09	3			None to report	0	3	TV	Dec-16	
MH 57	CO 27								Inspection by Dan Garrett and Jeff Corda 2/28/2014				There seems to be a good amount of intrusion coming uphill of MH 57 and needs to be tv'd in our next TV inspection sequence. If I remember correctly, this was inspected a couple of years ago, and it had root penetration, but I cannot remember if they ever were cleaned out.					
MH 58	CO 9	3	1	Rear of property @ 6 Waikiki Lane	Rear of property @ 581 Oceana Drive, near lot line for #577	6"	ACP	107.0	06-00,12-09	3	8.2	MH58 - CO9	Pipe separation at 3', Sag 3-10', joint separation 46', Roots in joint	2	5	TV	Dec-16	Cut and repair at next inspection
MH 58	CO 27	3	1	Rear of property @ 581 Oceana Drive, near lot line for #577	Rear of property @ 577 Oceana Drive, near lot line for #573	6"	ACP	62.7	12-09	3	41'	MH58-CO27	Roots at 41'	3	6	TV	Dec-16	Cut at next inspection
MH 59	MH 60	26	1	Approx. 85' behind 10 Waikiki Lane, on Parcel "N"	Near front of Parcel "M", between 585 & 591 Oceana Drive	6"	ACP	365.0	06-00,12-09	3	234.6	MH60 - MH59	Lateral - appears to be infiltrating, roots	5	8	TV	Dec-16	Notice to Resident
MH 60	MH 61	25	1	Near front of Parcel "M", between 585 & 591 Oceana Drive	In front of 584 Oceana Drive	6"	ACP	75.3	06-00,12-09	3			None to report	0	3	TV	Dec-16	

OCEANA MARIN SEWER SYSTEM (Pipe Segments)

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PIPE SEGMENT				PHYSICAL LOCATION						PROBLEMS?						REPAIRS?		
FROM	TO	# of Upstream Services	Service rating	FROM	TO	PIPE SIZE	TYPE OF PIPE	LENGTH OF SECTION (in feet)	YEAR(s) T.V.'d	Date rating	Distance (in feet)	Direction (From MH/CO to MH/CO)	Problem Found	Wt. of Problem	Priority	Recommended Action & Date	Date	Work Done
MH 61	MH 62	2	1	In front of 584 Oceana Drive	Intersection of Oceana Drive & Lelani Lane	6"	ACP	175.8	12-09	3			None to report	0	3	TV	Dec-16	
MH 61	MH 63	22	1	In front of 584 Oceana Drive	In front of 568 Oceana Drive	6"	ACP	312.4	12-09	3			None to report	0	3	TV	Dec-16	
MH 62	CO 30	1	1	Intersection of Oceana Drive & Lelani Lane	Front of property @ 588 Oceana Drive, near lot line for #584	6"	ACP	158.8	12-09	3			None to report	0	3	TV	Dec-16	
MH 63	MH 64	18	1	In front of 568 Oceana Drive	In front of 556 Oceana Drive	6"	ACP	354.5	12-09	3	241.6	64-63	Grease	1	4	TV	Dec-16	
MH 64	MH 65	14	1	In front of 556 Oceana Drive	In front of 541 Oceana Drive	6"	ACP	407.2	12-09	3			None to report	0	3	TV	Dec-16	
MH 64	CO 26	1	1	In front of 556 Oceana Drive	Near front of property @ 560 Oceana Drive					3				0	3	TV	Dec-16	
MH 65	MH 66	8	1	In front of 541 Oceana Drive	In front of 511 Oceana Drive	6"	ACP	404.8	12-09	3			None to report	0	3	TV	Dec-16	
MH 65	CO 22	1	1	In front of 541 Oceana Drive	Near front of property @ 536 Oceana Drive					3				0	3	TV	Dec-16	
MH 66	CO 10	3	1	In front of 511 Oceana Drive	In street between 504 & 508 Oceana Drive	6"	ACP	247.2	12-09	3	200.0	MH66-CO10	Some dirt, offset	2	5	TV	Dec-16	
MH 54	MH 67	16	1	On lot line between 56 & 60 Kailua Way, approx. 175' from street	Located at rear of property @ 27 Waikiki Lane	6"	122' ACP, 150' DIP	272.6	06-00	9	84.8	MH67 - MH54	42° pushing through joint	1	10	CIP	2013	Repair with liner FY13
MH 67	MH 68	15	1	Located at rear of property @ 27 Waikiki Lane	Rear of property @ 19 Waikiki Lane (adjacent to lot line for #23)	6"	DIP	174.0	06-00	9				0	9	CIP	2013	Repair with liner FY13
MH 68	MH 69	14	1	Rear of property @ 19 Waikiki Lane (adjacent to lot line for #23)	Rear of property @ 11 Waikiki Lane (adjacent to lone line for #15)	6"	DIP	189.6	06-00	9	187.6	MH69 - MH68	~~Cement in line~~	0	9	TV	2013	Roys SS removed
MH 69	MH 70	11	1	Rear of property @ 11 Waikiki Lane (adjacent to lot line for #15)	Rear of property @ 565 Oceana Drive (SE corner, adjacent to lot line for #563)	6"	DIP	216.3	06-00	9	214.9	MH70 - MH69	Infiltration just before manhole	2	11	TV	2013	
MH 69	CO 29	1	1	Rear of property @ 11 Waikiki Lane (adjacent to lot line for #15)	Near rear of property @ 11 Waikiki Lane, approx. 40' N of MN #69									0	0	TV	2013	
MH 70	MH 71	9	1	Rear of property @ 565 Oceana Drive (SE corner, adjacent to lot line for #563)	At rear of property, on lot line between 561 & 563 Oceana Drive	6"	ACP	90.0	06-00	9	3.0	MH71 - MH70	3 ft. in offset joint	2	11	TV	2019	
											89.4		Infiltration @ joint		0	TV	2019	
									1-2012	1				0	1	TV	2019	
MH 70	CO 28	2	1	Rear of property @ 565 Oceana Drive (SE corner, adjacent to lot line for #563)	Near rear of property @ 7 Waikiki Lane					15				0	15	TV	2013	
MH 71	MH 72	7	1	At rear of property, on lot line between 561 & 563 Oceana Drive	SE corner @ rear of property at 553 Oceana Drive	6"	ACP	278.2	1-2012	1	8.5	MH72 - MH71	Infiltration in the pipe	2	3	Repair	FY13	
										1	82.5		Joint offset in the pipe	3	1	Repair	FY13	
										1	146.1		Joint offset in the pipe	3	1	Repair	FY13	
										1	166.1		Joint Offset in the Pipe	5	1	Repair	FY13	
										1	274.5		Infiltration in the pipe	2	1	Repair	FY13	
MH 71	CO 25	1	1	At rear of property, on lot line between 561 & 563 Oceana Drive	Near front of property @ 561 Oceana Drive					15				0	15	TV	2013	
MH 72	MH 73	4	1	SE corner @ rear of property at 553 Oceana Drive	At rear of property, on lot line between 541 & 545 Oceana Drive	6"	ACP	168.8	1-2012	1			None to report	0	1	TV	2019	
MH 72	CO 24	1	1	SE corner @ rear of property at 553 Oceana Drive	On property @ 553 Oceana Drive, approx. 40' from street					15				0	15	TV	2013	
MH 73	CO 11	1	1	At rear of property, on lot line between 541 & 545 Oceana Drive	Rear of property @ 537 Oceana Drive, near lot line of #541	4"	ACP	76.9	1-2012	1			None to report	0	1	TV	2019	
MH 73	CO 21	1	1	At rear of property, on lot line between 541 & 545 Oceana Drive	Middle of property @ 541 Oceana Drive, near lot line for #537	4"	ACP	38.2	1-2012	1			None to report	0	1	TV	2019	
MH 74	MH 75	71	2	Northern end of "vacant" lot between 6 @ 12 Kailua Way	In Parcel "A", approx. 150' NE of MH #74	6"	DIP	146.0	12-08	1	127.8	MH75 - MH74	~~Root problem in joint~~	0	1	CIP	2013	Repair with liner FY13
											24.4	MH76 - MH75	~~Joint Offset~~		1	CIP	2013	Repair with liner FY13
											125.9		~~Root problem in joint~~		0	CIP	2013	Repair with liner FY13
									12-08		136.5		~~Root problem in joint; camera unable to get thru~~		0	CIP	2013	Repair with liner FY13

OCEANA MARIN SEWER SYSTEM (Pipe Segments)

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PIPE SEGMENT				PHYSICAL LOCATION						PROBLEMS?							REPAIRS?	
FROM	TO	# of Upstream Services	Service rating	FROM	TO	PIPE SIZE	TYPE OF PIPE	LENGTH OF SECTION (in feet)	YEAR(s) T.V.'d	Date rating	Distance (in feet)	Direction (From MH/CO to MH/CO)	Problem Found	Wt. of Problem	Priority	Recommended Action & Date	Date	Work Done
MH 75	MH 76	71	2	In Parcel "A", approx. 150' NE of MH #74	SE corner @ rear of property at 11 Kameha Way	6"	DIP10 0' ACP 357'	400.0		1	44.1	MH75 - MH76	~~Root problem in joint; camera unable to get thru; concrete in the bottom~~	0	0	CIP	2013	Repair with liner FY13
									1-09		125.7	MH76 - MH75	~~Root problem~~		0	CIP	2013	Repair with liner FY13
											135.8		~~Root problem~~		0	CIP	2013	Repair with liner FY13
											145.7		~~Root problem~~		0	CIP	2013	Repair with liner FY13
											156.0		~~Root problem~~		0	CIP	2013	Repair with liner FY13
											166.9		~~Root problem~~		0	CIP	2013	Repair with liner FY13
											177.4		~~Root problem~~		0	CIP	2013	Repair with liner FY13
											227.0		~~Repair area~~		0	CIP	2013	Repair with liner FY13
											231.7		~~Can't get thru~~		0	CIP	2013	Repair with liner FY13
MH 75	CO 35	71	2	In Parcel "A", approx. 150' NE of MH #74	In Parcel "A", approx. 217 NE from MH 75	6"	DIP 10 0' ACP 117'	217'	1-09	3			Installed Clean out 35	1	5	CIP	2013	
CO 35	MH 76	71	2	In Parcel "A", approx. 217 NE from MH 75	SE corner @ rear of property at 11 Kameha Way	6"	ACP	240'	1-09	3			Installed Clean out 35	1	5	CIP	2013	
MH 76	MH 77	17	1	SE corner @ rear of property at 11 Kameha Way	At rear of property @ 19 Kameha Way, near lot line for #15	6"	ACP	234.1	06-00	9	221.3	MH77 - MH76	Lateral is broken behind the Y	1	10	Patch	FY13	
			1						2-2012	1	198.7		Crack in the pipe	2	3	Patch	FY13	
			1						2-2012	1	203.9		Joint offset in the pipe	3	4	TV	2019	
MH 76	MH 85	54	2	SE corner @ rear of property at 11 Kameha Way	In front of 11 Kameha Way, near Parcel "A"	6"	DIP	135.6	06-00,12-08	4			None to report	0	4	CIP	2013	Repair with liner FY13
MH 77	MH 78	14	1	At rear of property @ 19 Kameha Way, near lot line for #15	Rear of property @ 23 Kameha Way, near lot line for #19	6"	ACP	114.7	2-2012	1	105.4	MH78 - MH77	Joint separated in the pipe	3	4	TV	2019	
MH 78	MH 79	13	1	Rear of property @ 23 Kameha Way, near lot line for #19	At rear of property @ 35 Kameha Way, center of lot line	6"	ACP	258.9	1-2012	1	2.2	MH79 - MH78	Root in joint	3	4	Cut	FY 13	
										1	30.3		Joint offset in the pipe	3	1	TV	2019	
										1	178.6		Joint offset in the pipe	3	1	TV	2019	
										1	254.8		Infiltration in the pipe	2	1	Patch	FY 13	
MH 79	MH 80	10	1	At rear of property @ 35 Kameha Way, center of lot line	On lot line at rear of properties @ 43 & 45 Kameha Way	6"	ACP	208.1	06-00	9	82.4	MH79 - MH80	Offset joint	1	10	TV	2019	
			1						1-2012	1	82.3	MH80 - MH79	Joint offset in the pipe	5	6	TV	2019	
MH 80	MH 81	8	1	On lot line at rear of properites @ 43 & 45 Kameha Way	In Parcel "A", approx. 40' beyond rear lot line of #48 Kameha Way	6"	ACP	181.3	1-2012	1			None to report	0	1	TV	2019	
MH 81	MH 82	6	1	In Parcel "A", approx. 40' beyond rear lot line of #48 Kameha Way	In Parcel "A", approx. 40' N of MH #80	6"	ACP	65.2	1-2012	1			None to report	0	1	TV	2019	
MH 82	MH 83	6	1	In Parcel "A", approx. 40' N of MH #80	At rear of property @ 43 Kona Lane	6"	ACP	57.2	1-2012	1	57.2	MH83 - MH82	Infiltration in the pipe	2	3	Patch	FY 13	
MH 83	MH 84	4	1	At rear of property @ 43 Kona Lane	At rear of property at 31 Kona Lane, adjacent to lot line for #35	6"	ACP	270.2	06-00	9	67.5	MH84 - MH83	Lateral @ 2:00 offset behind the Y w/roots in joint	3	12	Cut	FY 13	
			1						1-2012	1	69.9		Root problem in lateral	3	4	Cut	FY 13	
MH 85	MH 86	27	1	In front of 11 Kameha Way, near Parcel "A"	In front of 18 Kameha Way	6"	ACP	171.7	1-2012	1			None to report	0	1	TV	2019	
MH 85	MH 93	27	1	In front of 11 Kameha Way, near Parcel "A"	In front of 6 Kameha Way	6"	ACP	92.0	1-2012	1	0.2	MH93 - MH85	Roots in the pipe	3	4	Cut	FY 13	
			1							1	23.6		Joint Offset in the Pipe	3	4	TV	2019	
MH 86	MH 87	25	1	In front of 18 Kameha Way	In front of 42 Kameha Way	6"	ACP	482.0	1-2012	1			None to report	0	1	TV	2019	
MH 87	MH 88	19	2	In front of 42 Kameha Way	At rear of property @ 42 Kameha Way, near lot line for #38	6"	ACP	142.6	1-2012	1			None to report	0	1	TV	2019	
MH 87	CO 12	1	1	In front of 42 Kameha Way	End of cul-de-sac on Kameha Way, in front of #48					15				0	15	TV	2019	
MH 88	MH 89	18	2	At rear of property @ 42 Kameha Way, near lot line for #38	At rear of properties on lot line between #31 and #34 Maui Lane	6"	ACP	61.4	1-2012	1	1.5	MH89 - MH88	Roots in the pipe	3	7	Cut	FY 13	

OCEANA MARIN SEWER SYSTEM (Pipe Segments)

C:\Users\Barbara\Desktop\[Book2.xlsx]Pipe Segments 14

PIPE SEGMENT				PHYSICAL LOCATION						PROBLEMS?							REPAIRS?	
FROM	TO	# of Upstream Services	Service rating	FROM	TO	PIPE SIZE	TYPE OF PIPE	LENGTH OF SECTION (in feet)	YEAR(s) T.V.'d	Date rating	Distance (in feet)	Direction (From MH/CO to MH/CO)	Problem Found	Wt. of Problem	Priority	Recommended Action & Date	Date	Work Done
MH 89	MH 90	5	1	At rear of properties on lot line between #31 and #34 Maui Lane	NW corner of Parcel "J", just behind rear lot line for #27 Maui Lane	6"	ACP	134.9	1-2012	1	124.1	MH89 - MH90	Infiltration in the pipe	2	3	Patch	FY 13	
MH 89	MH 91	11	1	At rear of properties on lot line between #31 and #34 Maui Lane	End of cul-de-sac of Maui Lane	6"	ACP	147.1	1-2012	1			None to report	0	1	TV	2019	
MH 89	CO 13	2	1	At rear of properties on lot line between #31 and #34 Maui Lane	On lot line between 30 & 34 Maui Lane, rear of properties	6"	ACP	117.5	1-2012	1	9.3	MH89 - CO13	Joint offset in the pipe	3	4	TV	2019	
			1							1	114.7		Joint Offset in the Pipe	3	4	TV	2019	
MH 90	CO 35	1	1	NW corner of Parcel "J", just behind rear lot line for #27 Maui Lane	Approx. 60' SW of MH90	4"	ACP	59.9	1-2012	1	34.5	MH90 - CO35	Sag close to MH	0	1	TV	2019	
MH 90	CO 36	1	1	NW corner of Parcel "J", just behind rear lot line for #27 Maui Lane	Approx. 60' SW of MH90	4"	ACP		1-2012	1	17.8	CO36- MH90	Sag	0	1	TV	2019	
MH 91	MH 92	11	1	End of cul-de-sac of Maui Lane	Near from of Maui Lane, adjacent to #6	6"	ACP	420.7	1-2012	1			None to report	0	1	TV	2019	
MH 91-92	CO 23	1	1		Near front of property @ 15 Maui Lane					15				0	15	TV	2019	
MH 93	MH 94	26	1	In front of 6 Kameha Way	In street between 425 & 427 Oceana Drive	6"	ACP	213.7	1-2012	1			None to report	0	1	TV	2019	
MH 94	MH 95	24	1	In street between 425 & 427 Oceana Drive	In front of 435 Oceana Drive	6"	ACP	230.8	1-2012	1			None to report	0	1	TV	2019	
MH 95	MH 96	20	2	In front of 435 Oceana Drive	In front of 451 Oceana Drive	6"	ACP	280.2	1-2012	1			None to report	0	1	TV	2019	
MH 95	CO 32	1	1	In front of 435 Oceana Drive	On property @ 435 Oceana Drive, approx. 40' W of MH #95					15				0	15	TV	2019	
MH 96	MH 97	13	1	In front of 451 Oceana Drive	In street between 463 & 464 Oceana Drive	6"	ACP	295.4	1-2012	1			None to report	0	1	TV	2019	
MH 97	MH 98	5	1	In street between 463 & 464 Oceana Drive	In street between 484 & 490 Oceana Drive	6"	ACP			15			None to report	0	15	TV	2019	
MH 97	CO 19	2	1	In street between 463 & 464 Oceana Drive	Near front of property @ 468 Oceana Drive					15				0	15	TV	2013	
MH 98	CO 20	4	1	In street between 484 & 490 Oceana Drive	Near front of property @ 468 Oceana Drive	4"	PVC	33.7	1-2012	1			None to report	0	1	TV	2019	
MH 99	MH 100	2	1							15				0	15	TV	2019	
MH 100	MH 101	3	1							15				0	15	TV	2019	
MH 101	MH 102	4	1							15				0	15	TV	2019	
MH 102	MH 103	4	1							15				0	15	TV	2019	
CO 19	CO 31	1	1	Near front of property @ 468 Oceana Drive	Near front of property @ 472 Oceana Drive					15				0	15	TV	2013	
MH 104	CO 34	12	1	@ Lift Station on Ocean View Drive (inside manhole)	Approx. 225' SE of MH 104	6"	PVC	341.8	1-2012	1	59.7	MH104 - CO 34	Joint separated in the pipe	3	4	TV	2019	

APPENDIX D

OCEANA MARIN INTRUSION INSPECTION REPORT

Work Done on February 28, 2014

Oceana Marin Intrusion Inspection Report

Work done on February 28th 2014
Work Done By Dan Garrett and Jeff Corda
Report Done By: Jeff Corda

The purpose of the investigation it the intrusion areas of rain water at Oceana Marin was to try and unearth the reasons for high flows within the sewer system during a rain event and locate the major areas on intrusion. Having been on scene during previous rain events and during our last few rounds of TVing, I have come to the realization that there are miniscule intrusion areas throughout the system. On the 28th of February Dan and I went out and tried to find the areas that contributed the largest amount of water into the system, this is what we found.

MH 59- This manhole had been injected with foam by Christian Brothers recently. The walls of the manhole look fine, the intrusion is coming from where the wall meets the floor. The water is coming in from everywhere, I am not sure if the foam injection will work in this area. We might have to try and grind out the base and mortar around the entire area.

MH 23- It looks like there is a significant amount of intrusion coming in from the consumers lateral. The flow looked clean and did not have any bubbles so it is not a washing machine or bath tub. It is my recommendation that we TV the consumers lateral to know for certain if there is a problem. It is relatively easy access to the lateral considering it daylights directly into the manhole.

MH 90- There is a lot of intrusion within this manhole, from the base all the way up the walls. Christian brothers will probably work on the walls but it might end up like MH 59 in regards to the base. Also if I remember correctly a couple years ago we tv'ed this line and there was a leak in the top of the sewer pipe leaving mh 90 and going to mh 89. I believe it was within 10ft of mh 90.

MH 65- Good size leak up high on the wall in this manhole, this one seems like it would be perfect for Christian brothers to do.

MH 29- The intrusion coming into the manhole is entering on top of the pipe coming from the upper manhole 30. The pipe looks to be newer than other pipes in the system. For this leak to be fixed I believe we need to break out the mortar around the pipe and put new mortar in its place.

The next two sets are areas that look to have intrusion other than what can be identified through looking at the manholes in the area.

MH-28 to MH-30

Even though manhole 29 is in this group, and the main culprit, I believe there is more intrusion in this area. It can not be seen from a particular manhole but I do believe that this area should be tv'ed in our next TV sewer line inspection sequence.

MH-57 to CO-27

There seems to be a good amount of intrusion coming uphill of manhole 57 and needs to be tv'ed in our next TV inspection sequence. If I remember correctly this was inspected a couple years ago and it had root penetration but I can not remember if they ever where cleaned out.

In conclusion I believe that the major areas of intrusion that Dan and I located account for around 10GPM. If we can correct these problem areas it should significantly reduce the rate of intrusion within our Oceana Marin sewer system.

APPENDIX E

BEECHER ENGINEERING
Electrical System Assessment Report

North Marin Water District

Oceana Marin Wastewater System

Electrical System Assessment Report

May 2015

Prepared By:

Todd Beecher, P.E.

Beecher Engineering, Inc.

Beecher Engineering, Inc.

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Purpose of Assessment

The purpose of this assessment is as follows:

- Identify aspects of the existing Oceana Marin Pump Station power distribution and control system which require repair or modification based on visual field inspection.

- Identify aspects of the existing North Street Lift Station power distribution and control system which require repair or modification based on visual field inspection.

- Identify aspects of the existing Treatment Ponds power distribution and control system which require repair or modification based on visual field inspection.

- Provide recommendations and associated cost estimates for each of the three (3) sites listed above.

Existing Electrical System Installation Assessment

On April 16, 2015, a site inspection was conducted by Mr. Todd Beecher, P.E. (Beecher Engineering, Inc.), accompanied by personnel from NMWD and Nute Engineering for the purpose of investigating the existing NMWD wastewater system sites. The assessment of each site's power distribution and control system installations was based on visual site inspection and discussions with NMWD personnel.

In general, the following assessment factors are applied to existing, installed electrical systems and comprise the basis for the recommendations included within this report:

- **Equipment Age** – In general, electrical power distribution equipment is typically designed for a maximum service life of approximately 30 years.
- **Visual Condition** – Equipment was inspected for signs of enclosure corrosion, excessive dirt or dust buildup and discoloration on internal components and terminals.
- **Code and Standard Compliance** – Existing equipment and installations were checked for compliance with applicable codes and standards including NFPA 70 (i.e. National Electrical Code) and NFPA 70E (i.e. Standard for Electrical Safety in the Workplace).
- **System Reliability** – A general analysis of existing power system equipment interconnections to assess overall power system reliability.
- **Personnel Safety Concerns** – Based on visual inspection of the existing electrical installations, any concerns related to personnel safety were noted and are included as part of this report.
- **Obsolescence** – Determine if new replacement components and parts are still commercially available for existing power distribution equipment.
- **NMWD Maintenance Staff Input** – Informal interviews with Maintenance Staff were conducted to determine background and historical information for several pieces of equipment and installations and asked to report on reoccurring component and equipment failures.

- **Opportunity for Replacement** – Electrical equipment which is nearing the end of its useful service life but still in good working condition should be considered for replacement if an upcoming improvement project is planned for an area which encompasses the electrical equipment or installation.

Time frames for implementation of the recommendations included in this report are based on the following criteria:

- **Immediate**:
  a. Equipment or current installation conditions present a potential safety hazard to Operations and Maintenance personnel.
  b. Equipment or current installation conditions present a high degree of risk that facility operational reliability may be compromised unless immediate action is taken.
  c. Equipment is well beyond its useful service life and should be planned for immediate replacement.
- **Within Next 5 Years** – This equipment is currently in good working condition but is approaching the end of its useful service life within the next five years. It is recommended that the Owner include replacement of this equipment over the next five year planning time frame.
- **Beyond 5 Years** – This equipment is in good working condition and the useful service life extends beyond the next five years. No recommendations for replacement within the next five years are recommended for this equipment.

Listed below are specific parts of the electrical power system which were inspected:

<u>Oceana Marin Pump Station</u>

The existing pump station is supplied utility power from a pad-mounted PG&E transformer at 240 volts, 3-phase. Standby power is supplied from an 80kW/100kVA, propane gas engine-driven generator (Generac) and automatic transfer switch (ATS). The electrical equipment at the site is housed in three (3) different structures:

- "Doghouse" Shed: PG&E meter, main circuit breaker, ATS, circuit breaker for the main panelboard (installed below-grade) and generator auxiliary power panelboard.

- Above-Grade Block Building: Standby generator.

- Below-Grade Pump Station: Pumps, motor controls, programmable logic controller (PLC) pump station control system, level controls, flowmeter transmitter, grinder local control panel (LCP), ventilation blower controls and main panelboard.

Figure 1: "Doghouse" Shed Interior

The "Doghouse" Shed enclosure is constructed of wood and has not provided adequate protection from the corrosive salt air. Although all of the enclosures within this structure are showing signs of corrosion, the PG&E meter enclosure and main circuit breaker enclosure are the most deteriorated and are both beyond repair. The ATS enclosure, which is fabricated from stainless steel, has some surface corrosion but the enclosure integrity has not been compromised. The small panelboard located in the "Doghouse" Shed includes circuit breakers for powering the standby generator equipment building. This panelboard and the circuit breaker enclosure (i.e. feeder breaker for the main panelboard in the below-grade structure) are starting to show signs of corrosion but the degree of rust appears to be cosmetic at this time.

The above-grade block building that houses the standby generator appears to have provided a good degree of protection for the interior equipment. There is, however, a ventilation louver located along the north wall of the structure which is designed to gravity-close when the ventilation fan is not running (i.e. the ventilation fan is activated when the generator runs). The louver was found to be hung up in the "open" position due to linkage hardware corrosion. Thus, with the louvers stuck in the "open" position, corrosive salt air has been permitted to freely enter the interior of the block building. This is evidenced by surface corrosion on the standby generator enclosure. NMWD personnel reported that the generator enclosure was recently painted due to corrosion that accumulated when the generator was originally installed outdoors. The interior generator and engine equipment appear to be in good visual condition. NMWD personnel reported that the generator is tested regularly (i.e. once per month) and that no operational or maintenance issues have been reported.

Figure 2: Standby Generator Enclosure Surface Corrosion

The standby generator is fueled by a propane fuel source.   During a seismic event, this piping is prone to shearing, particularly at the wall penetration and equipment connection locations.

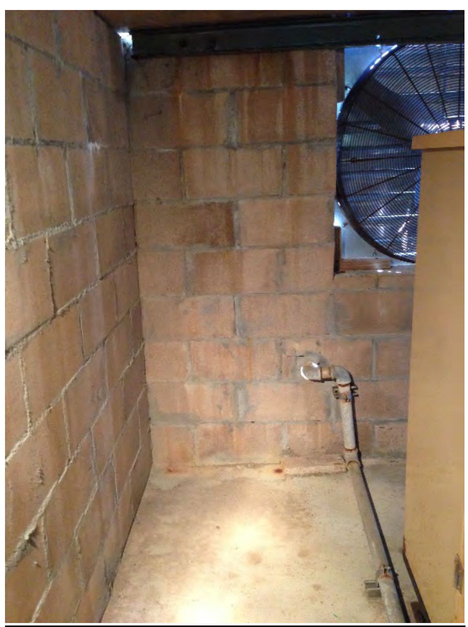


Figure 3: Standby Generator Fuel Piping

The below-grade pump station includes the pump motor control, bubbler level control system and instrumentation equipment. This location is prone to flooding should a piping system failure occur within the below-grade structure. The existing pump motors are floor-mounted and have totally-enclosed fan-cooled (TEFC) enclosures which are not rated for submersion.

The motor control LCP is wall-mounted within the below-grade structure, appears to be relatively new and is in very good condition. NMWD personnel did not report any operational issues with this equipment. The PLC control panel also appears to be relatively new and in very good condition.

The main panelboard located in the below-grade structure includes circuit breakers for supplying power to the pumping equipment, PLC panel, grinders, structure lighting/receptacles and the structure sump pump. This panelboard is in good condition.

Although the electrical equipment and instrumentation located in the below-grade structure is in good condition and has been well maintained, pump station operability is vulnerable to flooding of this structure. The location of the pump LCP, PLC control panel and non-submersible rated motors within the below-grade structure could render the pump station non-operational if there were to be a piping system failure.

North Street Lift Station

According to NMWD personnel, it is likely that this lift station will be eliminated due to planned modifications for the existing sewage collection system underground piping. Thus, the below-grade lift station was not entered and inspected. NMWD personnel reported that the station level sensor is installed in the below-grade structure. The existing PG&E metering enclosure and level controller were inspected (i.e. this equipment is currently housed in a wood cabinet adjacent to the street). This equipment is in good condition and NMWD did not report any operational issues.

Figure 4: North Street Lift Station Level Controller and PG&E Meter

Treatment Ponds

The motor control equipment at the Treatment Ponds is likely 30+ years of age and is obsolete. Despite this obsolescence condition, however, the equipment has been well maintained. Additionally, the motor controller panel construction is quite simple and future retrofitting of failed components within these existing controller compartments can likely be performed without too much difficulty. NMWD personnel reported that reliability of the electrical equipment at this site has been very good and no operational issues currently exist.

The PLC panel at this site is essentially new and in very good condition. NMWD personnel stated that this equipment is working well and no operational issues exist at this time.

Figure 5: Treatment Ponds Motor Controller Compartment

Recommendations

Based on the observations noted during the site investigation, the following recommendations have been developed for consideration:

Recommendation No.1: Oceana Marin Pump Station PG&E Meter/Main Replacement:

As noted, the existing PG&E meter and main circuit breaker enclosures have deteriorated beyond repair and require replacement. It is recommended that an outdoor, 316 stainless steel “meter/main” pedestal be installed within the existing “Doghouse” Shed location (e.g. Tesco pedestal). The pedestal equipment is rated for outdoor use. The 316 stainless steel enclosure coupled with installation within the “Doghouse” Shed will provide prolonged service life in the corrosive, salt air environment. This replacement will not require any modification to the existing PG&E service entrance other than engagement of PG&E to disconnect the existing meter and re-connect the new pedestal meter once it is installed.

The estimated installed cost for this replacement is as follows:

- Demolition of Existing Metering Enclosure and Main Breaker Enclosure: $3,000
- 316 Stainless Steel Pedestal Meter/Main Enclosure: $15,000
- PG&E Cost: $3,000

Recommendation No.1 Total Estimated Cost: $21,000

Recommendation No.2: Relocation of Electrical Equipment to Generator Block Building:

As noted in the discussion above, the existing automatic transfer switch and small panelboard located in the "Doghouse" Shed are prone to salt air corrosion due to the type of construction of the shed. Furthermore, the location of the sewage pump LCP, PLC control panel, bubbler panel and main panelboard are all prone to failure due to below-grade structure flooding. During discussions with NMWD, there seemed to be a comfort level that keeping the flowmeter, grinder LCP and blower equipment in the below-grade structure would be acceptable since the operation of this equipment is not as critical to overall pump station operability as the level control system and sewage pumping.

To mitigate these vulnerabilities, it is recommended that the LCP/PLC/bubbler panel/main panelboard equipment be relocated to the above-grade standby generator block building. Although it may be possible to relocate this equipment to locations within the interior of the existing standby generator block building, a better option would be to build an "add on" room, attached to the above-grade block building.   This new room could essentially become the "Electrical Equipment Room", constructed with block walls and an industrial type personnel door that provides a good seal from the outside elements. Based on preliminary measurements, existing equipment relocation to the interior of the existing standby generator room may not be possible due to National Electrical Code (NEC) clearance requirements. Additionally, the ventilation system within the generator room will expose the electrical panels to outside salt air on a regular basis (i.e. ventilation fan and louver system). Thus, an "add on" room to the existing building is recommended over using existing wall space within the existing standby generator room.

Also included as part of this recommendation is the replacement of the existing ventilation louver and addition of flexible propane fuel piping connections.

Recommendations regarding the existing pumping equipment are included in the Nute Engineering assessment report.

The estimated installed cost for this recommendation is as follows:

- ATS Relocation (from "Doghouse" to Electrical Room): $25,000
- New "Small Panelboard" (to replace panelboard located in "Doghouse"): $5,000
- Pump LCP Relocation: $15,000
- PLC Control Panel Relocation: $10,000
- Bubbler Panel Relocation: $10,000

- Main Panelboard Relocation: $15,000
- Misc. Electrical Costs: $10,000

Recommendation No.2 Total Estimated Cost: $90,000

*** (Note: Electrical Room addition, louver replacement, and flexible fuel piping connection construction costs are included in Nute Engineering report and are not included in the above estimates)*

Figure 6: Possible "Electrical Room" Location (Generator Building West Wall)

<u>Recommendation No.3: Electrical Power System Studies:</u>

Arc flash hazard warning labels are required by NFPA 70E for power distribution equipment to enhance maintenance personnel safety. In order to develop this labeling, power system software modeling and analysis is required utilizing specialized electrical engineering software (i.e. SKM Systems).

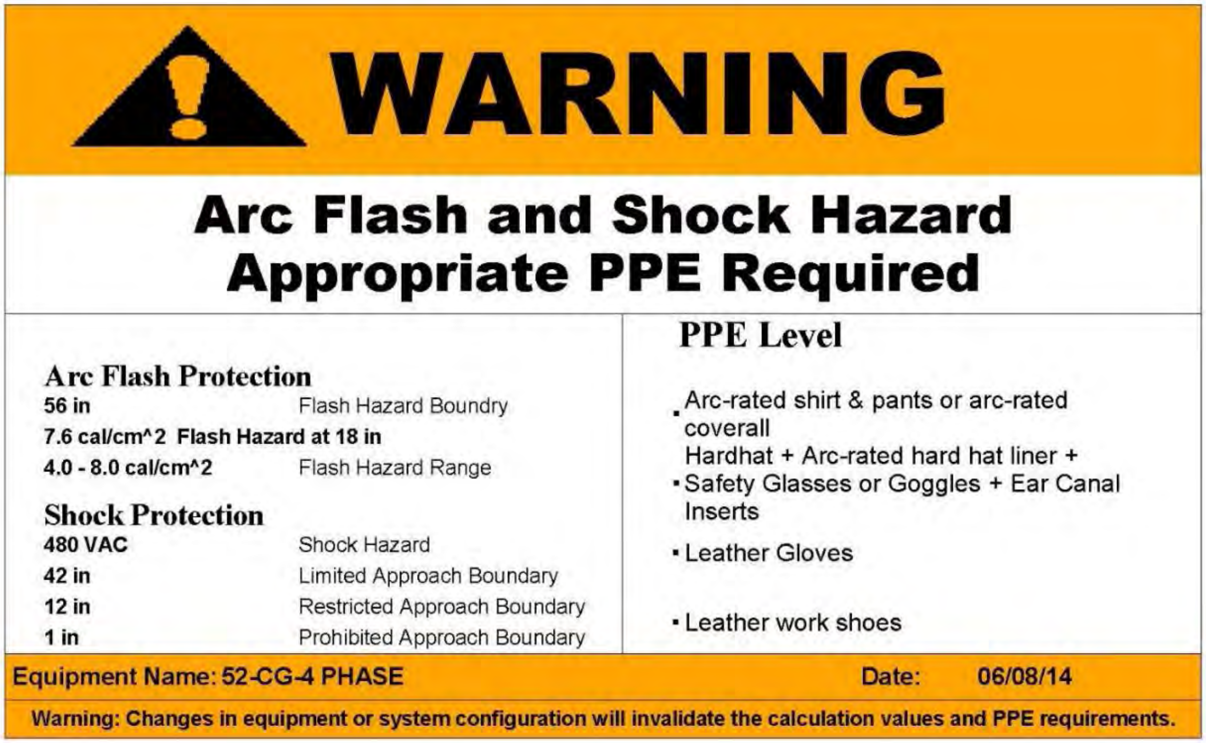


Figure 7: Arc Flash Hazard Warning Label Example

Modeling the existing power distribution systems at the Oceana Marin Pump Station and Treatment Pond sites will involve comprehensive field investigation to determine existing power system equipment ratings, connections, conductor sizes and conductor lengths. Once the systems are modeled within the software, short circuit analyses are performed to determine if the existing, installed equipment is adequately rated to withstand a fault condition at any point in the power system.

After the short circuit analyses are completed, protective device coordination studies and arc flash hazard studies will be performed simultaneously to optimize system protection while minimizing arc flash hazard at all points in each system.

Arc flash hazard warning labels are a code requirement. It is recommended that the District initiate the development of this labeling immediately to warn maintenance personnel about potentially dangerous locations within each facility with respect to electrical equipment arc flash hazard.

The estimated cost for this recommendation is $25,000.

<u>Recommendation No.4: Motor Control Equipment Replacement at Treatment Ponds:</u>

Due to the age of the motor controller equipment at the Treatment Ponds, it is recommended that NMWD include planning within the next 5-year time frame for upgrading the existing motor controls with new equipment.

The estimated cost for this recommendation is $50,000.

APPENDIX F

POND SOUNDINGS

Siphon structure

Storage pond

NW

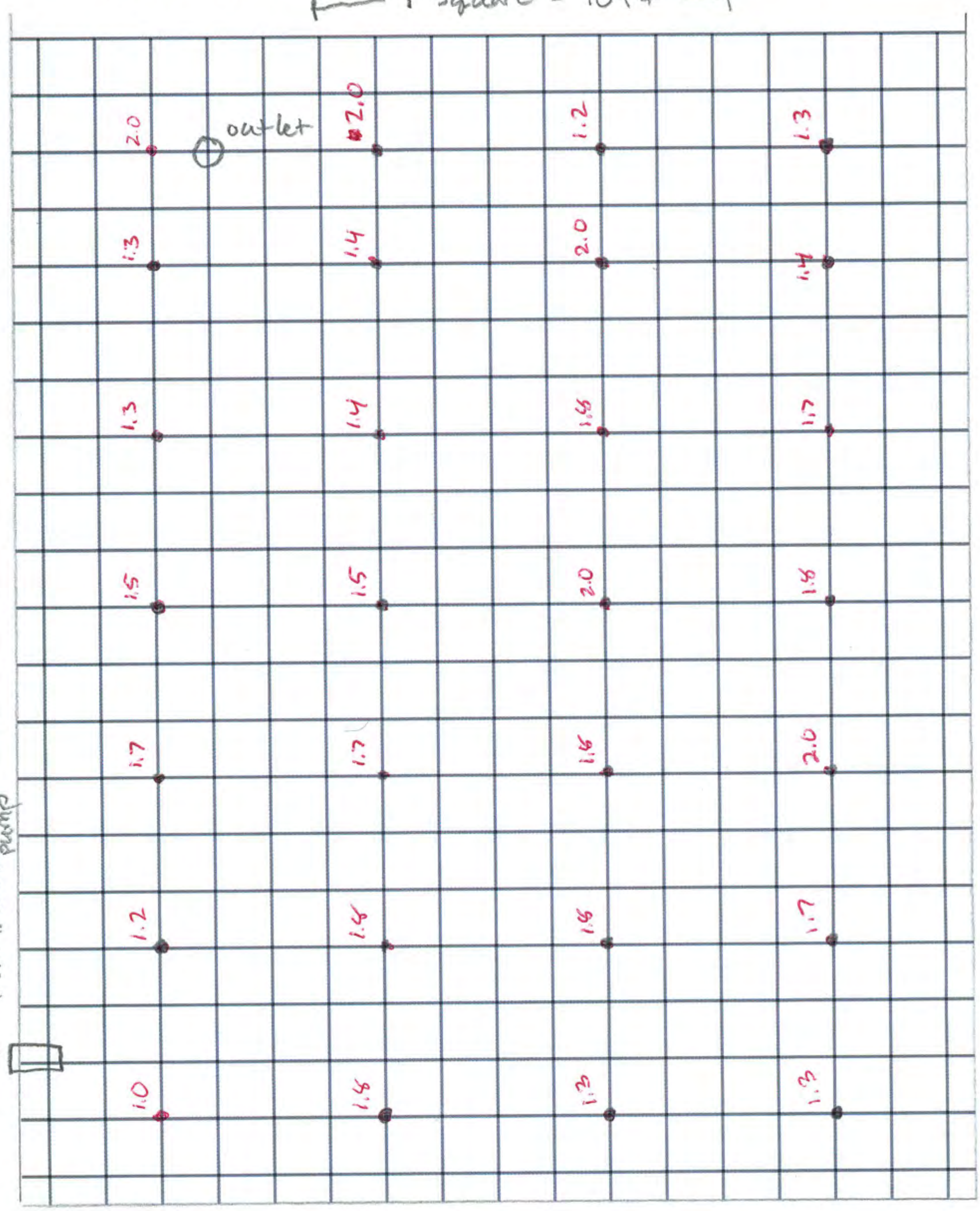
perimeter Lines equal Top of pond berms

1 Square = 10ft

measurements taken on 5/27/15

8' of free board

1 Square = 15ft



Treatment Pond

NW

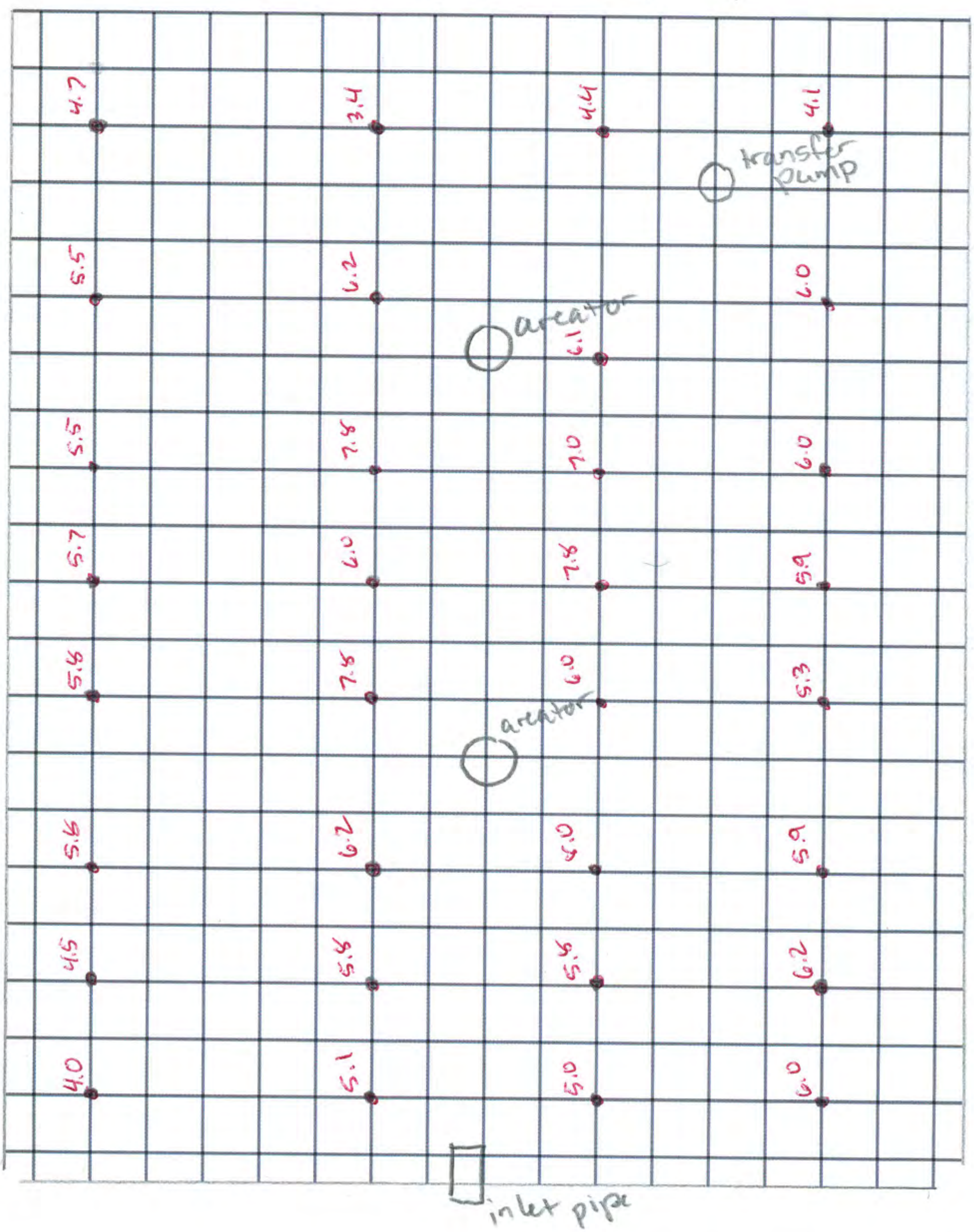
perimeter lines equals TOP of pond berms

Siphon Structure

1 Square = 10 ft

measurements taken on 5-27-15
3.1 ft of free board

1 Square = 15 ft



Center berm

APPENDIX G

AYS ENGINEERING GROUP, INC.
Review of Dispersal Field Oceana Marin Sewer System, Oceana Marin Dillon Beach, California, 5-19-15

Review of Dispersal Field
Oceana Marin Sewer System
Oceana Marin, Dillon Beach California

5-19-15

PO Box 5693, Petaluma, CA 94955, Voice (707) 763-6620, Fax (707) 781-8061

AYS is reporting our review of the dispersal field portion of the sewer collection and treatment system for the Oceana Marin subdivision located in Dillon Beach, California. Our review is part of a larger report for the operators of the sewage system for the subdivision, North Marin Water District. This overall report is to review and update the long range master plan for the sewer facilities. Our work is limited to the dispersal field and its operation. AYS is working with Nute Engineering who is reporting on the sewer system as a whole.

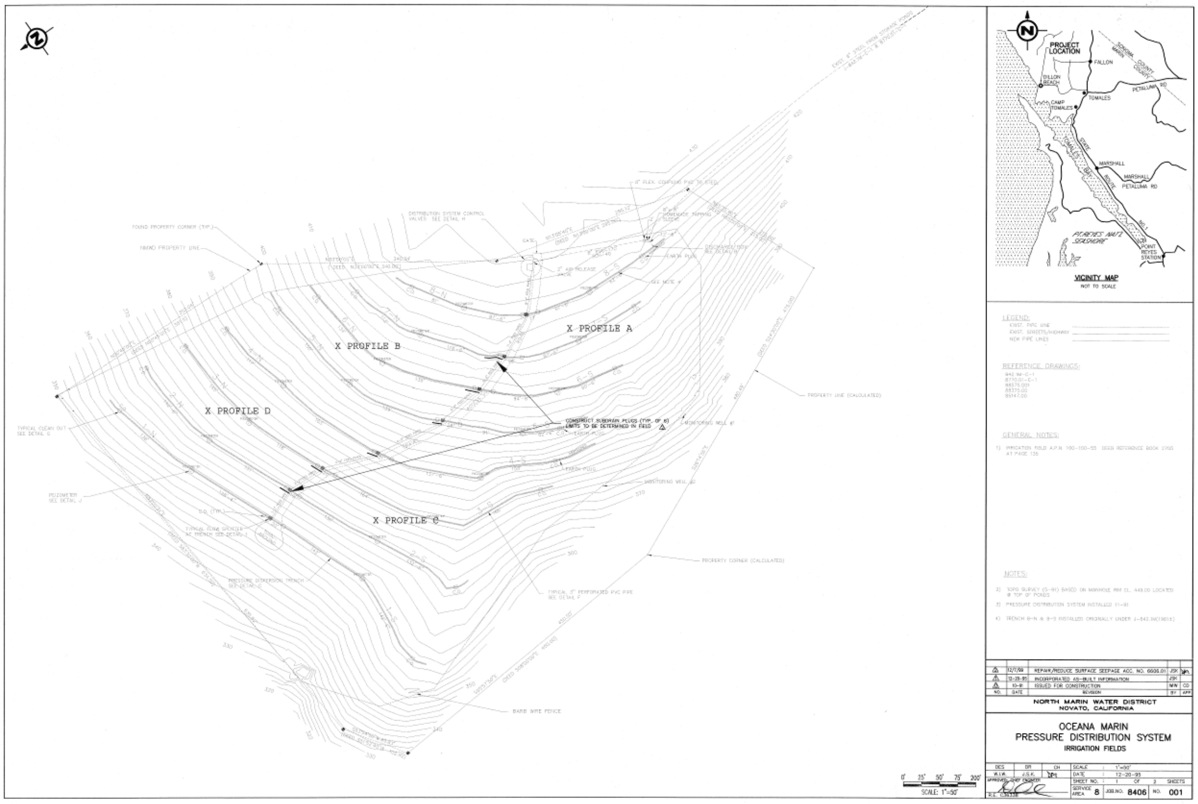
The review team, Nute Engineering and AYS Engineering, met with the North Marin Water Districts personnel 4-16-15 to observe and to review the sewer system for the subdivision. The meeting promptly split up with Ed Nute observing the main pump station and then portions of the sewer collection system and Troy Pearce moving to the dispersal field facility with Vernon Stafford to observe the dispersal field and talk about the operation of the field and how it is conducted. I had already reviewed the "Long-Range Master Plan Update" (Bracewell Engineering December 2005) and had many questions for Mr. Stafford.

The dispersal field is made up of 7 shallow pressure distribution leach lines located in an area with moderately sloping terrain with shallow soils and perched seasonal ground water due to the underlain less permeable clay soils. Another older trench exists at the upper portion of the field which does not match the newer design and is not used as it does not accept much effluent. The dispersal trenches are fed by a dosing siphon with an average dose of approximately 2,200 gallons at an approximate rate of 25 gallons per minute. Effluent is conveyed to each of the 7 operating drain lines for 24 hours and is controlled via an irrigation control panel and automated valves. The individual drain lines average 530 feet long 1.5 feet wide with 24 inches of gravel and 8 inches of soil cover.

The appearance of the drain field looked to be in relatively good condition. Some evidence of cattle in the field was apparent with some of the diversion boxes broken and areas that looked to be trampled in wet conditions. Down slope on the north side of the field showed a small slide that had recently occurred outside of the fence and about 75 to 100 feet from the south end of line #1. The area of the drain field appeared relative dry and was not spongy and no surfacing effluent was apparent.

We rejoined the group at the treatment and storage ponds and to the dosing siphon tanks. The dosing siphon is housed in a concrete cylindrical tank connected to a steel tank just upslope of the dosing chamber. These two tanks connect to act hydraulically as one larger tank. They store effluent from the ponds for a short period of time until the siphon is activated and the dispersal fields are dosed emptying and then refilling via gravity from pipes from the ponds. Staff reports that the steel tank is painted frequently in order to limit corrosion. This area also the injection site for the chlorination system using the tanks as the contact chambers.

At the completion of the tour of the facilities I returned to the dispersal fields and excavated 4- 4" diameter profile holes to a depth of 72 inches to observe the soil conditions at the dispersal field.



Profile A was excavated between drain line 7 and 8 on the South end of the field. The soil was found to have a high clay content very close to the surface and to the total depth of 72 inches. Mottling was noticed with 12 to 24 inched below grade which indicates that this area spends most of the year saturated. Typically areas with these conditions are not good candidates for use as dispersal fields. This may explain why line #8 is not accepting much effluent and is a good reason to abandon this line altogether.

Profile B was excavated between lines 6 and 5 on the north side of the field and found much better soil with 27 inches of very permeable silty loam topsoil over a permeable highly weathered sandstone with no indication of mottling.

Profile C was excavated between lines 2 and 3 on the south side of the field with similar topsoil to 24 inches as in profile B and then a sandy clay that showed some mottling although not nearly as strongly as profile A.

Profile D was excavated between lines 3 and 4 on the North side of the field. The shallow topsoil was very similar to profile B, upslope of it, with a depth of 29 inches then similar soils as B except that they were more clay and had some apparent mottles at 57 inches and deeper. The soil was also moist in this profile possibly as a result of the drain line above having dosed recently.

I would not suggest that my soil work be completely satisfactory for design level work but they do give an indication to the workings of this system. The soils found here are not ideal for use as a drain field by today's standards. The soil found would not be allowed for use as a septic system of this design for residential use. We would only be able to use mound type septic system in this area with the exception of the area surrounding Profile B which may support a cover fill or shallow pressure distribution type system limited in depth of trench to 36 inches or so (this matches your current design) but in the other areas we would be forced to utilize mound type system in order to satisfy the vertical setback of 36" to suitable soil or ground water. This may be one of the reasons why you are mandated to chlorinate your effluent before dispersing in the field. Attached is the map of the profile holes that were excavated.

I requested as much piezometer well monitoring data as I could get in order to review and summarize this data to determine if any trends could be noticed as to the overall permeability of the soils in the dispersal area. Studies show that permeability of the soils surrounding the trenches of dispersal fields lose permeability over time. This loss varies widely from a very little loss over time with fresh water to clogging being more aggressive with higher strength waste streams. The clogging mechanism appears to be a byproduct of the microbes that aid in the cleansing of effluent. Higher strength waste streams seem to accelerate the clogging process as does high hydraulic loading, less permeable soils and anaerobic soil conditions brought on by ponding effluent inside of the drain field trenches. Current design standards tend to encourage aerobic soil conditions by limiting the use of less permeable soil, using the generally more permeable soil closer to the surface grade and to dose each trench in as small a dose as possible while still providing enough flow to pressurize the laterals of the trenches.

I have not come across much information as to what effect using chlorinated effluent has on the slowing permeability over time effect but would think that with the small residual that you aim for in the field will have a negligible effect on both the beneficial microbes in the soil as well as the anaerobic microbes which appear to have been blamed for the decrease in permeability.

I have been provided the piezometer data from the years '03 and '04 as well as '14 and '15 for my review. While this is not all of the information you have for the dispersal field it does show quite a bit of change over the years in the operation of the dispersal field and gives enough insight to the operation to make some recommendations for the continued operation of the system.

The piezometer data is recorded largely weekly when the dispersal field is in operation. Staff tells me that the system was operated in a manual fashion in the past and I have to assume that the earlier data was during this period of manual operation or that the fields were operated until it was noticed that they were filled and then the next line was put into service. I would also think that this must have been done on a weekly basis.

An irrigation controller and automated valves were more recently added to the system allowing each of the lines to be dosed for a 24 hour period and then taken out of service with the next line is sequence going into service. The more current data ’14 and ’15 show a more even loading that is more consistent with current design standards of smaller more controlled dosing.

There are clearly differences in the data for this two time periods. One is the current drought conditions for Northern California compared to the normal rainfall totals for the ’03 and ’04 seasons. The other difference is the automated dosing of the more current data versus the manual dosing of the lines during the ’03 ’04 seasons.

I would consider hydraulic overloading of a leach line to occur when it is loaded so heavily that the effluent reaches the cover of the trench. I would say that a system is normally loaded when water reaches the mid point of the effect wall of the trench or the middle of the rock section of a dispersal trench. If we look at the two periods of ’03 and ’04 versus the ’14 and ’15 seasons we see a pretty big difference. The ’03,’04 seasons show hydraulic overloading occurring in 34.82 percent of all the piezometer reads as opposed to 14.76 percent for the more recent period. The difference probably is not due to just the automation of the system but also the drought and also your continued effort to correct infiltration though the conveyance system.

I also received NMWD’s Operations worksheets which show the gallons through the system. The gallons that were conveyed to the dispersal field are represented along with the doses and the meter reads. I received this information for the ’14, ’15 season and not the earlier period with the provided information. It is a simple task to arrive at the gallons per day for which the system is loaded during the monitoring period. This is shown on the attached spreadsheet for the piezometer readings and the data included from the operations worksheet for the loading to the dispersal field.

The data from the piezometer reads and the data from the operation worksheet for the dispersal field loading are the best information available to estimate the effectiveness of your dispersal field. Even with the limited information NMWD has provided it gives some insight to how the system is working. You can, with enough information, also determine the amount of effluent the field can disperse without adverse effect by looking at the loading versus the overall effluent level through the field. Weather, of course, has a great deal to do with the effectiveness of the dispersal field and is not part of the recorded data. Inferences from this data also can be made of the effective infiltration of each of the lines during wet and dry periods with a little more effort.

If rainfall data, such as weekly totals, could make this data even more useful a tool for the determining the basic health of the dispersal field. One could determine how the field reacts to high loadings during both wet and dry weather although it seems that your operation of the dispersal field are mostly a dry weather occurrence.

Recommendations:

I would strongly recommend that someone responsible for the dispersal field be given the task of entering all of your data from the dispersal field piezometers including the active dispersal trench and the loadings from the operations worksheets to a simple spreadsheet; this along with rainfall data would give NMWD the best indicator of the relative health of the dispersal field. While this spreadsheet is not going to be able to predict with certainty your ultimate capacity it will help toward it by showing how much effect wastewater loading and rainfall effects your overall piezometer levels. The spreadsheet also can show if any decreases over time are appearing in year over year changes. This task would be best for whoever is responsible for the monitoring as it will give them insight to the operation of the system acting like a fuel gauge in a car and the data should be reviewed at first every quarter while the system is in operation.

The cows should be restricted from the dispersal field especially in the wet season weather the field is in operation or not. With only 8 to 12 inches of cover this is especially important to keep the effluent in the trenches not on the surface. Cattle also can cause compaction of the surface of the field especially when wet limiting gas transfer to the trenches which can promote the anaerobic conditions that must be avoided to extend the useful lifespan of the system to its maximum.

The slide adjacent (downslope of the field) should be looked at by a geotechnical engineer to see how much a problem it may be. It also appears to be off the property which may complicate things. I cannot say if the slide has occurred due to the use of the area upslope of it as a drain field. I can say, however, that the hydraulic loading of this area did not help stabilize the area. If the slide area is on another property it may be wise to notify the owner if this has not been done.

The minor corrective work to the distribution boxes that are broken should be corrected but as time allows as it is not an emergency.

I would suggest that you consider reducing the time each line is in service from 24 hours to 12 hours. I would also suggest this be done as a trial while increasing the monitoring (and recording in the spread sheet) to twice weekly. I would expect the hydraulic overloading of each trench to be reduced even more than the 3.5 percent of the reads noticed during the ’14, ’15 season.

During the above period I would also suggest that one of the lines be taken out of service for a period of a month to allow it to rest while watching the rest of the field to see how the increase in effective loading to the remaining lines is tolerated. If this is tolerated during the trial I would suggest that each season one of the seven lines be rested to reduce any bio-slime buildup aiding in the longevity of the system. The data(spreadsheet) for this period should be reviewed carefully to determine if the dosing regimen and the resting of one of the lines should be continued. We will need a good amount of data to see the effects in the system.

The last recommendation would be to come up with a system upgrade/ failure plan. The dispersal field has a huge spacing between individual lines. Normal residential spacing is 7.5 to 10 feet. The spacing between lines in the dispersal field is much greater than this some approaching 50 feet or more. Should the lines of the system begin to fail individually or collectively it could be reinstalled in the space between lines provided this is agreed to by Regional Water Quality Control Board. I would even suggest that this be negotiated now for the future. They may not agree to ahead of time as they may want to see if better treatment / dispersal technology would be more appropriate in the future but it would be wise to start the planning in the event that this system develop issues over time. Your spreadsheet review will be your best tool in estimating how your system is doing. When your year over years indicate that the effluent levels in the piezometer are not dropping at rates shown in the past then it will be time to come up with your replacement plan. With proper management if is feasible that this system could last for a very long time but even with our best efforts dispersal fields can start developing issues over time.

Date	1A	1B	2A	2B	3A	3B	4A	4B	5A	5B	6A	6B	7A	7B	Active	Sump	Cl2	Meter gal	GtF		DtF	Rate	Notes
						inches from grade																	
Tot Depth	36	34	34	38	36	34	32	26	33	25	33	34	32	31									
9/18/2002	dry	dry	32	dry	31	dry	19	28	12	11	7	11	14	13		52	0.5						
3/5/2003	dry	dry	26	dry	24	dry	21	dry	29	30	8	13	17	20		51	1.8						
3/12/2003																51	0.4						No inspection because of impending storm.
4/17/2003	35	35	19	34	19	30	15	24	23	23	2	13	17	16		51	.7/1.35						
5/14/2003	dry	dry	dry	dry	27	dry	15	dry	28	23	4	13	18	16		50	1						
5/21/2003	dry	dry	21	dry	22	26	14	18	31	28	dry	dry	dry	dry		50	0.8						Excellent condition
5/30/2003	dry	dry	dry	repair	dry	dry	dry	dry	25	20	22	19	16	16		53							
6/4/2003	dry	dry	dry	dry	31	dry	18	dry	23	26	9	9.5	17	15		51							
6/11/2003	34	dry	21	dry	18	18	11	17	26	25	dry	dry	dry	dry		50							
6/25/2003	29	dry	9	30	13	15	dry	dry	dry	dry	dry	dry	dry	dry		52	not done						
7/9/2003	dry	dry	9	off	14	29	dry	dry								49	0.14						
7/16/2003	dry	dry	26	31	13	15	9	16	19	22	dry	dry	dry	dry		52	0.7						
7/23/2003	dry	dry	28	dry	31	dry	18	27	16	19	8	12	16	16		52	0.4						
7/30/2003	28	dry	8	29	15	16	dry	dry	dry	dry	dry	dry	dry	dry		48							
8/6/2003	dry	dry	32	dry	28	32	17	dry	20	23	3	5	12	12		51	0.44						
8/13/2003	26	dry	6	30	14	14	dry	dry	dry	dry	29	dry	dry	dry		50	0.2						
8/20/2003	dry	dry	dry	dry	27	dry	17	dry	19	24	6	7	15	14		50	0.91						
8/27/2003	25	dry	2	dry	15	14	dry	dry	dry	dry	dry	dry	dry	dry		52	0.16						
9/3/2003	32	dry	8	32	12	11	7	12	13	17	dry	dry	dry	dry		49	not done						
9/10/2003	dry	dry	17	dry	25	29	17	dry	12	13	3	7	13	14		51	0.7						Field soggy at 7N and 6N water seeping down road 7N to 5S Rained day before.
9/17/2003	26	dry	5	32	13	13	dry	dry	dry	dry	dry	dry	dry	dry		49	0.3						
9/24/2003	35	0	8	off	12	11	11	14	17	15	29	0	0	0		50	0.23						
10/1/2003	dry	dry	dry	dry	29	dry	12	16	11	9	3	6	10	13		49	out						
10/8/2003	25	0	4	31	12	12	0	0	0	0	31	31	0	0		49	1						
10/15/2003	dry	dry	19	dry	12	12	10	13	16	17	dry	dry	dry	dry		51	1.2						
10/22/2003	dry	dry	17	dry	28	dry	28	dry	15	17	6	10	13	12		50	not done						A few soggy spots lines 6-7 middle
10/29/2003	dry	dry	29	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry		51							Turned off for season
2/25/2004	31	26	7	23	9	10	3	7	8	9	4	5	14	8		44							field very wet and soggy from discharge and heavy rain
3/3/2004	29	dry	14	31	17	17	5	11	28	27	28	30	dry	dry		39	>2.2						
3/10/2004	32	dry	14	dry	7	dry	16	dry	18	27	10	14	20	18		N/A	1.5						
3/17/2004	27	dry	12	31	18	18	dry	dry	dry	dry	dry	dry	dry	dry		41	1						Wet area below 2N
3/24/2004	33	34	16	31	17	17	15	18	32	30	32	33	33	31		47	1.57/2.00						
3/31/2004	32	34	16	34	18	29	14	24	21	28	10	15	18	18		47	0.78						
4/7/2004																43	0.25						
4/14/2004	34	34	16	34	18	23	16	28	25	32	8	14	17	18		48	1.02/1.82						
4/22/2004	28	dry	7	31	15	15	dry	dry	dry	dry	dry	dry	dry	dry		44	1.2						
4/28/2004	34	34	24	34	22	34	14	27	26	27	5	11	14	15		48	.60/1.2						
5/5/2004	dry	dry	11	31	14	14	8	12	17	17	dry	dry	dry	dry		49	0.4						
5/12/2004	25	dry	5	31	12	11	dry	dry	dry	dry	dry	dry	dry	dry		46	0.66						Soggy aroune #2N
5/20/2004	34	34	30	34	26	34	18	27	28	34	2	4	14	16		51	.21/1.58						
5/26/2004																	not done						Not inspected just rotated trenches
overloaded	0	2	22	1	22	16	22	14	15	12	17	18	17	17			195	40	14		560	34.82%	

_	1A	1B	2A	2B	3A	3B	4A	4B	5A	5B	6A	6B	7A	7B	Sump	Cl2	Meter gal	GtF	gall/day	DtF	Rate	Notes
						inches from grade																
Tot Depth	36	34	34	38	36	34	32	26	33	25	33	34	32	31								
4/16/2014	32	28	22	33	17	14	12	12	32	33	29	32	off	off	32	0.57	69117.339	221088	31,584.00	105	23	
4/22/2014	33	35	22	31	26	34	26	20	15	17	30	34	32	32	36	1.37	69298.216	180877	30,146.17	86	22	Standing water at sump
4/30/2014																	69298.216	0		0	0	No flow to fields
5/7/2014	36	34	34	38	36	34	32	26	33	25	33	34	32	31	42	off	69300.118	2		0	0	All Fields dry
5/14/2014	23	30	34	34	34	35	27	25	30	35	30	32	33	32	42		69494	194152	27,736.00	99	19.5	
5/21/2014	34	34	31	32	32	30	35	33	25	30	33	30	24	16		0.73	69681	187000	26,714.29	94	14.6	
5/28/2014	35	32	26	33	35	34	16	12	33	35	30	34	32	32	36	1.02	69842	161000	23,000.00	91	17.9	
6/4/2014	35	34	33	34	30	31	28	24	17	18	33	34	32	32	39	8.8	69998	156000	22,285.71	80	18.6	
6/11/2014	35	34	34	34	35	33	29	25	28	32	3	10	32	32	40	8.8	70143	145000	20,714.29	82	15	
6/18/2014	35	35	34	34	35	33	30	25	31	34	24	23	28	26	42	6.5	70291	148000	21,142.86	76	12.5	
6/25/2014	34	34	34	34	36	35	32	25	33	35	33	32	32	32	42	>20	70331	40000	5,714.29	24	2.1	Turned off discharge to fields
7/2/2014															dry	no dischrg	70331	0		0	0	No discharge
7/16/2014															52	off	70331					
7/23/2014																no dischrg	70331					
7/30/2014																	70331					
8/2/2014																	70339	8000	2,666.67		25	
8/13/2014	34	34	31	34	34	33	31	25	24	26	34	34	31	31	43	0.6	70493	154000	14,000.00	83	15	Water boiling up out of hole by Sta 5. Cows in field
8/20/2014	35	34	33	32	35	33	29	27	33	34	16	19	32	31	44	0.4	70627	134000	19,142.86	75	14	
8/27/2014	35	34	26	34	25	34	25	20	33	35	34	34	32	32	36		70733	106000	15,142.86	59		
9/3/2014	35	36	34	34	35	30	32	29	32	35	32	39	32	32	44	off	70789	56000	8,000.00	27	off	discharge to field off
9/10/2014																	70789	0		0	0	
9/17/2014																	70789	0		0	0	
9/24/2014															58	off	70789	0		0	0	
10/1/2014																	70789	0		0	0	
10/8/2014																	70789	0		0	0	
10/15/2014	35	35	35	32	35	35	29	25	33	38	33	35	32	35	71	1.83	70864	75000	10,714.29	41	20	
10/22/2014	35	35	35	32	35	35	30	25	33	35	33	35	32	31	60		70915	51000	7,285.71	27	13	
10/28/2014	35	35	34	34	35	34	32	25	34	34	20	25	32	31	50	4.2	71001	86000	14,333.33	45	9	
11/5/2014																0.1	71171	170000	21,250.00	86	16	Cows in field
11/12/2014	35	31	34	34	36	32	24	29	33	36	21	30	32	32	48	1.08	71324	153000	21,857.14	79	15	
11/20/2014																	71515	191000	23,875.00	92	8	#5 box crushed full of water, 4B mushy cows inside

11/26/2014																	71515	0		0	0	
12/3/2014																	71516	1000	142.86	1		
12/10/2014																off	71516	0		0	0	Bull inside, no standing water
12/17/2014																	71516	0		0	0	
12/23/2014																	71516	0		0	0	
Date	**1A**	**1B**	**2A**	**2B**	**3A**	**3B**	**4A**	**4B**	**5A**	**5B**	**6A**	**6B**	**7A**	**7B**	**Sump**	**Cl2**	**Meter**	**GtF**	**gall/day**	**DtF**	**Rate**	**Notes**
							inches from grade										**gal**					
Tot Depth	36	34	34	38	36	34	32	26	33	25	33	34	32	31								
1/2/2015																	71516	0		0	0	
1/7/2015	34	34	32	34	35	34	28	25	29	30	7	11	31	31	40	2.2	71666	150,000.00	30,000.00	72	23	Standing water in hoof prints in field 6
1/14/2015	34	34	30	26	34	32	26	31	17	10	18	20	4	10	44	.	71957	291,000.00	41,571.43	114	35	
1/21/2015	17	20	23	34	34	33	19	16	22	26	19	15	29	32	38		72296	339,000.00	48,428.57	120	28	
1/26/2015	26	29	20	23	27	30	11	10	33	36	29	31	32	32	31	0.5	72508	212,000.00	42,400.00	79	28	
2/4/2015	33	dry	32	30	dry	dry	30	dry	dry	dry	35	dry	34	34	30	1.44	72884	376,000.00	41,777.78	143	30	Fields soaking wet, probably from cows, turning off irrigation because of storm coming.Large slide below sump
2/11/2015	29	dry	20	31	31	32	24	24	24	33	21	21	dry	dry	30		72884	off		0	0	Lots or cow evidence still mushy, starting to dry out after storm
2/18/2015	33	dry	32	30	dry	dry	30	dry	dry	dry	35	dry	34	34	38		72884	0.00		0	0	Starting to dry out, Trench 4 south has lost 11" of Pizo depth now measures 25" top to bottom
2/25/2015	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	44		72884	0.00		0	0	No water in any field all in good condition, Irrigation restarted #4 first field
3/4/2015																none	73138	254,000.00	36,285.71	111		replaced hydro pump
3/11/2015	34	34	27	34	32	34	28	25	34	29	11	10	32	32	40	.85/2.2	73287	149,000.00	21,285.71	82		
3/18/2015	dry	dry	dry	dry	dry	dry	26	dry	20	25	20	21	16	16	43	1.1	73498	211,000.00	30,142.86	100	25	
3/25/2015	19	27	33	dry	dry	dry	28	dry	30	28	26	26	24	28	N/A	na	73701	203,000.00	29,000.00	101	25	Good condition, cows getting in sometimes.
4/1/2015	31	36	12	15	36	33	32	25	33	32	28	30	32	31	36	2.2	73890	189,000.00	27,000.00	N/A	19	
4/8/2015																	73961	71,000.00	10,142.86	141	0	
4/15/2015																	73961	0.00		0	0	Field is off
4/22/2015																	70961	0.00		0	0	
	3	1	5	2	1	1	6	7	6	3	11	9	4	3	62	30	14	420		14.76%		

Appendix H

Element 9 (Monitoring, Measurement, Modifications) Placeholder for Future Supporting Documents

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Appendix I

Element 10 (SSMP Audits) Supporting Documents

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North Marin Water District – Oceana Marin Sewer
SSMP Change Log

Date	SSMP Element	Description of Change/Revision Made	Change Authorized by

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North Marin Water District
SSMP Audit Report Form

Audit Period Covered: January 2018 through December 2019

Audit completed by: V.W. HOUSEN & ASSOCIATES on 08/11/2020

Introduction		Yes	No
Is the current system description complete and up to date? Are all infrastructure statistics current and complete?			X
Discussion: The current SSMP does not include a system description or map. The District should add these components, as well as overall infrastructure statistics.			
Element 1 – Goals		**Yes**	**No**
A	Are the goals stated in the SSMP still appropriate and accurate?		X
Discussion: The District bases this Element on its Mission Statement rather than discussing the goals recommended by the Statewide WDR. The District should restate goals specific to sewer system management, following the SWRCB guidelines. Additionally, District metrics, such as response time can be discussed under the relevant subsequent SSMP element.			
Element 2 -- Organization		**Yes**	**No**
A	Is the Contact Information current?		X
B	Is the Sanitary Sewer Overflow Responder List current?		X
C	Is the Organization Chart in Figure 2-1 of the SSMP current?		X
D	Are the position descriptions an accurate portrayal of staff responsibilities?	X	
E	Is the chain of communication for reporting and responding to SSOs accurate and up-to-date?		X

Discussion:

A & B: There is no Contact Information included in the current SSMP. District Staff have changed and position holder names should be updated, along with phone numbers.

C: The position titles are accurate, but position holders should be updated.

D: Position descriptions and responsibilities are assumed to be correct, but will be reviewed during the upcoming SSMP update.

E: The current chain of communication is vague; this section requires more information, including communication flowcharts.

	Element 3 – Legal Authority	**Yes**	**No**
	Does the SSMP contain current references to the District's Code documenting it's legal authority to:		
A	Prevent illicit discharges?		X
B	Require proper design and construction of sewers and connections?		X
C	Ensure access for maintenance, inspection, or repairs for portions of the lateral owned or maintained by the District?		X
D	Limit discharges of fats, oil and grease?		X
E	Enforce any violation of its sewer ordinances?		X
F	Were any changes or modifications made in the past year or since the last SSMP audit to District Ordinances, Regulations, or standards?		X

Discussion:

A: There is no discussion or reference to NMWD code documenting its legal authority to prevent illicit discharges.

B: There is no discussion of NMWD code documenting its legal authority to require proper design and construction of sewers and connections.

C: No specific code is cited discussing access for maintenance, inspection or repairs. The District does not own or maintain private laterals

D: Section IV of the current SSMP briefly mentions the FOG program in place, stating that "consists only of an annual clean out of the primary lift station wet well and grit chamber." Fats, oils, and grease are not mentioned otherwise.

E: There is no discussion of enforcement policy for violations of sewer ordinances.

Element 4 – Operations and Maintenance		Yes	No
Collection System Maps			
A	Does the SSMP reference the current process and procedures for maintaining the District’s sanitary sewer system maps?		X
B	Are the District’s wastewater collection system maps complete, current, and sufficiently detailed?	X	
Prioritized Preventive Maintenance			
C	Does the SSMP describe current preventive maintenance activities and the system for prioritizing the cleaning of sewer lines?	X	
D	Based upon the SSO information in CIWQS and the Annual SSO Report, are the District’s preventive maintenance activities sufficient and effective in minimizing SSOs and blockages?	X	
Rehabilitation and Replacement Program			
E	Is there an ongoing condition assessment program sufficient to rank the condition of sewer pipes and schedule rehabilitation? Are the current components of this program documented in the SSMP?		X
F	Does the rehabilitation and replacement plan include a capital improvement plan that addresses proper management and protection of the infrastructure assets? Does the plan include a time schedule for implementing the short and long-term plans plus a schedule for developing the funds needed for the capital improvement plan?		X
Contingency Equipment and Replacement Inventory			
G	Does the SSMP list the major equipment currently used in the operation and maintenance of the collection system?		X
H	Are contingency equipment and replacement parts sufficient to respond to emergencies and properly conduct regular maintenance?	X	
Training			
I	Are the training records current?		X
J	Does the SSMP document current training expectations and programs?		X
Discussion:			

A & B: The current SSMP only lists the server location of the maps that were current at the time. The maps were not included in the SSMP. It is assumed that the maps are current. However, this will be confirmed during the upcoming SSMP update. The District should discuss how it updates system maps, how often these updates occur, and who is implementing the updates. The SSMP should also discuss the software, such as GIS, in which these maps exist.

C: The current SSMP states that a third party is contracted for maintenance work within in the collection system. The District should include a more thorough description of routine preventative operation and maintenance activities, including a system for scheduling regular maintenance and cleaning. The District should include details such as how long the program with the contracted party has been in place and whether or not the program has changed to accommodate the system necessities. The current SSMP states that the current agreement is attached but no attachment is available, and thus was not reviewed for content. This agreement may also have been updated since the last SSMP audit.

D: CIWQS reports only three SSOs since 2009; two spills occurring in 2009 and 2013 were caused by maintenance issues such as roots and debris, and one SSO that occurred in 2015 was due to a structural failure. The District’s Sewer System Operations and Maintenance Plan was not included and thus was not reviewed for content. However, based on SSO records, it does appear that sewer management methods are effective at controlling SSOs.

E & F: Section VI of the SSMP briefly mentions an annual infiltration and intrusion inspection program which includes a CCTV inspection of the entire system every five years. The District should include more discussion about this program and how pipes are regularly being assessed for risk. No discussion of a rehabilitation and replacement program was included in the current SSMP the District should include a description of the current CIP program. The SSMP references an attachment that includes a CIP for a five-year period, but no document was accessible for this audit. Further review of the CCTV database and the District’s CIP and budget may result in adjustments to audit findings.

G & H: The District should include equipment and replacement part inventories. Based on the limited number of SSOs, and absence of recent SSOs, it appears that available equipment is sufficient.

I & J: No training document was attached, and thus not reviewed for content. Training objectives, programs, and records should be included in the SSMP.

Element 5 – Design and Performance Standards		Yes	No
A	Does the SSMP reference current design and construction standards for the installation of new sanitary sewer systems, pump stations and other appurtenances and for the rehabilitation and repair of existing sanitary sewer systems?	X	
B	Does the SSMP document current procedures and standards for inspecting and testing the installation of new sewers, pumps, and other appurtenances and the rehabilitation and repair of existing sewer lines?		X
Discussion: Section VII references specifications that can be found at the Main District office, but these documents were not reviewed for the purpose of this audit. These documents should include standards for design criteria, and procedures for construction, inspecting and testing.			

Element 6 – Overflow and Emergency Response Plan (OERP)		Yes	No
A	Does the District's OERP contain proper notification procedures so that the primary responders and regulatory agencies are informed of all sanitary sewer overflows (SSOs) as required by the WDR and MRP?		X
B	Does the OERP have a program to ensure an appropriate response to all overflows?		X
C	Does the OERP contain procedures to ensure prompt notification to appropriate regulatory agencies and other potentially affected entities of all SSOs that potentially affect public health or reach waters of the State in accordance with the MRP? Does the SSMP identify the officials who will receive immediate notification of such SSOs?		X
D	Are staff and contractor personnel aware of and appropriately trained on the procedures of the OERP?	NA	NA
E	Does the OERP contain procedures to address emergency operations such as traffic and crowd control and other necessary response activities?		X
F	Does the OERP ensure that all reasonable steps are taken to contain and prevent the discharge of untreated and partially treated wastewater to waters of the United States and to minimize or correct any adverse impact on the environment resulting from SSOs, including such accelerated or additional monitoring as may be necessary to determine the nature and impact of the discharge?		X
G	Considering SSO performance data, is the OERP effective in handling SSOs in order to safeguard public health and the environment?	X	
H	Is the Water Quality Monitoring Plan current and has it been trained on		X

	and practiced by staff that would be involved in a SSO of large volume?		
I	Was sampling conducted within 48 hours for all SSOs greater than 50,000 gallons and were results entered for these SSOs through the CIWQS website?	NA	NA
J	Has the District prepared a Technical Report for all SSOs larger than 50,000 gallons? Have all Technical Reports been filed on the CIWQS website as required?	NA	NA

Discussion:

The SSMP includes a separate Emergency Operations Plan for SSOs labeled “SECTION 7D.” This plan will be reviewed with staff during the upcoming SSMP update to confirm that the described processes are current.

The current SSMP OERP should be updated to include the District’s response protocols, and should include information such as proper notification procedures, and a detailed explanation of who to notify at all times of the day and week if a spill occurs. The current plan must discuss prompt notification to appropriate regulatory agencies and other potentially affected entities such as health agencies, regional water boards, water suppliers, etc. There is currently no discussion of procedures to address emergency operations such as traffic and crowd control.

Considering SSO performance data, emergency response procedures in use but not documented in the OERP appear to be sufficient.

	Element 7 – Fats, Oils, and Grease (FOG) Control Program	**Yes**	**No**
A	Does the Fats, Oils, and Grease (FOG) Control Program include a description of public education outreach efforts that promote proper handling and disposal of FOG?	NA	NA
B	Does the FOG program include a plan for the disposal of FOG generated within the sewer system service area?	NA	NA
C	Does the District have sufficient legal authority to prohibit discharges to the system and identify measures to prevent SSOs and blockages caused by FOG?	NA	NA
D	Are there requirements to install grease removal devices (such as traps or interceptors), best management practices (BMP) requirements, record keeping, maintenance requirements and reporting requirements established in the District’s FOG Control Program?	NA	NA
E	Does the District have authority to inspect grease producing facilities and have sufficient staff to inspect and enforce the FOG ordinance?	NA	NA
F	Does the FOG control program identify sections of the collection system subject to FOG blockages, establish a cleaning schedule and address source control measures to minimize these blockages?	NA	NA

G	Does the FOG control program implement source control measures for all sources of FOG discharged to the collection system?	NA	NA
H	Is the current FOG program effective in minimizing blockages of sewer lines resulting from discharges of FOG to the system?	NA	NA

Discussion:

The SSMP states that no FOG program is necessary since the service area has no commercial services. Based on SSO history, a FOG program is not required. However, this will be confirmed and discussed in the upcoming SSMP update.

Element 8 – System Evaluation and Capacity Assurance Plan		**Yes**	**No**
A	Does the System Evaluation and Capacity Assurance Plan evaluate hydraulic deficiencies in the system and provide estimates of peak flows associated with conditions similar to those causing overflow events, if applicable?		X
B	Does the District's capital improvement program (CIP) establish a schedule of approximate completion dates for both short-term and long-term improvements and is the schedule reviewed and updated to reflect current budgetary capabilities and activity accomplishment?		X
C	Does the District take steps needed to establish a short and long-term CIP to address hydraulic deficiencies, including prioritization, alternatives analysis, and schedules? Are repair and replacement projects developed based upon condition assessment and/or field maintenance results?	NA	NA

Discussion:

The District mentions a long-range plan that can be obtained at the Main District Office and does not appear to have a formal capacity assurance plan; however, there have been no reported SSOs related to wet weather capacity issues according to CIWQS.

The District should complete a SECAP which includes a more developed hydraulic analysis of the system's flows.

The SSMP did not currently include a Capital Improvement Program, and since there have been no capacity-related SSOs in the last ten years, the necessity of a CIP should be decided by District staff. It is advised that the District develop a plan to address identified existing or potential problem areas within the system, if any.

Element 9 – Monitoring, Measurement, and Program Modifications		**Yes**	**No**
A	Does the District maintain relevant information that can be used to establish and prioritize appropriate SSMP activities?		X
B	Does the District monitor the implementation and, where appropriate,		X

	measure the effectiveness of each element of the SSMP?		
C	Does the District assess the success of the preventive maintenance program?		X
D	Does the District update program elements, as appropriate, based upon monitoring or performance evaluations?		X
E	Does the SSMP identify and illustrate SSO trends, including frequency, location and volume of SSOs?		X

Discussion:

The SSMP does not provide metrics by which the District measures success of the SSMP or sewer system management. The District should assess the success of the preventative maintenance program and monitor the implementation and effectiveness of each element of the SSMP, as well as update program elements based on these performance evaluations.

	Element 10 – SSMP Audits	**Yes**	**No**
A	Does the audit focus on the effectiveness of the SSMP? If not, what needs to be changed to increase the effectiveness of the overall collection system program?	X	
B	Were the audit results shared with the District Board? And the public, via the District website?	X	
C	Will the SSMP Audit be completed, reviewed, and filed as an Appendix to the SSMP on a biennial basis?	X	
D	Do any proposed changes to the SSMP require Board approval as they have a substantial change in the policies and procedures for collection system operations and maintenance?	X	

Discussion:

An updated SSMP, which will include these Audit results, will be shared with the public via Board discussion and action.

	Element 11 – Communication Program	**Yes**	**No**
A	Does the District communicate on a regular basis with the public and other agencies about the development and implementation of the SSMP? Does the communication system provide the public the opportunity to provide input as the program is developed and implemented? Were annual progress reports and metrics of implementation of the SSMP provided to the District Board?	X	

Discussion:

The SSMP is currently available on the District's website.

Change Log		Yes	No
A	Is the SSMP Change Log current and up to date?	NA	NA
Discussion: There have been no changes to the SSMP since its development in 2013.			

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North Marin Water District – Oceana Marin Sewer
SSMP Audit Report Form

Audit Period Covered: Month day, Year through Month day, Year
Audit completed by: Name of firm or person on MM/DD/YYYY

Introduction		**Yes**	**No**
Is the current system description complete and up to date? Are all infrastructure statistics current and complete?			
Discussion:			
Element 1 – Goals		**Yes**	**No**
A	Are the goals stated in the SSMP still appropriate and accurate?		
Discussion:			

Element 2 -- Organization		**Yes**	**No**
A	Is the Contact Information current?		
B	Is the Sanitary Sewer Overflow Responder List current?		
C	Is the Organization Chart in Figure 2-1 of the SSMP current?		
D	Are the position descriptions an accurate portrayal of staff responsibilities?		
E	Is the chain of communication for reporting and responding to SSOs accurate and up-to-date?		
Discussion:			

Element 3 – Legal Authority		Yes	No
Does the SSMP contain current references to the District’s Regulations documenting it’s legal authority to:			
A	Prevent illicit discharges?		
B	Require proper design and construction of sewers and connections?		
C	Ensure access for maintenance, inspection, or repairs for portions of the lateral owned or maintained by the District?		
D	Limit discharges of fats, oil and grease?		
E	Enforce any violation of its sewer ordinances?		
F	Were any changes or modifications made in the past year or since the last SSMP audit to District Ordinances, Regulations, or standards?		
Discussion:			

Element 4 – Operations and Maintenance		Yes	No
Collection System Maps			
A	Does the SSMP reference the current process and procedures for maintaining the District’s sanitary sewer system maps?		
B	Are the District’s wastewater collection system maps complete, current, and sufficiently detailed?		
Prioritized Preventive Maintenance			
C	Does the SSMP describe current preventive maintenance activities and the system for prioritizing the cleaning of sewer lines?		
D	Based upon the SSO information in CIWQS and the Annual SSO Report, are the District’s preventive maintenance activities sufficient and effective in minimizing SSOs and blockages?		

Element 4 – Operations and Maintenance		Yes	No
Rehabilitation and Replacement Program			
E	Is there an ongoing condition assessment program sufficient to rank the condition of sewer pipes and schedule rehabilitation? Are the current components of this program documented in the SSMP?		
F	Does the rehabilitation and replacement plan include a capital improvement plan that addresses proper management and protection of the infrastructure assets? Does the plan include a time schedule for implementing the short and long-term plans plus a schedule for developing the funds needed for the capital improvement plan?		
Contingency Equipment and Replacement Inventory			
G	Does the SSMP list the major equipment currently used in the operation and maintenance of the collection system?		
H	Are contingency equipment and replacement parts sufficient to respond to emergencies and properly conduct regular maintenance?		
Training			
I	Are the training records current?		
J	Does the SSMP document current training expectations and programs?		
Discussion:			

Element 5 – Design and Performance Standards		Yes	No
A	Does the SSMP reference current design and construction standards for the installation of new sanitary sewer systems, pump stations and other appurtenances and for the rehabilitation and repair of existing sanitary sewer systems?		
B	Does the SSMP document current procedures and standards for inspecting and testing the installation of new sewers, pumps, and other appurtenances and the rehabilitation and repair of existing sewer lines?		
Discussion:			

	Element 6 – Overflow and Emergency Response Plan (OERP)	Yes	No
A	Does the District's OERP contain proper notification procedures so that the primary responders and regulatory agencies are informed of all sanitary sewer overflows (SSOs) as required by the WDR and MRP?		
B	Does the OERP have a program to ensure an appropriate response to all overflows?		
C	Does the OERP contain procedures to ensure prompt notification to appropriate regulatory agencies and other potentially affected entities of all SSOs that potentially affect public health or reach waters of the State in accordance with the MRP? Does the SSMP identify the officials who will receive immediate notification of such SSOs?		
D	Are staff and contractor personnel aware of and appropriately trained on the procedures of the OERP?		
E	Does the OERP contain procedures to address emergency operations such as traffic and crowd control and other necessary response activities?		
F	Does the OERP ensure that all reasonable steps are taken to contain and prevent the discharge of untreated and partially treated wastewater to waters of the United States and to minimize or correct any adverse impact on the environment resulting from SSOs, including such accelerated or additional monitoring as may be necessary to determine the nature and impact of the discharge?		
G	Considering SSO performance data, is the OERP effective in handling SSOs in order to safeguard public health and the environment?		
H	Is the Water Quality Monitoring Plan current and has it been trained on and practiced by staff that would be involved in a SSO of large volume?		
I	Was sampling conducted within 48 hours for all SSOs greater than 50,000 gallons and were results entered for these SSOs through the CIWQS website?		
J	Has the District prepared a Technical Report for all SSOs larger than 50,000 gallons? Have all Technical Reports been filed on the CIWQS website as required?		
Discussion:			

Element 7 – Fats, Oils, and Grease (FOG) Control Program		Yes	No
A	Does the Fats, Oils, and Grease (FOG) Control Program include a description of public education outreach efforts that promote proper handling and disposal of FOG?		
B	Does the FOG program include a plan for the disposal of FOG generated within the sewer system service area?		
C	Does the District have sufficient legal authority to prohibit discharges to the system and identify measures to prevent SSOs and blockages caused by FOG?		
D	Are there requirements to install grease removal devices (such as traps or interceptors), best management practices (BMP) requirements, record keeping, maintenance requirements and reporting requirements established in the District's FOG Control Program?		
E	Does the District have authority to inspect grease producing facilities and have sufficient staff to inspect and enforce the FOG ordinance?		
F	Does the FOG control program identify sections of the collection system subject to FOG blockages, establish a cleaning schedule and address source control measures to minimize these blockages?		
G	Does the FOG control program implement source control measures for all sources of FOG discharged to the collection system?		
H	Is the current FOG program effective in minimizing blockages of sewer lines resulting from discharges of FOG to the system?		
Discussion:			

	Element 8 – System Evaluation and Capacity Assurance Plan	Yes	No
A	Does the System Evaluation and Capacity Assurance Plan evaluate hydraulic deficiencies in the system and provide estimates of peak flows associated with conditions similar to those causing overflow events, if applicable?		
B	Does the District's capital improvement program (CIP) establish a schedule of approximate completion dates for both short-term and long-term improvements and is the schedule reviewed and updated to reflect current budgetary capabilities and activity accomplishment?		
C	Does the District take steps needed to establish a short and long-term CIP to address hydraulic deficiencies, including prioritization, alternatives analysis, and schedules? Are repair and replacement projects developed based upon condition assessment and/or field maintenance results?		
Discussion:			

	Element 9 – Monitoring, Measurement, and Program Modifications	Yes	No
A	Does the District maintain relevant information that can be used to establish and prioritize appropriate SSMP activities?		
B	Does the District monitor the implementation and, where appropriate, measure the effectiveness of each element of the SSMP?		
C	Does the District assess the success of the preventive maintenance program?		
D	Does the District update program elements, as appropriate, based upon monitoring or performance evaluations?		
E	Does the SSMP identify and illustrate SSO trends, including frequency, location and volume of SSOs?		
Discussion:			

Element 10 – SSMP Audits		Yes	No
A	Does the audit focus on the effectiveness of the SSMP? If not, what needs to be changed to increase the effectiveness of the overall collection system program?		
B	Were the audit results shared with the District Board? And the public, via the District website?		
C	Will the SSMP Audit be completed, reviewed, and filed as an Appendix to the SSMP on a biennial basis?		
D	Do any proposed changes to the SSMP require Board approval as they have a substantial change in the policies and procedures for collection system operations and maintenance?		
Discussion:			

Element 11 – Communication Program		Yes	No
A	Does the District communicate on a regular basis with the public and other agencies about the development and implementation of the SSMP? Does the communication system provide the public the opportunity to provide input as the program is developed and implemented? Were annual progress reports and metrics of implementation of the SSMP provided to the District Board?		
Discussion:			

Change Log		Yes	No
A	Is the SSMP Change Log current and up to date?		
Discussion:			

Appendix J

Element 11 (Communication Plan) Placeholder for Future Supporting Documents

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