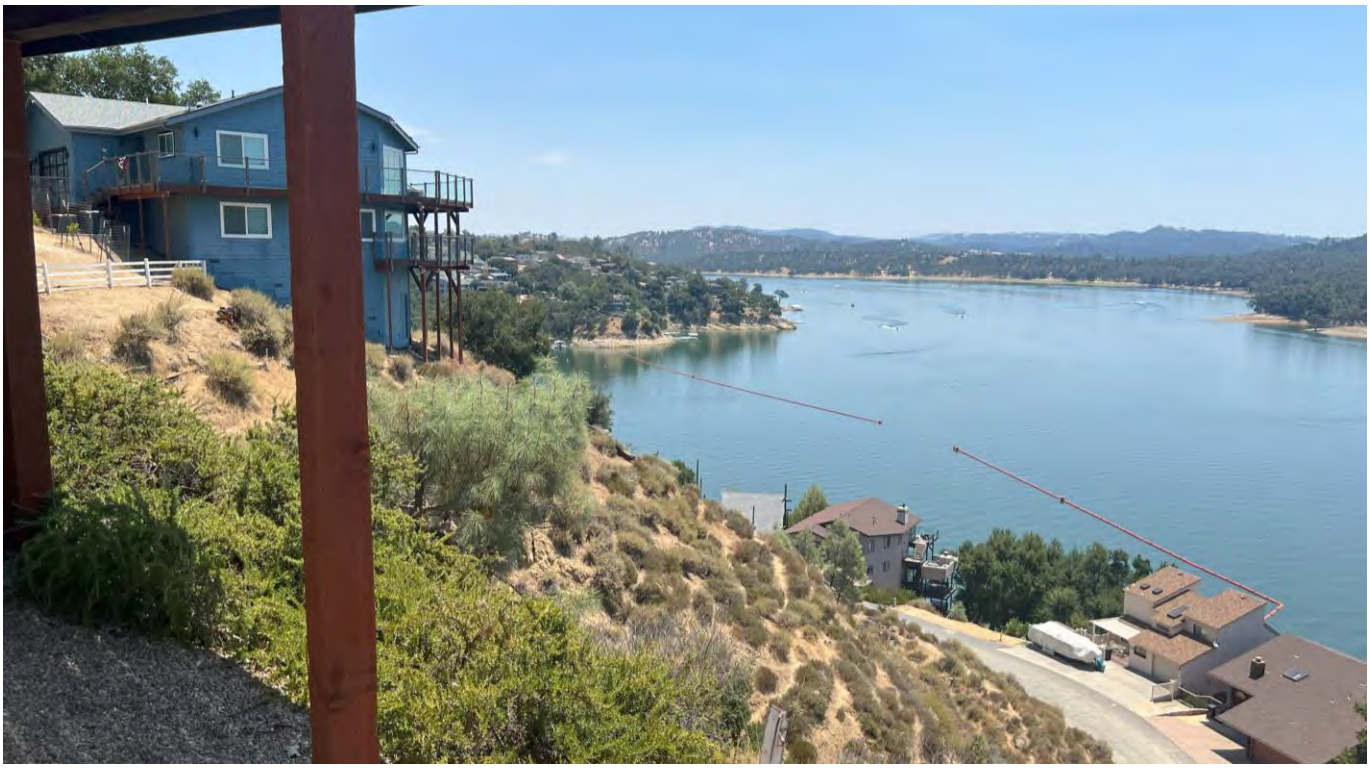
COUNTY OF SAN LUIS OBISPO

OAK SHORES INTERCEPTOR BYPASS PROJECT

FEASIBILITY STUDY – DRAFT



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APRIL 2025

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LIST OF ABBREVIATIONS

APN	Assessor's Parcel Number
BRA	Baseline Risk Assessment
CEQA	California Environmental Quality Act
CDFW	California Department of Fish and Wildlife
CSA	County Service Area
El.	Elevation
ENR	Engineering News Record
EPIMS	Environmental Permit Information Management System
Ex.	Existing
GIS	Geographic Information System
HDD	Horizontal Directional Drilling
HP	Horsepower
HWL	High Water Level
IS-MND	Initial Study / Mitigated Negative Declaration
LF	Linear Foot
MH	Manhole
No.	Number
NWP	Nationwide Permit
PG&E	Pacific Gas and Electric
RWQCB	Regional Water Quality Control Board
SCADA	Supervisory Control and Data Acquisition
SLO	San Luis Obispo
USACE	United States Army Corps of Engineers
WWTF	Wastewater Treatment Facility

Section 1. Executive Summary

The County operates the County Service Area 7A (CSA 7A) Oak Shores wastewater collection, treatment, and disposal facilities for the Oak Shores Village on the northwest shore of Lake Nacimiento (Lake), in northern San Luis Obispo County.

1.1. Project Background

The existing interceptors and appurtenant manholes are constructed below the lake's high-water level (HWL El. 800 feet), presenting a substantial risk to Lake water quality. The goal of the Interceptor Bypass Project (Project) is to reduce the risk of a pipeline failure by abandoning portions of the existing interceptor in high-risk areas and rerouting wastewater by pressure and gravity flow to existing and/or upgraded portions of the wastewater collection system where risks of failure are substantially reduced.

1.2. Reference Material

Previous planning documents have been developed regarding the Oak Shores wastewater collection system, its condition, and possible ways to reduce identified risks. Prior works reviewed as part of this Project include:

- 2004 Interceptor Bypass Study, prepared by the County Public Works Department
- 2015 Risk assessment Study on the Interceptor Sewerline System in the County Service Area 7A, Oak Shores, prepared by MNS Engineers
- 2022 Technical Memorandum - CSA 7A Oak Shores Interceptor Bypass Project Recommended Project Improvements, prepared by the County Public Works Department

1.3. Capacity Analysis

Existing wastewater flow data is based on daily influent flows measured at the Oak Shores wastewater treatment facility from January 2020 to February 2024. The per-connection maximum instantaneous flow was calculated to be 0.312 gallons per minute. This flow rate is used in conjunction with the number of connections upstream of each segment of the proposed sewer to estimate the maximum flow to be conveyed by each sewer segment.

1.4. Alternatives and Feasibility Assessment

The main goal of the recommended Project improvements is to mitigate as much risk of Interceptor failure as economically feasible. This is proposed to be accomplished by partially bypassing the Westside and Eastside Interceptors through construction of new gravity sewer and force mains similar to what was recommended in MNS's 2015 *Risk Study* and further altered in the County's 2022 *Technical Memorandum.*

To inform development of conceptual designs, investigations were conducted to support the development of improvement alternatives including an aerial and limited topographic survey, a preliminary geotechnical memorandum, and an arborists tree survey.

Separate concept evaluations processes were completed for the Project, one for the Westside Interceptor, and one for the Eastside Interceptor. Detailed preliminary plan and profile views of the proposed and alternative Westside Interceptor bypass and Eastside Interceptor bypass improvements are included as Appendix F and Appendix G, respectively.

1.5. Recommended Project Description

The recommended improvement project for the Oak Shores Interceptor Bypass is as follows:

1.5.1. Westside Interceptor Recommended Alignments

Based on the discussion in Section 5.4.1, the recommended alignment for the improvement of the Westside Interceptor are those shown in Appendix F.

1.5.2. Eastside Interceptor Recommended Alignments

Based on the discussion in Section 5.4.2, the recommended alignment for the improvement of the Westside Interceptor are those shown in Appendix G.

Due to the elevation difference between the proposed sewer alignment and existing lower-elevation residences, approximately 28 low-pressure grinder sump pumps will be required on the downhill side of such residences to convey wastewater to the proposed gravity sewer mains.

Three new lift stations will be required to convey wastewater through proposed force mains, the Bluff Court, Bass Point Road, and East Beach Circle lift stations.

1.6. Planning Issues by Discipline

The Project involves a variety of engineering disciplines to complete the design for the Project.

Three trees are proposed to be removed, 10 may have major impacts, and 36 may have minor impacts. Some of these impacts may be mitigated during detailed design.

Pending pump selection, the submersible pumps proposed for the force main pump stations are expected to be rated at 10 to 20 horsepower (hp), depending on the lift station, and likely require 480-volt service from Pacific Gas and Electric (PG&E). Pump stations will require instrumentation and controls to be integrated with the County's existing SCADA system. The proposed grinder pump stations require 220-volt power, with an associated, dedicated circuit breaker.

New utility easements will be required for proposed pipeline and lift station infrastructure to provide access for construction and ongoing operation and maintenance of the facilities.

1.7. Permitting Assessment

A variety of permits will be required for Project construction.

An Initial Study / Mitigated Negative Declaration (IS-MND) is anticipated to be the appropriate level of environmental document for compliance with the California Environmental Quality Act (CEQA). If required by the construction funding source, compliance with the National Environmental Policy Act (NEPA) will also be required.

Additional permits are anticipated to be required for project construction including permits from the United States Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), and the California Department of Fish and Wildlife (CDFW).

1.8. Project Costs

A preliminary construction cost opinion has been developed for the recommended Project along with additional costs which will be incurred as part of the Project. The additional costs are estimated based on an assumed percentage of the construction cost and included in the total Project costs. A total Project cost for the recommended improvements is provided in Table 1-1.

Table 1-1. Total Project Costs

Item	Percent of Construction Cost	Cost
Project Construction	100%	$12,360,000
Administration	3%	$370,000
Easement Acquisition	3%	$370,000
Topographic and Boundary Survey	1%	$120,000
Detailed Design	10%	$1,240,000
Traffic Control Plans and Permitting	1%	$120,000
Environmental Permitting	1%	$120,000
Construction Management	15%	$1,850,000
Total Project Cost		**$16,550,000**

Section 2. Project Background

The County of San Luis Obispo (County) operates the County Service Area 7A (CSA 7A) Oak Shores wastewater collection, treatment, and disposal facilities for the Oak Shores Village on the northwest shore of Lake Nacimiento (Lake), in northern San Luis Obispo County. The Oak Shores wastewater collection system consists of gravity collectors totaling 9.74 miles and seven lift stations. The gravity collectors discharge to two gravity wastewater interceptors located along the shoreline of the Lake. The wastewater interceptors, which combine the eastside and westside sewers, collect wastewater and convey it to a main lift station (Lift Station No. 3). Lift Station No. 3 is approximately 60 feet deep and conveys all flows to the Wastewater Treatment Facility (WWTF).

The existing interceptors and appurtenant manholes are constructed below the Lake's high-water level (HWL El. 800 feet), presenting a substantial risk to Lake water quality or inundation of Lift Station No. 3 if a leak or pipe failure were to occur. When the lake level is low, portions of the interceptors and connector sewers are exposed above the soil from localized erosion on steep slopes. Additionally, the surface of the interceptors' ductile iron pipe has significant pitting corrosion at exposed locations. Pits appear to be nearly 30% of pipe wall thickness.

2.1. Project Goals

The goal of the Interceptor Bypass Project (Project) is to reduce the risk of a pipeline failure, which would result in a raw wastewater spill into the Lake, or for Lake water to enter the collection system and potentially overwhelm Lift Station No. 3 and the WWTF, resulting in a spill into the lake. The goals of the Project will be achieved by abandoning portions of the existing interceptor in high-risk areas and rerouting wastewater by pressure and gravity flow to existing and/or upgraded portions of the wastewater collection system where risks of failure are substantially reduced. The existing Westside and Eastside Interceptors and their portions proposed to be abandoned are shown on Figure 2-1.

The purpose of this Feasibility Study is to review, evaluate, and finalize a selection of collection system improvements to balance financial and infrastructure goals by analyzing past studies and new survey data. The conclusions of this Study will become the basis for the Project's detailed design.

EXISTING
LIFT STATION NO. 3

SADDLE WAY

CIRCLE OAK DR

BLUFF CT

LANDS END RD

WESTSIDE INTERCEPTOR
TO BE ABANDONED

EASTSIDE INTERCEPTOR
TO BE ABANDONED

BASS POINT RD

SHORELINE RD

SMITH POINT RD

E BEACH CR

LEGEND

- EXISTING GRAVITY SEWER
- EXISTING WESTSIDE SEWER INTERCEPTOR
- EXISTING EASTSIDE SEWER INTERCEPTOR

200' 100' 0' 100' 200'

1 in. = 200 ft.

C:\Box\Projects\COSLO San Luis Obispo\COSLO 22\MXD WW Pipe Oak Shores\Engr\CAD\Exhibits\Overall Existing Interceptor Overview.dwg
Tue 08 Apr 25 10:06:13 AM by: Ethan Coon

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OAK SHORES INTERCEPTOR BYPASS
COUNTY OF SAN LUIS OBISPO

EXISTING INTERCEPTORS OVERVIEW
DRAFT FEASIBILITY STUDY

FIGURE NUMBER
2-1

Section 3. Reference Materials Summaries

Previous planning documents have been developed regarding the Oak Shores wastewater collection system, its condition, and possible ways to reduce identified risks. This section summarizes these documents; the full documents are provided in Appendix A, B, and C.

3.1. Interceptor Bypass Study

Author: SLO County Public Works Department

Year Published: 2004

The County's 2004 *Interceptor Bypass Study* describes the modifications that would be required to abandon the Oak Shores Sewer Interceptor and the 60-ft-deep Lift Station #3. Its primary methods of investigation involved record drawings, operator consultations, and site review. A summary of its findings is as follows:

Westside Interceptor

The improvements proposed for abandoning the existing Westside Sewer Interceptor included four new lift stations located at Saddle Way, Bluff Court, the Oak Shores Activity Center parking lot, and adjacent to the existing Lift Station No. 3. Further proposed improvements included new 4-inch PVC force main, new gravity sewer and manholes, re-routing force main from the existing Lift Station No. 2, and the construction of a new steel pipe bridge spanning approximately 150 feet across a Lake inlet west of the existing Life Station No. 3. The total project cost of the Westside improvements was estimated at approximately $3.65 million (ENR Index 6,957, Q1 2004).

Eastside Interceptor

The improvements proposed for abandoning the existing Eastside Sewer Interceptor included four new lift stations located at East Beach Circle, Smith Point Road, Bass Point Road, and Cove Lane. Further proposed improvements included new 4-inch PVC force main, new gravity sewer and manholes, up-sizing of existing 6-inch gravity sewer to 8-inch to accommodate future flow, and the construction of two new steel pipe bridges to span approximately 130 total linear feet across Lake inlets just east of the existing Lift Station No. 3. Additionally, eight individual 230 Volt sewer package pump stations were anticipated to be required at select residences. The total project cost of the Eastside improvements was estimated at approximately $2.35 million (ENR Index 6,957, Q1 2004).

These proposed improvements were not recommended due to their high estimated capital and maintenance costs.

3.2. Risk Assessment Study on the Interceptor Sewerline System in the County Service Area 7A, Oak Shores

Author: MNS Engineers, Inc.

Year Published: 2015

MNS Engineers' 2015 *Risk Assessment Study* assessed the risk of failure of the Oak Shores Sewer Interceptors and proposed recommended improvements to the system. Its primary sources included a 2012 site visit, past studies and drawings, a physical survey of manholes, and a hydraulic model. The *Risk Assessment Study* grouped its proposed risk mitigation improvements into categories and ranked them by importance. A summary of its proposed improvements is as follows, in decreasing order of importance:

Interceptor Physical Improvements

1. Provide additional flow monitoring devices, mechanical, and electrical improvements to Lift Station No. 3
2. Perform minor repairs to the existing Interceptors, including covering exposed pipe, replacing deteriorated laterals and supports, and mitigating wave-action erosion with riprap
3. Perform one of the three actions below:
    a. Line the existing Interceptors with an in-situ structural liner and rehabilitate the existing manholes
    b. Partially bypass the existing Interceptors as follows:
        i. Westside abandonment: 45% (2,223 feet of pipeline from MH-84 to MH-95). This would require new gravity sewer constructed from a new manhole on Saddle Way to convey flow from Saddle Way across Lots 43 and 61 to Bluff Court, then along the back side of Bluff Court's southern lots to Lands End Road, and finally to re-connect with the existing Interceptor at MH-96.
        ii. Eastside abandonment: 74% (3,533 feet of pipeline from MH-112 to MH-128). This would require new gravity sewer constructed from new manholes at Smith Point Road and East Beach Circle to convey flow to a new lift station within Lot 310. New force main would convey flow from this lift station and another new lift station on Bass Point Road to an existing manhole on Shoreline Road.
    c. Completely bypass the existing Interceptors per the 2004 *Interceptor Bypass Study*

Lift Station No. 3

4. Provide redundant alarms and procure an additional backup generator rental agreement
5. Integrate Supervisory Control and Data Acquisition (SCADA) capabilities
6. Provide an on-site backup lift station pump
7. Construct a containment berm around the Lift Station

Operational Improvements

8. Schedule enhanced frequency of inspections for interceptors and lift stations
9. Develop a GIS system including pipeline locations, property ownership, repair logs, etc.
10. Develop a comprehensive emergency operations plan
11. Adopt enhanced system inspection procedures, including a cleaning and video inspection schedule
12. Develop a staff work plan, position duties, and proficiency testing on current procedures
13. Prepare more detailed standard operation procedures

Administrative Improvements

14. Prepare development standards, standard plans, and easement maps

3.3. Technical Memorandum - CSA 7A Oak Shores Interceptor Bypass Project Recommended Project Improvements

Author: San Luis Obispo County Public Works Department

Year Published: 2022

The County's 2022 *Technical Memorandum* summarizes the proposed modifications to the Oak Shores wastewater collection system to allow bypass & abandonment of the Interceptor Sewer. Its recommendations are built upon the Partial Interceptor Bypass described in MNS's 2015 *Risk Study* and are summarized as follows:

Eastside Interceptor

The County recommends the portion of the Eastside Interceptor downstream of MH-111 be rehabilitated using an in-situ structural liner for the pipe, liner for the manholes, and any additional repairs deemed necessary through field and CCTV inspections. The Interceptor upstream of MH-111 would be abandoned in place according to MNS's 2015 *Risk Study* with one major deviation from MNS's original design: Instead of one proposed lift station to convey flows from both Smith Point Road and East Beach Circle, the County proposes two separate lift stations—one located at the end of each street due to the inaccessibility of the original MNS-proposed lift station location.

Westside Interceptor

The County recommends the portion of the Westside Interceptor downstream of MH-96 be rehabilitated using an in-situ structural liner for the pipe, liner for the manholes, and any additional repairs deemed necessary through field and CCTV inspections. The Interceptor upstream of MH-96 would be abandoned in place according to MNS's 2015 *Risk Study* with one major deviation from MNS's original design. MNS's original gravity sewer alignment along the backside of Bluff Court's southern lots does not appear feasible due to existing topography. Instead, the County proposes a new lift station located at the end of Bluff Court to convey sewer flow via force main to a new manhole on Circle Oak Drive north of the Lands End cul-de-sac.

The County's recommendations are the basis and starting point of the design alternatives discussed in Section 5.

Section 4. Capacity Analysis

This section examines the existing wastewater flows of the Oak Shores community and documents how the flows are incorporated into the design of the proposed collection and interceptor systems.

4.1. Existing Flows

For this Feasibility Study, existing wastewater flow data is based on daily influent flows measured at the Oak Shores wastewater treatment facility from January 2020 to February 2024. Table 4-1 shows a summary of the measured flow data from this period. A complete table of daily flow data in the period analyzed is included as Appendix D.

Table 4-1. Summary of Existing Oak Shores Wastewater Treatment Facility Influent Flow Data, Jan 2020 – Feb 2024.

Parameter	Measured Flow (Gallons / Day)
Average Daily Flow*	40,275
Maximum Daily Flow	147,851
Date of Maximum Daily Flow	June 11, 2023

*Days with measured flow equal to zero are considered outlier values and are not included in calculating averages.

Many homes in the Oak Shores community are used as vacation homes and are not inhabited year-round. The treatment facility often sees peak flows coinciding with summer holidays, when more homes tend to be occupied.

4.2. Estimated Unit Flows

To determine the required size of wastewater collection and conveyance pipes to be installed, measured maximum daily flows are used to estimate peak instantaneous flows on a per-connection basis.

The community-wide maximum daily wastewater flow is divided by the number of connections in the collection system to estimate the maximum daily flow per connection. This per-connection maximum daily flow is then multiplied by a factor of 2.0 to account for diurnal variations in wastewater flow per *County of SLO Public Improvement Standards* (June, 2019) to estimate the maximum instantaneous wastewater flow per connection. Table 4-2 lists the results of these calculations.

Table 4-2. Calculated Per-Connection Instantaneous Flow

Parameter	Value	Units
Maximum Daily Flow	147,851	Gallons / Day
Maximum Daily Flow	103	Gallons / Minute
Number of Connections	658	Connections
Per-Connection Maximum Daily Flow	225	Gallons / Day / Connection
Per-Connection Maximum Daily Flow	0.156	Gallons / Minute / Connection
Instantaneous Flow Peaking Factor	2.0	-
Per-Connection Maximum Instantaneous Flow	0.312	Gallons / Minute / Connection

The per-connection maximum instantaneous flow of 0.312 gallons per minute is used in conjunction with the number of connections upstream of each segment of proposed sewer to estimate the maximum flow to be conveyed by each sewer segment. Per County Public Improvement Standards, wastewater pipes up to 15-in. in diameter shall be sized to accommodate peak flows with the pipe flowing no more than half full. This flow rate calculation is also used for lift station and force main sizing. The design implications of this are discussed further in Section 6.3.

Section 5. Alternatives and Feasibility Assessment

This section discusses the approach to developing the proposed Project and the feasibility of the alternative approaches considered.

5.1. Design Criteria

Design criteria for the Project gravity sewers are dictated by the County of San Luis Obispo 2019 Public Improvement Standards. Major design requirements and any MNS-recommended deviations for new force main and gravity sewer mains are listed in Table 5-1.

Table 5-1. Project Design Criteria

Criteria	County Standard	MNS Recommendation	MNS Justification
Gravity Pipe Material	Ductile iron, PVC, or County-approved other	SDR 35 PVC	-
Gravity Pipe Depth	48-in. minimum cover	-	-
Gravity Pipe Size	8-in. nominal diameter minimum	-	-
Gravity Pipe Minimum Slope (8-in. diameter pipe)	0.0035 vertical ft per horizontal ft	-	-
Gravity Pipe Maximum Velocity	10 ft / sec, unless special erosion protection is provided	-	-
Distance Between Manholes	400-ft maximum	-	-
Minimum Radius of Alignment Curvature	As recommended by manufacturer and approved by County – no pipe joint deflection on curved sewers	-	-
Force Main Material	Ductile iron or C200 PVC	HDPE DR 17 IPS	HDPE will allow for horizontal directional drilling (HDD) pipe installation method and results in seamless pipe installation
Force Main Operating Velocity	4.0 fps – 6.0 fps	4.0 fps	Reduced pipe velocities decrease friction losses and resulting energy consumption

5.2. Supporting Information

To inform development of conceptual designs, investigations were conducted to support the development of improvement alternatives. These investigations are described as follows.

5.2.1. Aerial and Topographical Survey

An orthographic survey of the Project area was conducted by Central Coast Aerial Mapping, Inc. to provide topographical base mapping and aid in determining alignment alternatives. In addition to this, a manhole survey was conducted by MNS to aid in producing preliminary profile drawings for each alignment considered. Approximately 15 manholes were located and measured as part of this survey to aid in determining the proposed improvements' connections to the existing system. More detailed topographical ground surveys will be conducted in the future at select locations to provide a comprehensive base map for detailed design.

5.2.2. Preliminary Geotechnical Memorandum

A Preliminary Geotechnical Memorandum was developed by Yeh and Associates in May 2024 to review and convey geotechnical and geologic considerations and recommendations for the proposed Project improvements. The full Preliminary Geotechnical Memorandum is included as Appendix E, and its findings and recommendations are summarized as follows:

Eastside Interceptor

Excavations along the proposed Eastside alignments are likely to encounter residual soil or Vaqueros Formation sandstone. Pipelines here can likely be constructed using conventional cut-and-cover trench methods. Subsurface conditions and slope stability should be evaluated for final design.

Westside Interceptor

For the proposed gravity sewer to run from Saddle Way to Bluff Court, pipe anchors or other methods of trench stabilization may be required.

For the proposed gravity sewer to run from Circle Oaks Drive to Lands End Road, Yeh and Associates recommends the use of an overland pipe bridge with anchors bearing in stable bedrock for the steep downhill slope due to the risk of erosion.

For the proposed gravity sewer to run from Lands End Road to the existing Westside Interceptor, temporary shoring and a monitoring program is anticipated to be required during construction to monitor any movement of existing nearby structures.

For other gravity sewer and force mains, construction can likely be accomplished via conventional cut-and-cover trench methods. Excavations will likely encounter residual soil, Vaqueros Formation sandstone, or Red Beds. During detailed design, additional subsurface investigations should be conducted to further clarify and understand existing geologic conditions within the Project footprint.

5.2.3. Arborist Tree Survey

MNS subconsultant, Rincon Consultants Inc. (Rincon), conducted a tree survey within the proposed alignment of the Project, noting potential construction impacts to existing trees and their anticipated severity based on preliminary construction plans.

5.3. Alternative Development and Evaluation Approach

The main goal of the recommended Project improvements is to mitigate as much risk of Interceptor failure as economically feasible. This is proposed to be accomplished by partially bypassing the Westside and Eastside Interceptors through construction of new gravity sewer and force mains similar to what was recommended in MNS's 2015 *Risk Study* and further altered in the County's 2022 *Technical Memorandum.* The recommendations proposed in this Feasibility Study build upon the past studies discussed in Section 3, using the supporting information discussed in Section 5.2 for further development.

More specific goals for each Interceptor's partial abandonment are discussed as follows:

5.3.1. Westside Interceptor

The Westside Interceptor is proposed to be abandoned from its upstream-most manhole, MH-84, to manhole MH-96, as the Interceptor downstream from manhole MH-96 appears to be in stable condition. To accomplish this, new gravity sewer and lift stations/force mains will be constructed to re-route upstream wastewater flow to MH-96. Significant design constraints exist where new gravity sewers will convey flow from one street to another, especially the steep slope from Bluff Court to Lands End Road. The design proposed in this Study accounts for these constraints and is discussed in detail later in this Section and in Section 6. Preliminary plan and profile drawings of the discussed Westside improvements are available in Appendix F.

5.3.2. Eastside Interceptor

The Eastside Interceptor is proposed to be abandoned from its upstream-most manhole, MH-128, to manhole MH-111, as the Interceptor downstream from manhole MH-111 appears to be in stable condition. To accomplish this, new gravity sewer and lift

stations/force mains will be constructed to re-route upstream wastewater flow to manhole MH-111 or farther downstream. Specific design goals for this partial bypass include determining how best to convey Smith Point Road's wastewater flow, re-routing the gravity sewer that currently exists underneath the structure at 2569 Shoreline Road, and bypassing the existing exposed gravity sewer at Woody Point Lane. Preliminary plan and profile drawings of the discussed Eastside improvements are available in Appendix G.

The portions of the Eastside and Westside Interceptors to remain in operation could be lined with an in-situ structural liner to enhance their remaining lifespans as discussed in previous studies, but such improvements are beyond the scope of this Project

Due to the topography of the Project area, approximately 26 residences along both the Eastside and Westside Interceptors will require individual grinder pumps to convey wastewater from certain residences to the proposed gravity sewer mains. These residences are noted in the preliminary plan and profile drawings included in Appendix F and Appendix G.

5.4. Alternative Identification and Evaluation

Improvement concepts and alternatives are developed in this section. Separate concept evaluations processes were completed for the Project, one for the Westside Interceptor, and one for the Eastside Interceptor.

5.4.1. Westside Interceptor

The proposed configuration of the improved Westside Interceptor, including two alternate sub-configurations, is shown on Figure 5-1. More detailed preliminary plan and profile views of the proposed improvements are included as Appendix F.

ALT ALIGNMENT W 3.1

ALT ALIGNMENT W 2.1

SADDLE WAY

CIRCLE OAK DR

BLUFF CT

LANDS END RD

FIGURE W 1.0

FIGURE W 2.0

FIGURE W 3.0

MH 84

MH 85

MH 86

MH 8

MH 88

MH 89

MH 90

MH 91

MH 92

MH 93

MH 94

MH 95

MH 96

MH 97

EX 12" DIP

EX 6" DIP

SSCO

LEGEND

- EXISTING SEWER
- PROPOSED SEWER
- PROPOSED FORCE MAIN
- ALTERNATE PROPOSED SEWER
- PROPERTY LINE
- EXISTING MANHOLE
- PROPOSED MANHOLE
- EXISTING SURVEYED TREE AND CANOPY

70' 0' 70'

SCALE: 1" = 70'

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OAK SHORES INTERCEPTOR BYPASS
COUNTY OF SAN LUIS OBISPO

WESTSIDE INTERCEPTOR
PLAN & PROFILE FIGURES OVERVIEW
DRAFT FEASIBILITY STUDY

FIGURE NUMBER
5-1

Descriptions of proposed improvement features and alternatives by figure number are described as follows:

W 1.0
The upstream-most sewer main of the Westside Interceptor improvements would start at the existing manhole MH-LS3W-019 on Saddle Way where it would connect to the existing system and convey wastewater flows by gravity through parcels numbered 012-232-004, 012-232-021, and 012-232-020 to a new wet well lift station located in the cul-de-sac on Bluff Ct. The pump station would discharge through a new force main along Bluff Ct.

W 2.0
Continuing from W 1.0, the new force main would travel along Bluff Ct and turn east onto Circle Oak Dr, where flow would discharge to a new manhole located in front of parcel number 012-232-033. Flow would then travel by gravity sewer to the east edge of the parcel and then down a steep slope via an above-ground pipe bridge to a new manhole located in the western cul-de-sac of Lands End Rd. As an alternative to the pipe bridge, the pipe may be run below-grade down the slope, but this option is less desirable due to potential unstable soil conditions (see Section 5.2.2 for additional information about the pipe bridge and geotechnical considerations). From the western cul-de-sac of Lands End Rd, wastewater would flow by gravity along Lands End Rd to the east. An alternative to these improvements is discussed in the paragraph headed “Alternative – W 2.1” later in this section.

W 3.0
Continuing from W 2.0, the new gravity sewer would continue down Land Ends Rd and connect to existing manhole MH LS3W-049, which would be replaced approximately five feet deeper than the existing manhole to accommodate the depth of the newly connected gravity main. Existing gravity sewer downstream of this connection point would likely need to be similarly deepened, although more site investigation would be necessary to determine to what extent. An alternative to these improvements is discussed in the paragraph headed “Alternative – W 3.1” later in this section.

Alternative – W 2.1
As an alternative to the proposed improvements described in paragraph W 2.0 of this section, the proposed force main on Circle Oak Dr could instead continue until it discharged to a new manhole in front of parcel number 012-232-034. From this point, a new gravity sewer would convey flow eastward between parcels 012-232-037 and 012-232-038 and down a steep slope past the properties as an above-ground pipe bridge similar to that described in paragraph W 2.0. The sewer would then connect to the new Lands End Rd gravity sewer via a new manhole northwest of parcel 012-254-017.

W 2.1 Advantages
While preliminary investigation suggests that this alternative is technically feasible, no explicit advantages are noted.

W 2.1 Disadvantages
This alternative would result in a greater quantity of new sewer construction and a greater quantity of trees to be removed.

Alternative – W 3.1
As an alternative to the proposed improvements described in paragraph W 3.0 of this section, the new gravity sewer main along Lands End Rd could be shortened to a new manhole on the road between parcels 012-254-013 and 012-254-012. Flow would then be conveyed eastward along the property line between the parcels to connect to the existing interceptor via existing MH-LS3W-96.

W 3.1 Advantages
This alternative would reduce the required number of new manholes installed and / or rehabilitated.

W 3.1 Disadvantages

This alternative would require a new easement for the construction of sewer on private property, in a narrow corridor between homes with existing trees, as opposed to utilizing an existing sewer main within an easement as in W 3.0.

5.4.2. Eastside Interceptor

The proposed configuration of the improved Westside Interceptor, including two alternate sub-configurations, is shown on Figure 5-2. More detailed preliminary plan and profile views of the proposed improvements are included as Appendix G.

Descriptions of proposed improvement features and alternatives are described as follows:

E 1.0

Bass Point Rd contains an existing gravity sewer which collect flow from the residences along the street. The Bass Point segment of the Eastside Interceptor would start as a new gravity sewer connection to the existing manhole MH-LS3E-057 at the southern end of the street. The gravity sewer connection would collect flow into a new lift station located within the loop at the end of the street. From there, a sewer force main would convey flow along Bass Point Rd to a new gravity transition manhole at the intersection of Bass Point Rd and Shoreline Rd. Flow would then continue via newly constructed gravity sewer as described in Paragraph E 6.0 in this section. An additional manhole connection to the existing gravity system in Shoreline Rd would disconnect the existing Bass Point Rd gravity system from the Shoreline Rd gravity system. An emergency overflow connection between the new gravity connection manhole and the existing Bass Point Rd gravity MH-LS3E-053 would be installed.

E 2.0

Smith Point Rd contains an existing gravity sewer which collects flow from the residences along the street. The Smith Point Rd gravity sewer would be redirected from the connection point at the last manhole before the sewer connects to the Eastside Interceptor. The Smith Point Rd gravity sewer would include new gravity sewer manholes in the open space, on parcel number 012-266-071, and a new drop manhole located on parcel number 012-266-052. Flow then continues to the East Beach Circle-1 gravity system as described in Paragraph E 3.0 in this section. An alternative to these improvements is discussed in the paragraph headed “Alternative – E 2.1” in this section.

E 3.0

The East Beach Circle-1 gravity system would start at a new manhole located at or near the border of parcel numbers 012-266-071, 012-266-052, and 012-166-053. Flow from the Smith Point Rd gravity sewer would be directed into this new manhole. Flow would continue southward along the lake side edge of the residential parcels, collecting flow from residences, and around parcel number 012-266-057 to continue northward to a new wet well pump station as described in Paragraph E 1.0 above.

E 4.0

Continuing from E 2.0, flow collects from gravity sewer lines described in Paragraphs E 3.0 and E 5.0 into the East Beach Circle lift station by gravity. From the East Beach Circle lift station, flow would travel via force main north along East Beach Circle, turn westward at Shoreline Road, and continue until it transitions to the existing gravity main at manhole MH-LS3E-035 located at the intersection of Shoreline Road and Pine Ridge Road.

E 5.0

A new manhole constructed in front of parcel number 012-226-004 on East Beach Circle would convey sewer flows collected along the street westward by gravity before turning south-westward toward the East Beach Circle lift station, where flow would continue as described in Paragraph E 4.0 in this section.

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OAK SHORES INTERCEPTOR BYPASS
COUNTY OF SAN LUIS OBISPO

EASTSIDE INTERCEPTOR
PLAN & PROFILE FIGURES OVERVIEW
DRAFT FEASIBILITY STUDY

FIGURE NUMBER
5-2

E 6.0

A new manhole MH E-13 would connect to the existing gravity system, bypassing the existing Bass Point Rd gravity sewer system and connecting to the existing gravity sewer and would convey flow north to the reconnection point at existing manhole MH-LS3E-096 on Shoreline Road. The transition manhole for the Bass Point Rd force main would connect to the new gravity alignment. The gravity flow would continue in the existing sewer system north along Shoreline Road.

E 7.0

To bypass the existing gravity sewer that currently runs along the breezeway of the property on parcel 012-263-043 on Shoreline Road, a new gravity sewer would be installed around the south side of the residence along an existing, graded gravel road. This new sewer would start as a new connection to existing manhole MH-LS3E-098, reversing the flow of the segment of existing sewer to flow to a new manhole MH E-14. The existing sewer to the south of MH-LS3E-098 would also connect to this new manhole. From the new manhole the gravity sewer would flow around the existing residential structure and end at existing manhole MH-LS3E-099.

E 8.0

Existing gravity sewer flow from Woody Point lane collects at existing manhole MH-LS3E-105. A new connection to existing manhole MH-LS3E-105 would redirect flow via gravity main south-westward through parcel number 012-263-045, around the residence, where it would connect to the existing gravity sewer system at MH-LS3E-102. An alternative to these improvements is discussed in the paragraph headed “Alternative – E 8.1” in this section.

Alternative – E 2.1

As an alternative to the stretch of gravity sewer described in Paragraph E 2.0, a separate lift station could be constructed in the cul-de-sac of Smith Point Road. This lift station would receive flow from the existing manhole MH-LS3E-039 via a new gravity sewer connection and convey it via force main north-eastward along Smith Point Road, transitioning back to existing gravity at MH-LS3E-035 on Shoreline Road.

E 2.1 Advantages

The force main would be constructed entirely within the public right-of-way and a portion could be constructed in the same trench as the proposed East Beach Circle force main.

E 2.1 Disadvantages

An additional lift station is more expensive than the constructed gravity sewer alternative. An additional lift station also comes with increased operational and maintenance costs as well as the potential for odor issues compared to a gravity system.

Alternative – E 8.1

Existing gravity sewer from Woody Point Lane would be collected from a new manhole ALT MH E-18.1 instead of the existing MH-LS3E-105 and conveyed by gravity flow through parcel number 012-263-045 and in a southerly direction where it would connect to the existing gravity sewer system at MH-LS3E-103.

E 8.1 Advantages

The constructed alternative gravity sewer alignment is approximately 150 linear feet shorter than the E 8.0 gravity sewer alignment. The alternative alignment has one less manhole in residential property, and less construction near the existing residence.

E 8.1 Disadvantages

The existing slope along this alignment is significantly steeper (65%) compared to the alternative in E 8.0 (25), making construction significantly more challenging and would also be potentially impacted by future erosion. The sewer profile

also includes construction of an 18-foot-deep manhole and 140 linear feet of gravity sewer construction deeper than 8 feet from the ground surface.

A summary breakdown of the proposed improvements and required construction materials is listed in Table 5-2. Alternative alignment values are included for comparison purposes but are not included in summation totals.

Table 5-2. Interceptor Bypass Construction Summary

Corresponding Figure	Length of New Gravity Sewer (LF)	No. of New Manholes	No. of New Individual Grinder Pumps	Length of New Sewer Force Main (LF)	Additional Items
Westside Interceptor (Appendix F)					
W 1.0	581	5	5	219	Bluff Ct Pump Station
W 2.0	575	4	4	425	Overland pipe bridge, ~170 LF
W 3.0	1,073	6	9	-	Existing MH extension and new drop inlet
Westside Total	**2,229**	**15**	**18**	**644**	
ALTERNATIVE - W 2.1	311	2	-	211	
ALTERNATIVE - W 3.1	157	1	-	-	
Eastside Interceptor (Appendix G)					
E 1.0	20	1	2	655	Bass Point Rd Pump Station
E 2.0	575	3	2	-	-
E 3.0	-	-	-	1,233	East Beach Cr Pump Station
E 4.0	577	4	-	-	-
E 5.0	309	3	3	-	-
E 6.0	329	2	-	-	-
E 7.0	300	4	-	-	-
E 8.0	481	2	-	-	-
Eastside Total	**2,591**	**20**	**8**	**1,888**	
ALTERNATIVE – E 2.1	-	-	3	833	
ALTERNATIVE – E 8.1	323	3	-	-	

Section 6. Recommended Project Description

This section describes the recommended Project approach based on the alternatives discussed in Section 5.

6.1. Recommended Alignments

The recommended improvement project for the Oak Shores Interceptor Bypass is as follows:

6.1.1. Westside Interceptor Recommended Alignments

Based on the discussion in Section 5.4.1, the recommended alignment for the improvement of the Westside Interceptor are those described in paragraphs W 1.0, W 2.0, and W 3.0, W and shown as "PROPOSED" on Figure 5-1.

6.1.2. Eastside Interceptor Recommended Alignments

Based on the discussion in Section 5.4.2, the recommended alignment for the improvement of the Westside Interceptor are those described in paragraphs E 1.0 through E 8.0 and shown as "PROPOSED" on Figure 5-2.

6.2. Individual Grinder Pumps and Private Property Construction

Due to the elevation difference between the proposed sewer alignment and existing lower-elevation residences, low-pressure grinder lift pumps will be required on the downhill side of such residences to convey wastewater to the proposed gravity sewer mains. Discharge piping from each grinder pump would be installed within the private property to the sewer main. The routing of each grinder pump discharge pipeline would be determined based on existing conditions on each private property, and may include buried piping, or piping mounted to existing improvements. The lateral, typically 1-1/4" diameter HDPE piping, from the grinder pump to the sewer main would be pressurized from the pump to the property line. At the property line, the lateral would transition to a gravity lateral and connect to the sewer main matching a typical gravity sewer later connection. Each low-pressure lift pump would be owned, operated, and maintained by the individual property owner.

The properties which would require the installation of a grinder lift pump system are shown in Appendix H and summarized in Table 6-1, along with further estimated construction quantities and repair work to be done within each private property. The locations of proposed lift stations were determined during site visits by MNS staff to each property. The Environment One (E/One) DH071 grinder pump has been used as the basis for the conceptual design of the Project.

Table 6-1. Individual Grinder Pump Construction Summary

Property Address	Estimated Pipe Length (LF)	Estimated Concrete Repair (LF)	Estimated Asphalt Repair (LF)
8225 Bass Point Rd	154	28	30
8227 Bass Point Rd	105	17	17
8140 Smith Point Rd	125	23	-
8143 Smith Point Rd	120	21	31
3128 East Beach Cr	221	8	19
3130 East Beach Cr	306	5	19
3132 East Beach Cr	199	0	3
2864 Lands End Rd	191	3	23
2866 Lands End Rd	200	3	30
2868 Lands End Rd	239	3	44
2870 Lands End Rd	258	3	106
2876 Lands End Rd	213	3	75
2878 Lands End Rd	155	-	7
2880 Lands End Rd	147	-	48
2886 Lands End Rd	123	-	18
2888 Lands End Rd	105	-	16
2894 Lands End Rd	143	-	26
2896 Lands End Rd	173	-	36
2898 Lands End Rd	205	-	80
2900 Lands End Rd	190	51	59
8742 Bluff Ct	319	-	112
8744 Bluff Ct	131	-	28
8746 Bluff Ct	139	-	10
2882 Saddle Way	121	-	7
2884 Saddle Way	190	-	50
Total	4,472	51	266

Each individual grinder lift pump, such as those manufactured by E/One, would be installed below grade on the property of the residence which it serves and would require approximately 5 ft x 5 ft footprint. The pumps would be paid for by the County but would be the responsibility of the property owner to maintain and operate. The required number of pumps for each pump station and final location of each pump will be determined during detailed design through additional site visits and consultations with individual property owners.

6.3. Sewer and Lift Station Design Capacities

County GIS data and Google Earth imagery were used to estimate the number of residences whose flows would be conveyed to each proposed lift station. This number was multiplied by the calculated peak per-unit flow rate, as discussed in Section 4, to estimate the peak flows into each proposed lift station.

The proposed force main alignments, elevations, and estimated inflows were used to develop a hydraulic model to determine required pump flow rates and required total dynamic head (TDH) for the each lift station. Proposed force main diameters were determined using the County standard operating velocity of 4.0 fps. The proposed force main diameter is 3 inches due to the relatively low average flow conditions of the pump stations. However, this size of force main may lead to maintenance challenges due to the difficulty of video-surveying and cleaning smaller pipe diameters.

With the determined pump operating points, Flygt submersible pumps were preliminarily selected, and their factory data was used to size each proposed lift station wet well. Table 6-2 summarizes proposed design parameters for each lift station considered. Detailed lift station calculations can be found in Appendix I and Appendix J.

Table 6-2. Lift Station Design Summary

Design Parameter	Proposed Lift Station		
	Bluff Court	**Bass Point Road**	**East Beach Circle**
Est. Number of Influent Connections	130	30	120*
Est. Peak Inflow	41 gpm	9 gpm	37 gpm
Proposed Force Main Material	HDPE DR 17 IPS	HDPE DR 17 IPS	HDPE DR 17 IPS
Proposed Force Main Diameter	3 in.	3 in.	3 in.
Proposed Lift Station Wet Well Inner Diameter (circular)	96 in.	72 in.	96 in.
Proposed Lift Station Wet Well Minimum Inside Depth**	145 in.	106 in.	137 in.

**Includes 60 unconstructed but planned homes in Tract 2162*

***Includes a 30-inch minimum operating depth and 12-inch free board*

No lift station backup generators are included in this preliminary design. Each lift station is proposed to include a manual transfer switch and a receptacle for connection of a portable generator to allow operation during a power failure.

For the proposed gravity sewer, County design standards specify 8-inch minimum diameter piping and 0.0035 minimum slope allows for a 50% capacity flow rate of approximately 200 gpm. This flow capacity is greater than the estimated maximum flow for any single segment of proposed sewer in the Project. As a result, 8-inch diameter PVC SDR 35 pipe is used as the basis for gravity sewers included in the proposed improvements.

Section 7. Planning Issues by Discipline

The Project involves a variety of engineering disciplines to complete the design for the Project. This section discusses key design considerations, organized by design discipline.

7.1. Geotechnical

As described in Section 5.2.2, significant geotechnical considerations are made regarding the proposed gravity sewer running from Circle Oaks Drive to Lands End Road. See Section 5.2.2 and the full Preliminary Geotechnical Memorandum in Appendix E for more information.

7.2. Tree Impacts

As described in Section 5.2.3, MNS subconsultant, Rincon, conducted a tree survey within the proposed alignment of the Project, noting potential construction impacts to existing trees and their anticipated severity based on preliminary construction plans. Of the 92 live trees surveyed, 3 are proposed to be removed, 10 are expected to have major impacts, 36 would have minor impacts, and 43 are not expected to be impacted. MNS can mitigate some of the expected tree impacts during detailed design by conducting detailed ground surveys and refining proposed alignments to avoid impacts to trees. Further mitigation recommendations discussed in Rincon's survey report include fencing around tree drip lines during construction, avoiding tree roots during excavation, and avoiding soil compaction around trees. The full Arborist Report is available as Appendix K.

7.3. Electrical

Pending pump selection, the submersible pumps proposed for the force main pump stations are expected to be rated at 10 to 20 horsepower (hp), depending on the pump station, and likely require 480-volt service from Pacific Gas and Electric (PG&E). Pump stations will require instrumentation and controls to be integrated with the County's existing SCADA system.

The proposed grinder pump stations require 220-volt power, with an associated dedicated circuit breaker. It is believed all residences requiring grinder pump stations have 220-volt electrical services. Site visits and consultations with property owners will be required to ascertain the necessity of new electrical services and determine how to implement them. Design for electrical connections for each grinder pump station is outside the scope of the design for this Project and will need to be completed on a house-by-house basis for installation of the individual grinder pumps.

7.4. Public Access and Right-of-Way Considerations

Because the Project sewer improvements will not be constructed within existing County right-of-way, new utility easements must be procured. County standards require at least 10 ft of sewer easement width, but MNS recommends 20-ft-wide easements. Table 7-1 shows a list of the proposed Project sewer segments and their anticipated required easements.

Table 7-1. Required Sewer Easements

Westside Interceptor (Appendix F)					
Figure No.	**Upstream MH**	**Downstream MH**	**Length of Sewer Run (LF)**	**No. of Properties Crossed**	**APNs of Properties Crossed**
W-1.0	EX. LS3W-019	MH W-1	164	1	012-231-041
W-1.0	MH W-1	MH W-2	111	2	012-231-041, 012-232-004
W-1.0	MH W-2	MH W-3	113	3	012-232-004, 012-232-021, 012-232-020
W-1.0	MH W-3	MH W-4	64	2	012-232-020
W-1.0	MH W-4	Bluff Ct Pump Station	131	2	012-232-020 012-232-063
W-1.0 / W-2.0	Bluff Ct Pump Station	MH W-5	642	1	012-232-063
W-2.0	MH W-5	MH W-6	82	2	012-232-063, 012-232-033
W-2.0	MH W-6	MH W-7	193	3	012-232-033, 012-254-036, [Lands End Rd*]
W-2.0	MH W-7	MH W-8	151	2	012-254-036, [Lands End Rd*]
W-2.0 / W-3.0	MH W-8	MH W-9	178	1	[Lands End Rd*]
W-3.0	MH W-9	MH W-10	152	1	[Lands End Rd*]
W-3.0	MH W-10	MH W-11	191	1	[Lands End Rd*]
W-3.0	MH W-11	MH W-12	195	1	[Lands End Rd*]
W-3.0	MH W-12	MH W-13	45	1	[Lands End Rd*]
W-3.0	MH W-13	MH W-14	125	1	[Lands End Rd*]
W-3.0	MH W-14	EX. MH LS3W-049	53	1	[Lands End Rd*]

Eastside Interceptor (Appendix G)					
Figure No.	Upstream MH	Downstream MH	Length of Sewer Run (LF)	No. of Properties Crossed	APNs of Properties Crossed
E-1.0	EX. MH LS3E-057	Bass Point Rd Pump Station	20	1	[Bass Point Rd*]
E-1.0	Bass Point Rd Pump Station	MH E-1	655	1	[Bass Point Rd / Shoreline Rd*]
E-2.0	EX. MH LS3E-040	MH E-3	150	2	012-266-041, 012-266-071
E-2.0	MH E-3	MH E-4	221	1	012-266-071
E-2.0	MH E-4	MH E-5	201	1	012-266-071
E-3.0	E Beach Cr Pump Station	EX. MH LS3E-035	1233		012-266-040, [Shoreline Rd*]
E-2.0 / E-4.0	MH E-5	MH E-6	92	4	012-266-071, 012-266-052, 012-266-053, 012-266-054
E-4.0	MH E-6	MH E-7	66	2	012-266-054, 012-266-055
E-4.0	MH E-7	MH E-8	277	2	012-266-055, 012-266-071
E-4.0	MH E-8	MH E-9	104	3	012-266-071, 012-266-057, 012-266-040
E-4.0	MH E-9	E Beach Cr Pump Station	33	1	012-266-040
E-5.0	MH E-12	MH E-11	71	1	[E Beach Cr*]
E-5.0	MH E-11	MH E-10	50	1	[E Beach Cr*]
E-5.0	MH E-10	E Beach Cr Pump Station	185	2	[E Beach Cr*], 012-266-040
E-6.0	MH E-1	EX. MH LS3E-096	329	1	[Shoreline Rd*]
E-7.0	EX. MH LS3E-098	MH E-14	51	1	[Shoreline Rd*]
E-7.0	MH E-14	MH E-15	34	2	[Shoreline Rd*], 012-263-033
E-7.0	MH E-15	MH E-16	99	1	012-263-033
E-7.0	MH E-16	MH E-17	49	1	012-263-033
E-7.0	MH E-17	EX. MH LS3E-099	104	2	012-263-033, 012-263-043
E-8.0	EX. MH LS3E-105	MH E-18	81	1	012-263-040
E-8.0	MH E-18	MH E-19	145	2	012-263-040, 012-263-045
E-8.0	MH E-19	EX. MH LS3E-110	248	2	012-263-045, 012-201-042

* APNs for HOA owned/maintained roadways are not listed on County GIS

To mitigate the risk of future legal conflicts, it is recommended that work to be conducted on private property, such as the installation of individual grinder pumps, be coordinated by each individual property owner through County-pre-approved contractors, rather than directly by the County or through a County hired contractor.

7.5. Public Outreach

MNS Subconsultant, TBC Communications & Media (TBC), will develop pre-construction public outreach materials for the purpose of informing property owners—especially those of properties where Project work will occur, such as houses requiring individual grinder pumps—of the nature and status of the Project. These public outreach materials include pamphlets, community meetings, a press release, and a public website designed to increase transparency of the Project, ensure public support, and therefore mitigate the risk of public pushback that has been known to occur on similar past projects of this nature. TBC will also conduct outreach concurrent with Project construction, such as construction work schedule notices.

Section 8. Permitting Assessment

Rincon has been retained to obtain regulatory permits for construction of the Project. Most of the Project construction is expected to occur within existing roadways or previously developed areas. However, some work below the high-water line of Lake Nacimiento and its tributaries is expected.

8.1.1. CEQA / NEPA Compliance

As part of the project, Rincon will prepare an Initial Study / Mitigated Negative Declaration (IS-MND) in compliance with the California Environmental Quality Act (CEQA) and, if required, the National Environmental Policy Act (NEPA). To serve as a preliminary reference for this and for detailed Project design, Rincon will perform a desktop review of the Project sites' history, cultural resources records, and local special-status species, followed by an archaeological pedestrian survey and a biological field survey. The reviews and surveys will be encompassed in a cultural resources memorandum and a biological resources assessment, which will include documentation necessary to support CEQA review.

8.1.2. Further Permitting

Upon obtaining relevant design information and determining impacts to jurisdictional areas, Rincon will facilitate early agency coordination to confirm the identified permit pathways and confirm permitting requirements. Rincon will be responsible for the preparation of permit applications to the United States Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), and the California Department of Fish and Wildlife (CDFW).

Permit applications will include the following items:

- Project description
- Location description
- Description of existing conditions and expected impacts
- Description of restoration of temporary impacts and/or access paths
- Site photographs
- Proposed fill/dredge volume and/or removal of vegetation within the respective agencies' jurisdiction
- Impacts to special status species and vegetation
- Proposed measures to avoid and minimize impacts

The following permits are expected to be required as part of the Project. Further permits may be necessary.

Clean Water Act Section 404 Nationwide Permit

A Clean Water Act (CWA) Section 404 permit from USACE is expected to be required to address potential impacts to waters of the U.S. resulting from the Project. The Project is anticipated to qualify for NWP Permit 58 (Utility Line Activities for Water and Other Substances). As such, a pre-construction notification (PCN) will be prepared and submitted to USACE, which will include the information listed above as well as the aquatic resources delineation (ARD) report, baseline risk assessment (BRA), and Historic Properties Identification Report. Following County review, Rincon will submit the PCN to the USACE.

Clean Water Act Section 401 Water Quality Certification

Due to the need for a CWA Section 404 permit, issuance of a Water Quality Certification (WQC) from the RWQCB is also required to achieve compliance with CWA Section 401. This task involves preparation and submittal of an application for WQC, including the information listed above as well as the ARD report, BRA, and Initial Study / Mitigated Negative Declaration (IS-MND). The application will also include all measures that will be employed to avoid and minimize water quality impacts from sedimentation during construction. Following County review, Rincon will submit the application to the RWQCB. Pursuant to the federal 401 Rule, the initial application will be a "draft" application that will be submitted to RWQCB along with a request for a pre-application meeting, which is required at least 30 days prior to submittal of the final application. Following the pre-application meeting, the application will be revised and submitted as final to RWQCB.

Lake and Streambed Alteration Agreement

Under California Fish and Game Code Section 1600, CDFW requires a Lake and Streambed Alteration Agreement for potential impacts to lakes or streambeds and adjacent riparian vegetation. Rincon will prepare the required notification and supporting documentation for CDFW. The notification will include the information listed above as well as the ARD report, BRA, and IS-MND. Following County review, Rincon will submit the application to CDFW through its online application system (EPIMS) unless otherwise directed.

Section 9. Construction Cost Estimate

Preliminary construction cost opinions have been developed for the recommended Project and are summarized in Table 9-1. Detailed calculations of construction cost opinions are included as Appendix L.

Table 9-1. Construction Cost Estimate Summary

Project Element	Estimated Construction Cost	
Mobilization and Demobilization	$	350,000
Traffic Control	$	40,000
Sheeting, Shoring, and Bracing	$	100,000
Environmental Protection / Mitigation	$	150,000
Erosion and Sediment Control	$	30,000
8" Proposed Gravity Sewer	$	832,000
8" Gravity Sewer Main (Overland)	$	646,000
Overland Pipe Bridge	$	150,000
3" Proposed Force Main	$	442,000
Proposed Manhole	$	420,000
Proposed Grinder Pumps	$	750,000
Proposed Lift Stations 1-2	$	1,400,000
Proposed Lift Station 3	$	800,000
Abandon Existing Pipe	$	257,100
Proposed Private Pressure Lateral	$	670,800
Private Concrete Repair	$	10,200
Private Asphalt Repair	$	29,260
Miscellaneous Private Improvement Repair	$	80,000
Subtotal	$	7,157,360
Division 1 Costs (2%)	$	143,147
Taxes – Material Costs (7.63%)	$	265,436
Contractor OH&P (12%)	$	921,622
Estimate Contingency (30%)	$	2,546,269
Inflation Escalation (12%)	$	1,324,060
Total Construction Cost Estimate (Rounded to nearest $ 10,000)	**$**	**12,360,000**

Further additional costs will be incurred as part of the Project. The additional costs are estimated based on an assumed percentage of the construction cost and included in the total Project costs. A total Project cost for the recommended improvements is provided in Table 9-2.

Table 9-2. Total Project Costs

Item	Percent of Construction Cost	Cost
Project Construction	100%	$ 12,360,000
Administration	3%	$ 370,000
Easement Acquisition	3%	$ 370,000
Topographic and Boundary Survey	1%	$ 120,000
Detailed Design	10%	$ 1,240,000
Traffic Control Plans and Permitting	1%	$ 120,000
Environmental Permitting	1%	$ 120,000
Construction Management	15%	$ 850,000
Total Project Cost		**$ 16,550,000**