LOS OLIVOS COMMUNITY SERVICES DISTRICT WASTEWATER COLLECTION AND CONVEYANCE SYSTEM REPORT UPDATE

MAY 2026

WALLACE GROUP®

612 CLARION COURT . SAN LUIS OBISPO . CA 93401

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CERTIFICATION

In accordance with the provisions of Section 6735 of the Business and Professions Code of the State of California, this report was prepared by or under the direction of the following Civil Engineer, licensed in the State of California:

ENGINEER IN RESPONSIBLE CHARGE:

____ 05/28/2026______

Kari Wagner, PE C66026 — **Date**

Expiration: 6/30/2028

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS AND ABBREVIATIONS

ACP	Asbestos Cement Pipe
ADDWF	Average Daily Dry Weather Flow
ADMMF	Average Daily Maximum Month Flow
ADWF	Average Dry Weather Flow
AG	Agriculture
BODR	Basis of Design Report
CAD	AutoCAD Civil 3D
CBC	California Building Code
CCS Report	Los Olivos Community Services District Wastewater Collection and Conveyance System Report Update
CCS83	California Coordinate System of 1983
CCTV	Closed Circuit Television
CDFW	California Department of Fish and Wildlife
CIP	Capital Improvement Project
City	City of Solvang
County	County of Santa Barbara
d/D	Depth of Flow / Diameter
District	Los Olivos Community Services District
EDU	Equivalent Dwelling Unit
Ex.	Existing
FEMA	Federal Emergency Management Agency
FIRM	Flood Rate Insurance Map
fps	Feet per Second
ft	Feet
GIS	Geographic Information System
GPCD	Gallons per Capita per Day
GPD	Gallons per Day
GPM	Gallons per Minute
HDD	Horizontal Directional Drilling
HDPE	High Density Polyethylene Pipe
HSG	Hydrologic Soil Group
I/I	Inflow and Infiltration
ID1	Santa Ynez River Water Conservation District, Improvement District No. 1
LCCA	Life Cycle Cost Analysis
LOCSD	Los Olivos Community Services District
LS	Lift Station
MBR	Membrane Bioreactor
MGD	Millon Gallons per Day
Min.	Minimum
MND	Mitigated Negative Declaration
NAD	North American Datum
NAVD	North American Vertical Datum
NRCS	Natural Resources Conservation Service
NPV	Net Present Value
O&M	Operations and Maintenance

PDDWF	Peak Day Dry Weather Flow
PE	Polyethylene
PHWWF	Peak Hour Wet Weather Flow
PMDWF	Peak Month Dry Weather Flow
PVC	Polyvinyl Chloride
psi	Pounds per Square Inch
PWWF	Peak Wet Weather Flow
ROW	Right-of-Way
RWQCB	Regional Water Quality Control Board
SBCAG	Santa Barbara County Association of Governments
SBR	Sequencing Batch Reactor
SPA	Special Problem Area
SSFM	Sanitary Sewer Force Main
SSMH	Sanitary Sewer Manhole
STEP	Septic Tank with Effluent Pump
VFD	Variable Frequency Drive
WMP	Wastewater Management Plan
WSE	Water Surface Elevation
WWTP	Wastewater Treatment Plant

EXECUTIVE SUMMARY

This report presents the Wastewater Collection and Conveyance System Report Update (CCS Report) for the District.

PURPOSE

The preparation of this CCS Report is intended to:

- Evaluate two scenarios: conventional gravity collection system and the septic tank with effluent pump (STEP) system.
- Evaluate each scenario's strengths and weaknesses.
- Provide a peer review of the previously prepared BODR and 30% design prepared by Stantec in March 2025 and the REGEN 30% STEP design completed in 2024, with recommendations for design element changes.
- Identify unknowns, assumptions, and alternatives to the two scenarios.
- Identify impacts to the City of Solvang's sewer collection system and wastewater treatment plant.
- Prepare an Engineer's Opinion of Probable Cost for both scenarios based on the updated design.
- Prepare a 30-year Life Cycle Cost Analysis for both scenarios to aid in the selection of the design alternative, allowing the community the opportunity to determine the optimal design solution.

INTRODUCTION

This Los Olivos Community Services District Wastewater Collection and Conveyance System Report Update (CCS Report) is presented in ten chapters, summarized as follows:

- **Chapter 1: Introduction.** Chapter 1 presents an overview of the goals of this report, authorization and scope of work, and acknowledgement of the various staff and personnel involved in the preparation of this document.

- **Chapter 2: Study Area Characteristics.** Chapter 2 focuses on important characteristics of the study area. Key parameters established in this chapter include existing and future land uses, topography, groundwater, and identification of the study area.

- **Chapter 3: Existing Conditions Overview.** Chapter 3 provides a summary of the information gathered by Wallace Group and LOCSD related to the locations of existing utilities and septic systems, existing roadway improvements, and existing bridges/creek crossings.

- **Chapter 4: Assumptions and Design Criteria.** Chapter 4 provides a discussion of the assumptions and design criteria for both the collection and the conveyance systems.

- **Chapter 5: Wastewater Flow Estimate.** Chapter 5 focuses on the calculations and data used to estimate the wastewater flow entering the collection and conveyance systems.

- **Chapter 6: Wastewater Collection System Design and Analysis.** This chapter analyzes the gravity and pressure (STEP) main alternatives for the collection system upstream of the conveyance system and compares the advantages and disadvantages of each system. Design considerations for the collection system include anticipated construction methods, potential for shallow groundwater and dewatering, maintenance and operation of the system, and pipe capacity.

- **Chapter 7: Conveyance to the City of Solvang.** This chapter presents multiple approaches to the conveyance of wastewater from the collection system described in Chapter 6 to the point of connection to the City's WWTP. The conveyance system will be analyzed using much of the same criteria as the collection system. Additionally, discussion of the advantages and disadvantages of each design alternative including flow rates equalization, potential property acquisition, and creek crossing coordination with the City are included in this chapter.

- **Chapter 8: Impacts on the City of Solvang.** Chapter 8 analyses the potential impacts to the City's WWTP due to the construction of the District's wastewater collection and conveyance systems.

- **Chapter 9: Life Cycle Cost Analysis.** This chapter presents a 30-year life cycle cost analysis (LCCA) including initial construction cost estimates and operations and maintenance cost estimates for the LOCSD and the private property owners (commercial and residential) for each of the project scenarios.

- **Chapter 10: Summary of Findings.** This chapter provides an overview of the combined advantages and disadvantages of each design alternative for the collection and conveyance systems. A discussion of assumptions requiring further investigation and additional considerations for final design are included in Chapter 10.

PROJECT BACKGROUND AND HISTORY

Los Olivos is a small community with a population of approximately 1,000 permanent residents in the Santa Ynez Valley within the County of Santa Barabara. The Los Olivos community is known as a tourist destination, centrally located amongst the rolling hills and local wineries. During holidays, weekends, and the summer tourist season, there is estimated to be between 4,000 to 5,000 tourists that travel through or stay in Los Olivos.

Currently there is no community wastewater collection system or disposal within the District boundary, and thus wastewater disposal is via on-site wastewater treatment systems (septic tanks) located on each parcel. In addition, several commercial sites in the downtown core bring in portable toilets during the tourist season as their existing septic systems do not have the capacity to treat the temporary flow increases.

The community is designated as a Special Problem Area (SPA) by the County of Santa Barabara due to all parcels being on septic systems and the impact the septic systems have on local groundwater. There are currently around 350 septic systems per the Los Olivos Wastewater Management Plan 2010 (WMP). The LOCSD boundary includes a total of 391 parcels, of which 358 have existing septic systems. The remainder lots are currently vacant. There are also an additional 27 parcels located outside the service area boundary.

In 2003, prior to the formation of the District, the County of Santa Barabara commissioned a study for assessment of existing septic systems within the County by Questa Engineering. The study found that Los Olivos was a high problem area for existing septic systems due to the total number, density, age, and proximity/threat to surface water and groundwater. This study recommended that the County pursue a feasibility study for the development and implementation of a community wastewater facility for the town of Los Olivos.

The Los Olivos Wastewater Management Plan prepared by the County of Santa Barabra Environmental Health Services at the request of the Regional Water Quality Control Board made recommendations to mitigate the negative effects of the existing septic systems to the groundwater quality. This management plan reviewed the feasibility of traditional and advanced onsite wastewater disposal systems, and communal systems using gravity or STEP systems. Many options for centralized treatment options include a centralized treatment plant, package plant, conveying wastewater to Solvang Wastewater Treatment Plant, and a joint system with the community of Ballard. The Los Olivos Wastewater Management Plan recommended the formation of a Special Services District to fund and manage the implementation of the centralized treatment options.

In 2013, AECOM prepared the Los Olivos Wastewater System Preliminary Engineering Report for evaluating and making recommendations for a community collection, treatment and disposal system for the Los Olivos community. This report provided an assessment of two sewer collection system options, four treatment system options, and four effluent disposal alternatives. This report outlined the process for the formation of a special district.

The Los Olivos Wastewater System Preliminary Engineering Report was updated by AECOM in 2016 at the request of the Los Olivos Steering Committee. This update refined the preliminary report and added a "No Action" alternative to the cost estimate for a homeowner to continue using onsite wastewater treatment systems meeting current guidelines.

In 2018, the Los Olivos Community Services District was formed to facilitate the construction and operation of wastewater, recycled water, and stormwater collection and disposal.

Wastewater Collection and Treatment Basis of Design Report Final was prepared by Stantec Consulting Services in January 2022. This report proposed a gravity collection system with the construction of a wastewater treatment facility within the community. There was resistance from the community to the proposed locations of the wastewater treatment facility and the property acquisition costs limiting the feasibility of the new wastewater treatment facility.

In August of 2024, LOCSD contracted with Carollo Engineers for an evaluation of the potential impacts to the City of Solvang's wastewater treatment plant caused by the connection of the of LOCSD's wastewater flows. Carollo's technical memorandum concluded that the Solvang WWTP would be able to receive wastewater from LOCSD without exceeding plant capacity and comply with its effluent permit limits if the LOCSD connection was made after the proposed Phase II Solvang WWTP Upgrade project was completed which is expected by April 2028.

In 2024, the District hired REGEN to prepare a preliminary 30% design for a pressure effluent sewer wastewater collection system. This collection system was comprised of 3"-6" pressure mains within the roadways and a STEP system on each private parcel. While the shallower force main with smaller pipe sizes could potentially reduce the cost of construction for the District as compared to a gravity collection system, there were concerns over the cost of the STEP system for the private property owners.

In 2025, Stantec prepared a Basis of Design Report Final for the LOCSD Wastewater Connection to City of Solvang WWTP which included a 30% design for the lift stations, flow equalization storage, and a sewer force main to connect the LOCSD collection system to the Solvang sewer collection system.

COLLECTION SYSTEM

For the proposed collection system, Wallace Group prepared a 30% progress design for a gravity collection system and a pressure main collection system. The gravity collection system assumes open trench construction of 8" minimum PVC pipe with a minimum slope of 0.40%.

The proposed pressure sewer main will consist of 4" diameter PE pipe that could be constructed by open trench or horizontal directional drilling (HDD).

A minimum depth of cover of 5 feet below existing grade was used for the preliminary design of both sewer collection systems to reduce the potential for crossing conflicts with existing waterlines, storm drains, and other existing utilities.

For further information on the preliminary design of the sewer collection system alternatives, please see Chapter 6.

CONVEYANCE SYSTEM

Wallace Group prepared a 30% progress design for a pumped conveyance system and a gravity conveyance system to the City along Alamo Pintado Road. Both concepts begin at the southern tip of the LOCSD boundary and discharge to an existing manhole in the City's collection system. The pumped conveyance system assumes horizontal directional drilling (HDD) construction for a 6" HDPE DR 11 pipeline. The gravity conveyance system assumes open trench construction with a minimum pipe slope of 0.40%. The 30% progress plans show a 12" PVC gravity sewer, however further analysis indicated that a 10" gravity sewer will likely be sufficient. This will need to be confirmed at a later stage of design.

LIFE CYCLE COST ANALYSIS

The LCCA provides a comparison of the estimated permitting costs, engineering costs, administrative costs, construction costs, and operations and maintenance costs over a thirty-year period for each of the design alternatives. Estimated costs for the individual property owners and the District for each design alternative have been identified.

TABLE ES-1. LIFE CYCLE COST ANALYSIS SUMMARY

		Scenario 1 (Gravity Collection & Pumped Conveyance)	Scenario 2 (STEP Collection & Pumped Conveyance)
A	Capital Costs (LOCSD)	$51,180,900	$38,643,900
B	Capital Costs per EDU (LOCSD, 761 EDUs)	$67,300	$50,800
C	Private Residential Capital Costs (per EDU)	$16,400	$39,200
D	Private Commercial Capital Costs (per EDU)	$16,400	$85,600
E	30-Year Life Cycle Cost (LOCSD) - NPV	$52,893,600	$39,605,700
F	30-Year Life Cycle Costs per EDU (LOCSD, 761 EDUs) - NPV	$69,600	$52,100
G	30-Year Private Residential Life Cycle Cost – NPV (per EDU)	$18,600	$45,400
H	30-Year Commercial Life Cycle Cost – NPV (per EDU)	$18,600	$109,800
I	**Estimated Total Residential Cost (30-Years)[1] (per EDU)**	**$88,200**	**$97,500**
J	**Estimated Total Commercial Cost (30 Years)[2] (per 6 EDUs)**	**$436,200**	**$422,400**

1. Calculation for the Residential 30 Year cost: F+G
2. Calculation for the Commercial 30 Year cost: (F*6) + H

Note: the estimates listed above are intended to be for comparison purposes only. These costs are based on preliminary information and do not include all costs that will be associated with this project including, but not limited to financing costs, closing costs, interest, City of Solvang connection fees, City of Solvang capital improvement projects, etc.

SUMMARY OF FINDINGS

LOCSD contracted with Wallace Group to provide a peer review of previous studies for both a gravity and a pressure collection system. Wallace Group has prepared 30% drawings for both the gravity and pressure systems as well as the conveyance system to reconfirm/update the designs also prepared by previous consultants. These drawings aided in the development of our Engineer's Opinion of Probable Costs discussed in detail in Chapter 9.

In addition, Wallace Group completed a 30-year Life Cycle Cost analysis to evaluate the long-term costs for both the District and the private property owners which had not been previously completed. In summary, over a 30-year period, the costs for a gravity system versus a pressure system are fairly close with the anticipated costs for the gravity system being slightly lower than a pressure system. The initial construction costs for the gravity system for the District are higher than the pressure system but the on-site construction costs for the private pressure systems are more costly than the gravity system. In addition, the long-term operations and maintenance costs for the pressure system slightly out-paces the cost of the gravity systems.

As a supplement to these findings, Wallace Group will prepare a sensitivity analysis and will submit this sensitivity analysis under separate cover. The sensitivity analysis will evaluate various items in the capital and O&M costs for both systems to determine what factors could make or not make additional impacts on the overall life cycle cost.

Assumptions Requiring Further Investigations

This CCS Report is based on many assumptions that will require further refinement as Wallace Group works through final design. Geotechnical investigations are necessary to confirm subsurface assumptions for construction methods as well as groundwater. Dewatering for construction is an unknown with significant cost implications. Depth of the gravity collection system will depend largely upon location of existing septic tanks on private lots and depth of existing utilities in the roadway, both of which will require further investigations during final design and will ultimately impact the design and costs.

Additionally, further discussions with the City of Solvang are required to better understand their needs for flow equalization. If flow equalization is not required, the Santa Barbara Lift Station could be potentially eliminated altogether in the pressure system. The elimination of the lift station from Scenario 2 will be considered in the sensitivity analysis discussed above.

Other design refinements will be evaluated as design progresses, but these refinements will affect both Scenarios equally, thus are not further discussed. These refinements will ultimately affect the Engineer's Opinion of Probable Cost, which will get updated at each design stage.

Additional Items to Consider

Since costs do not glaringly suggest one system over another, there are additional items that should be considered as the District evaluates the desired collection system methodology. Table 10-1 provides a summary of the strengths and weaknesses for both systems which could aid in the overall considerations.

TABLE ES-2. SUMMARY OF STRENGTHS & WEAKNESSES

	Scenario 1 (Gravity Collection & Pumped Conveyance)	Scenario 2 (STEP Collection & Pumped Conveyance)
Strengths	**Proven, long-established technology** Gravity sewers are widely used and well-understood by engineers, operators, and regulators.	**Lower installation cost** Uses shallower trenches and smaller diameter pipe.
	Low routine operational complexity Once installed, the system relies primarily on natural gravitational flow with minimal mechanical equipment.	**Reduced infiltration and inflow (I&I)** Sealed pressure pipes and buried tanks greatly limit unwanted water entering the system.
	Less dependence on power Except at lift stations, flow is not reliant on electrical service.	**Flexible alignment** Pipes can follow terrain with fewer constraints, reducing construction impacts.
		Lower Flows, BOD, & TSS This may reduce connection fees with the City of Solvang, but still requires negotiations
Weaknesses	**High capital cost** Deep trenching, manholes, dewatering, shoring, and utility conflicts significantly drive-up installation cost.	**Higher operational and maintenance requirements** Each connected property has pumps, floats, and electrical components that must be maintained or replaced.
	Infiltration and inflow (I&I) risk Manholes, pipe joints, and cracks are common entry points for stormwater and groundwater, increasing flows.	**Power-dependent** Pump operation requires electricity; outages can affect reliability unless backup systems are installed. Septic tanks have limited capacity before overflows will occur.
	Larger construction footprint Deep excavations cause more disruption to roads, traffic, and adjacent utilities.	**Decentralized responsibility** Homeowners or utilities must maintain individual tanks and pumps—leading to more service calls and variability in upkeep. District will likely need to obtain an easement on all properties to access the septic tanks and pumps for maintenance
		Shorter equipment life Pumps typically require replacement every 8–12 years, adding to lifecycle costs.
		Sewer odors/Higher H2S Tanks must be periodically pumped and can generate odors if not serviced properly. Higher H2S at connection point to Solvang.
		Sewer Main Break In a sewer main break, all upstream connections are impacted until system is repaired. Bypassing is more difficult.

CHAPTER 1
INTRODUCTION

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PREVIOUS REFERENCED STUDIES

Below is a list of the previous studies related to the collection, conveyance, and disposal of wastewater within the community of Los Olivos.

- Septic System Sanitary Survey for Santa Barbara County California prepared by Questa Engineering Corporation, dated March 2003
- Santa Barabara County Los Olivos Wastewater Management Plan, dated September 2010
- Los Olivos Wastewater System Preliminary Engineering Report prepared by AECOM, dated January 8, 2013
- Final Draft Plan for Services & Feasibility Study Los Olivos Water Reclamation prepared by Berkson Associated, dated October 22, 2016
- Update to Los Olivos Wastewater System Preliminary Engineering Report prepared by AECOM, dated November 2, 2016
- City of Solvang 2021 Sewer Master Plan prepared by Water Systems Consulting, dated 11/8/2021
- Wastewater Collection and Treatment Basis of Design Report Final prepared by Stantec Consulting Services, Inc., dated January 7, 2022
- Basis of Design Report Los Olivos Wastewater Hybrid Collection Analysis prepared by Regen AEC, PLLC, dated May 7, 2024
- Technical Memorandum – Wastewater Connection Evaluation prepared by Carollo Engineers, dated November 2024
- Technical Memorandum – Los Olivos CSD Flow Impacts on Solvang Wastewater Treatment Plant, prepared by Water Systems Consulting, dated 12/20/2024
- LOCSD Connection to City of Solvang Basis of Design Report Final prepared by Stantec Consulting Services, Inc., dated March 21, 2025
- Technical Memorandum – Bi-Annual Groundwater Monitoring Report for the Los Olivos Community Services District Groundwater Quality Monitoring Network prepared by GSI Water Solutions, Inc., dated January 13, 2026

ENVIRONMENTAL REVIEW

Los Olivos Community Services District has contracted with Padre Associates Inc for environmental review and permitting of the proposed sewer collection and conveyance system. Currently, the Padre Associates environmental study is based upon the 2025 preliminary design prepared by Stantec Consulting Services. Under the preliminary conditions, it is anticipated that the project will receive a Mitigated Negative Declaration (MND). Further coordination on the environmental impact study will be needed between Padre Associates, Wallace Group, and LOCSD after the preferred design alternative is selected and the project moves into final design.

It is worthy to note that there is a historical presence of the Santa Ynez Band of Chumash Indians within the project vicinity and that archaeological mitigation measures should be anticipated during construction. This will increase costs for inspection during construction as tribal monitoring will be required for all excavations in addition to environmental monitoring and construction inspections.

In addition, this project includes three sanitary sewer crossings of the Alamo Pintado Creek. The first crossing is part of the collection system and is near the intersection of Alamo Pintado Road and Santa Barbara Avenue. The conveyance system design has two creek crossings which are located just south of the intersection of Adobe Canyon Road and Alamo Pintado Road, and to the north of the intersection of Lolland Folster Road and Alamo Pintado Road. Creek crossings add a higher level of environmental impact and design considerations. These crossings also increase construction costs. This CCS Report discusses multiple alternatives on how to cross the creeks.

AUTHORIZATION AND SCOPE OF WORK

In October 2025, the District authorized Wallace Group to provide a Wastewater Collection and Conveyance System Report Update. The scope of work is as follows:

Task 1. Document Review and Data Collection

Wallace Group reviewed the previous studies prepared by Stantec and Regen related to the preliminary design of the wastewater collection and conveyance system. Our review focused on design criteria and assumptions made in the previous studies along with potential environmental impacts or construction concerns.

LOCSD provided record drawings for some existing storm drain facilities within the project vicinity and facilitated the collection of data related to the locations of existing private septic tank locations. Wallace Group, with assistance from LOCSD, met with City of Solvang Staff to obtain design criteria and record information for the connection to the City of Solvang WWTP. Additionally, Wallace Group and LOCSD met with Santa Ynez River Water Conservation District, Improvement District No. 1 (ID1) and requested record drawings or any available information of the existing water distribution system, and water use data for the last three years.

Wallace Group used Civil Grid mapping services to obtain record drawings, atlases, and contact information for the utility providers and existing utilities within the project vicinity.

Task 2. Field Effort - Surveying

Wallace Group began the survey task by reviewing the existing topographic survey included in the Stantec preliminary design and prepared an exhibit indicating locations where additional field surveys would be needed for final design. Wallace Group contracted with AeroTech Mapping Technologies, LLC in November 2025 for an aerial survey to obtain the topography of the 3.4 mile x 100 ft wide conveyance system corridor.

Our survey team performed field survey of existing monuments critical to confirming existing rights-of-way and property boundaries within the District. Our survey team also surveyed existing storm drains and bridge crossings to support critical design points in the wastewater collection and conveyance systems and collected surface evidence of existing utilities along the corridor from LOCSD to the City of Solvang WWTP tie-in.

Task 3. 30% Design of Wastewater Collection System

Wallace Group utilized data collected in Tasks 1 and 2 to prepare a 30% progress plan for a gravity main collection system and a pressure main (or septic tank with effluent pump (STEP)) collection system. The wastewater collection system provides a sanitary sewer main located in the existing roadways (County right-of-way) to be owned, operated, and maintained by the District, with service lateral stub-outs to the property line for connection to the collection system by private property owners. Design of the on-site sewer laterals or the STEP system is not currently part of the design scope of work. The design also includes the preliminary layout of a collection system lift station on Grand Avenue at Roblar Avenue.

Task 4. 30% Design of Wastewater Conveyance System

Using data collected during Tasks 1 and 2, Wallace Group prepared 30% progress plans for a pressure main system to convey wastewater from LOCSD to the City of Solvang's sewer collection system including the preliminary layout of the lift station on Alamo Pintado Road. Wallace Group also looked at a gravity main system but did not provide plan and profile design sheets to illustrate the potential design option.

Task 5. Wastewater Collection and Conveyance System Report Update

In addition to providing an evaluation of assumptions and design criteria from the previous BODR Report for both the collection and conveyance systems, this report update includes discussion of creek crossing alternatives, lift station locations, estimates of probable construction costs for construction and a 30-year life cycle cost analysis for both the District and individual property owners.

ACKNOWLEDGEMENTS

The Los Olivos Community Services District Wastewater Collection and Conveyance System Report Update and 30% Preliminary Design is prepared by Wallace Group on behalf of the Los Olivos Community Services District. Wallace Group gratefully acknowledges the Los Olivos Community Services District, City of Solvang, and County of Santa Barbara for their efforts, involvement, and assistance in preparing the Los Olivos Community Services District Wastewater Collection and Conveyance System Report Update and 30% Preliminary Design.

Los Olivos Community Services District

Julie Kennedy, Board President
Tom Fayram, Board Member
Guy Savage, General Manager
Doug Pike, PE, District Engineer

City of Solvang

Jose Acosta, Utilities Director

County of Santa Barbara

Erik Adelman, PE, Engineering Manager, Capital Maintenance

The Los Olivos Community Services District Wastewater Collection and Conveyance System Report Update and 30% Preliminary Design was completed with the efforts of many Wallace Group team members. They include:

Kari Wagner, PE, COO/Principal
Rachel Hawthorne, PE, Director of Civil and Transportation Engineering
Erik Rutherford, PE, Senior Mechanical Engineer
Ralph Schell, Senior Technical Designer
Alex Cass, PE, Water Resources Engineer
Clayton Bradshaw, PLS, Director of Survey
Ryan Burmaster, Surveyor

CHAPTER 2
STUDY AREA CHARACTERISTICS

This Chapter presents an overview of the characteristics of the study area. This chapter establishes the regional topography, existing and future land uses within the study boundary. All figures are located at the end of this chapter.

INTRODUCTION

The community of Los Olivos is a small town full of history and charm located in Santa Barbara County, situated 30 miles south of the City of Santa Maria. The community is designated as a Special Problem Area (SPA) by the County of Santa Barabara due to all parcels being on septic systems and the negative impact the septic systems have on local groundwater.

STUDY AREA

The following sections discuss the existing characteristics of the study area as well as the land uses. Identifying existing and future land use for the District is important for evaluating estimated wastewater flow rates. The existing land uses are based on the County of Santa Barbara's Geographic Information System (GIS) database.

Study Boundary

The CSS Report study area boundary includes 65 commercial parcels, 325 residential parcels, and an elementary school within the LOCSD service area in the vicinity of the Special Problem Area. The study area boundary for the collection system generally follows the District boundary as shown in FIGURE 2-1 and Special Problem Area as seen in FIGURE 2-2. The study area boundaries for the collection system and conveyance system are shown in FIGURE 2-3 and FIGURE 2-4, respectively. The LOCSD is bounded by San Marcos Pass Road (SR 154) to the north, Alamo Pintado Road to the south, Grand Avenue and Easton Avenue to the east, and Santa Barbara Avenue to the west. Alamo Pintado Creek flows from north to south within the study area and bisects the collection system creating two wastewater collection sub-systems to the east and west of the creek. The east and west collection subsystems converge just upstream of the creek crossing near the intersection of Roblar Avenue, Santa Barbara Avenue, and Alamo Pintado Road.

The conveyance system begins directly downstream of the convergence of the east and west collection systems near the intersection of Roblar Avenue, Santa Barbara Avenue, and Alamo Pintado Road. The conveyance system runs southerly along Alamo Pintado Road to the point of connection to the City of Solvang's sewer collection system near the intersection of Alamo Pintado Road and Creekside Drive.

Topography

As described in Task 2, Wallace Group utilized the topographic survey performed by Stantec and performed additional field and aerial survey at locations critical to the preliminary design of the collection and conveyance systems.

Project Control was established based on control provided by the 2022 Stantec survey. The horizontal datum for this survey is the North American Datum of 1983, Epoch Date of 2017.5 (NAD83 2017.5). The projection used is the California Coordinate System of 1983 (CCS83), Zone 5. Elevations are based upon the North American Vertical Datum of 1988 (NAVD88).

The topography in the vicinity of the collection system for the community of Los Olivos generally slopes from north to south with elevations ranging from 835 to 725 feet. Alamo Pintado Creek also flows from north to south in the study area while acting as the main conveyance for stormwater for the community. While the downtown area is relatively flat, the residential neighborhoods towards the District boundary are comprised of rolling hills.

Topography in the vicinity of the conveyance system trends similar to the collection system. The existing grade of the Alamo Pintado Road corridor also slopes from north to south, elevations ranging from 750 to 510 feet.

Soil Characteristics

As shown in the Soil Resource Map of the study area obtained from the USDA Natural Resources Conservation Service (NRCS), FIGURE 2-5 and FIGURE 2-6, there are many soil types throughout the project site. The two most prevalent soil types are Salinas silty clay loam and Salinas loam which together make up 62% of the project site. Approximately 10% of the study area is designated as Cropley silty clay.

The NRCS report suggests that approximately 83% of soils within the study area are classified as Hydrologic Soils Group C which is described as soils having slow infiltration rates when thoroughly wet.

Groundwater

LOCSD has five active groundwater monitoring wells as shown in FIGURE 2-7. Groundwater levels measured at the monitoring wells on December 17, 2025, ranged from 4.6 to 28.6 feet below the surface with the highest groundwater level measured in Monitoring Well # 5 located near the intersection of Grand Avenue and Roblar Avenue just upstream on the Alamo Pintado Creek crossing.

Previous groundwater monitoring reports from 2024-2025 confirm the trend of higher groundwater levels at the southern portion of the collection system than in the northern area of the collection system.

Flood Hazard Areas

As noted above, Alamo Pintado Creek bisects the study area for the collection system and roughly parallels the Alamo Pintado Road corridor of the conveyance system. Please see FIGURE 2-8 and FIGURE 2-9 for an overview of the flood hazard area related to the project study area. For further information, please see the FEMA Flood Maps in Appendix F.

Land Use

LOCSD is comprised of 391 existing parcels, zoned for residential and commercial uses and one elementary school. TABLE 2-1 summarizes the different land uses in the LOCSD's boundary. Land use data shown on FIGURE 2-10 is GIS data for the County of Santa Barabara.

TABLE 2-1. LOCSD EXISTING LAND USE

	NUMBER OF PARCELS
RESIDENTIAL PARCELS	298
VACANT RESIDENTIAL PARCELS	27
COMMERCIAL PARCELS	59
VACANT COMMERCIAL PARCELS	6
SCHOOL	1
TOTAL	391

Future Land Use

For the purposes of this report, future land use is assumed to remain as currently zoned. Existing vacant parcels are assumed to be built out to allowed use based upon zoning regulations. Wallace Group also assumes some densification of commercial parcels upon completion of a sewer collection system. This is further discussed in Chapter 5 regarding wastewater flow estimates.

FIGURE 2-1: Los Olivos Community Services District Boundary

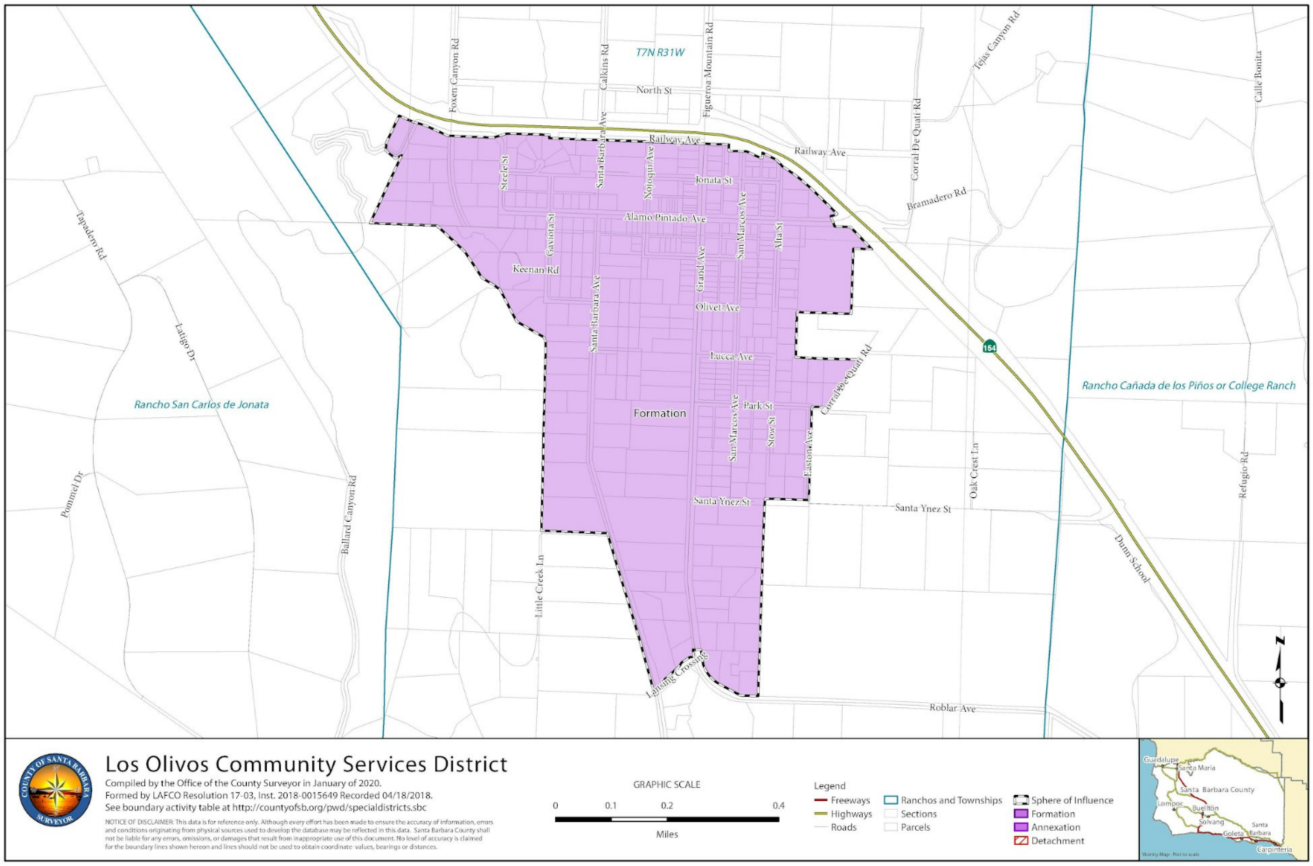
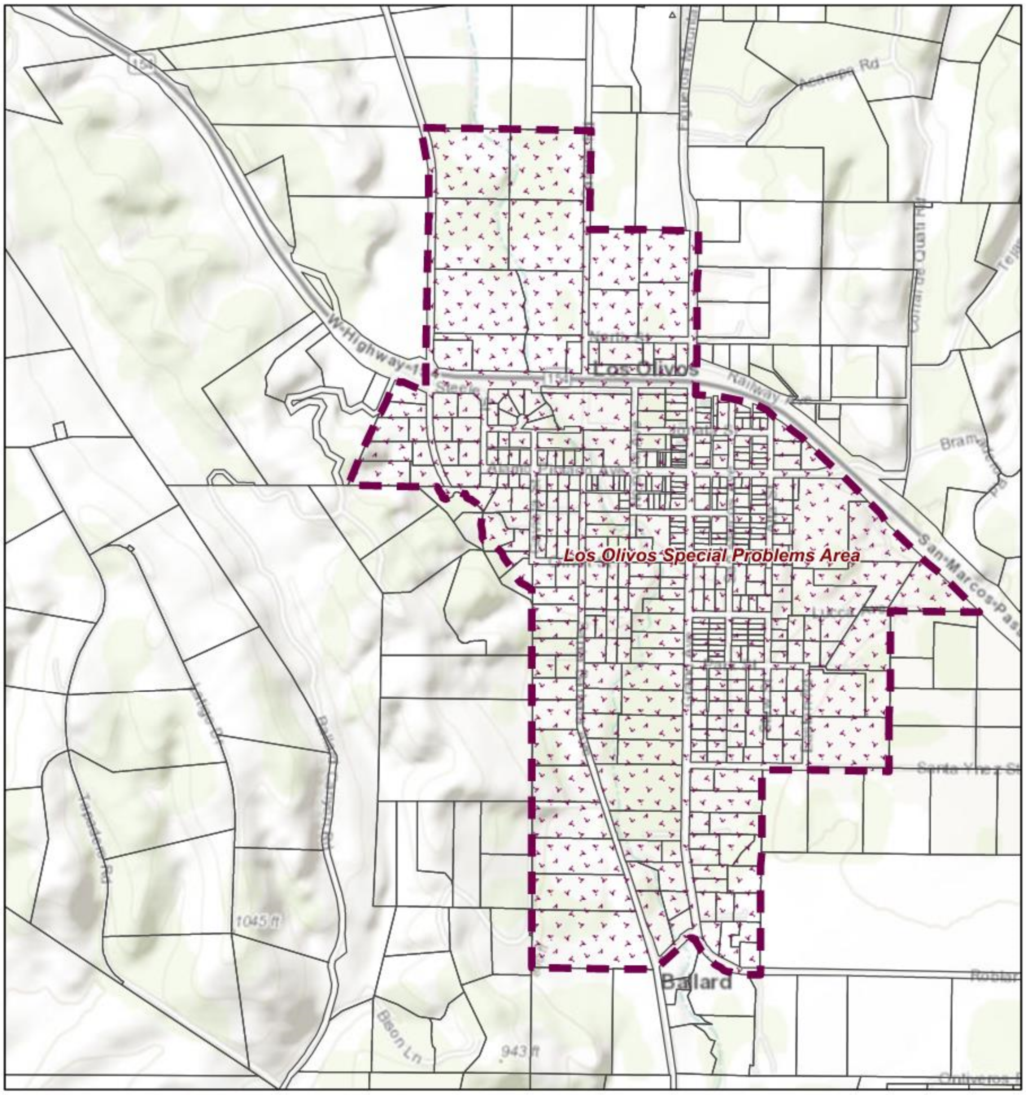


FIGURE 2-2: Special Problem Area



3/22/2026, 2:13:17 PM

Special Problem Areas

Parcel Boundaries

1:18,056

0 0.13 0.25 0.5 mi

0 0.2 0.4 0.8 km

Bureau of Land Management, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA

ArcGIS Web AppBuilder

Bureau of Land Management, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA | Authenticated | CalFire, Santa Barbara County Fire, Santa Barbara County Planning &

FIGURE 2-3: Study Area / Project Boundary – Collection System

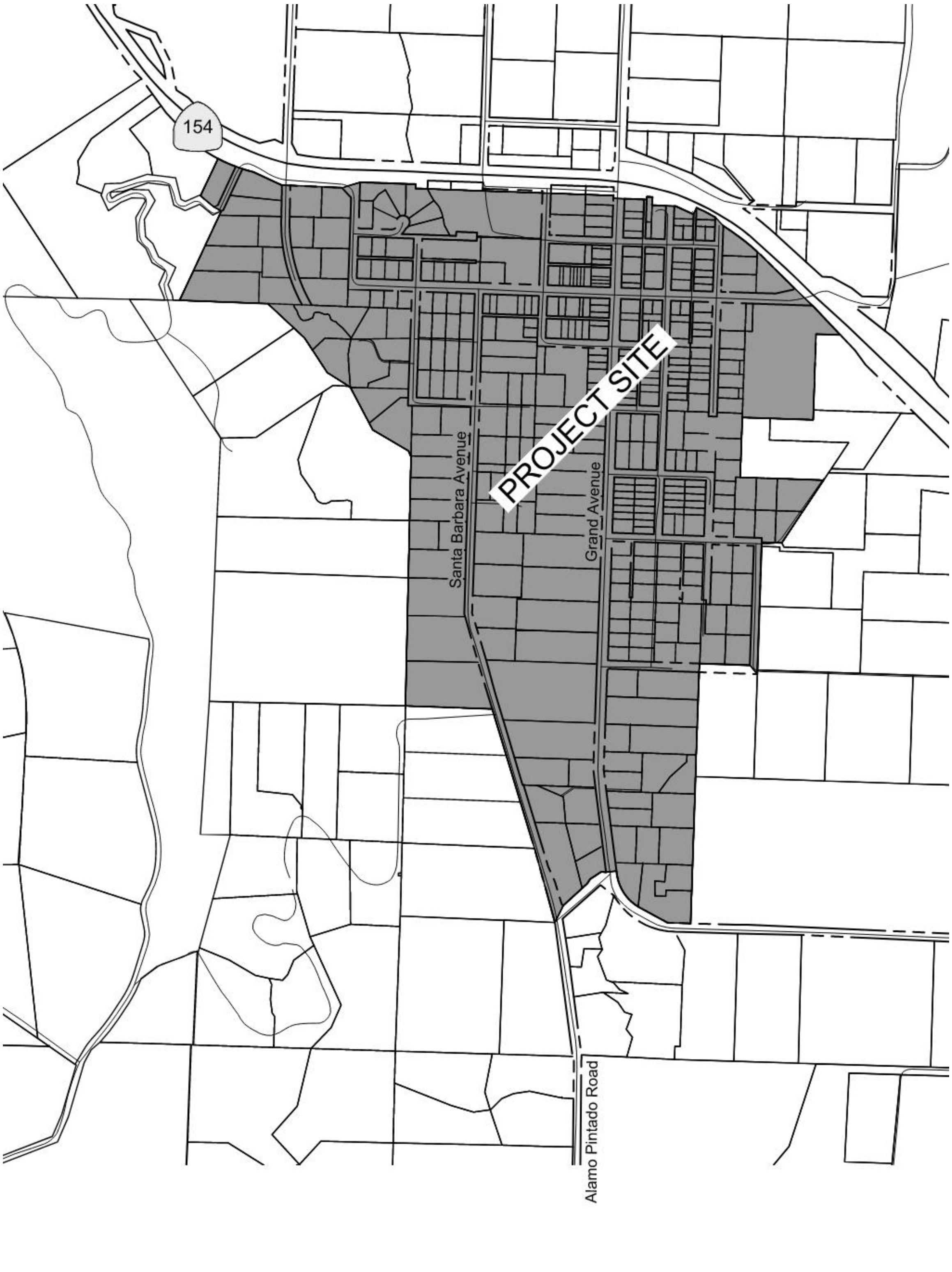


FIGURE 2-4: Study Area / Project Boundary – Conveyance System

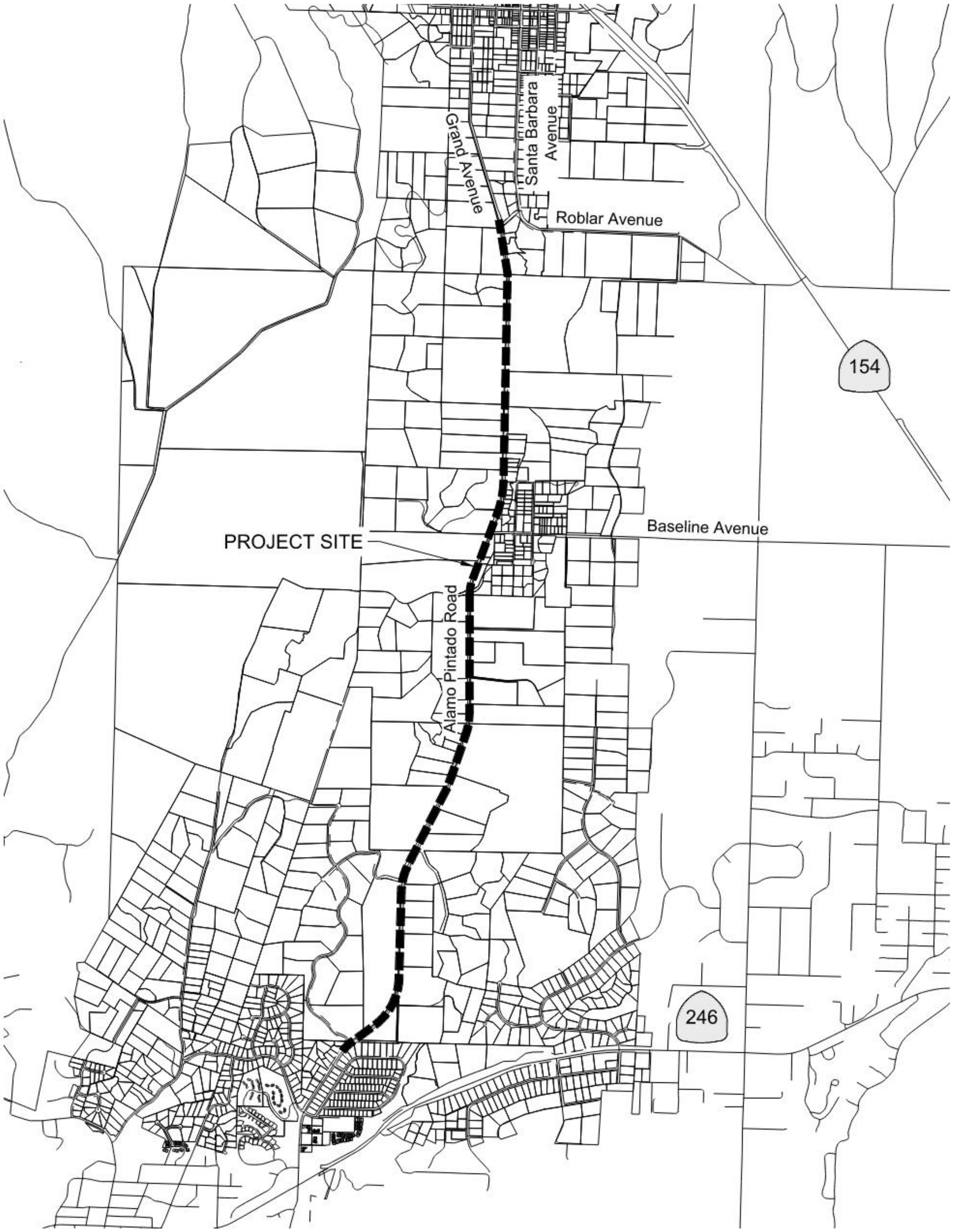


FIGURE 2-5: NRCS Soil Survey Map

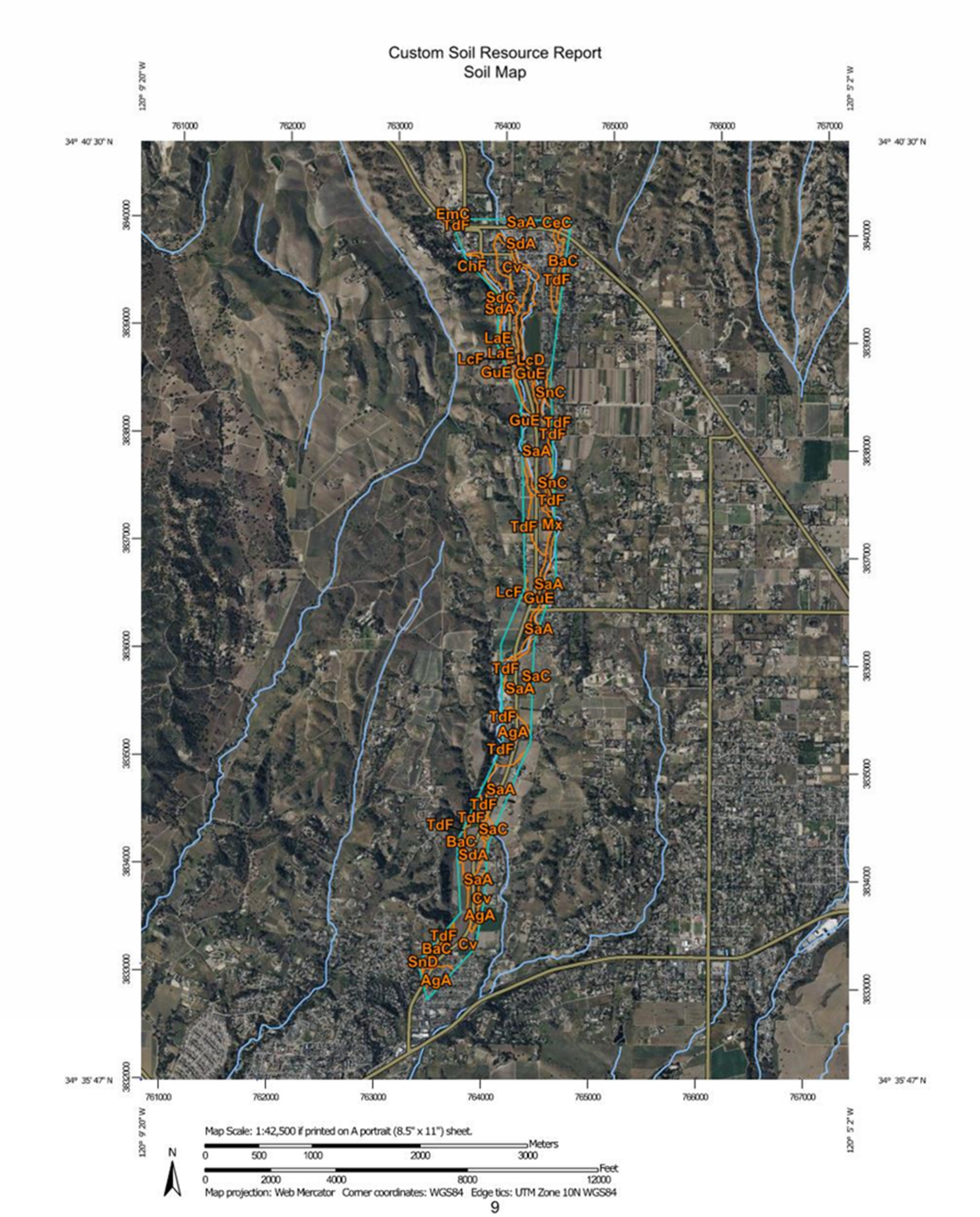


FIGURE 2-6: NRCS Soil Survey Map Legend

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AgA	Agueda silty clay loam, 0 to 2 percent slopes	40.5	6.2%
BaC	Ballard fine sandy loam, 2 to 9 percent slopes	16.6	2.5%
BbC	Ballard gravelly fine sandy loam, 2 to 9 percent slopes	0.5	0.1%
CeC	Chamise sandy loam, 5 to 9 percent slopes	0.6	0.1%
ChF	Chamise shaly loam, 15 to 45 percent slopes	0.0	0.0%
ChG2	Chamise shaly loam, 30 to 75 percent slopes, eroded	0.4	0.1%
Cv	Cropley silty clay	65.8	10.0%
EmC	Elder loam, 2 to 9 percent slopes, MLRA 14	0.2	0.0%
GuE	Gullied land	56.6	8.6%
LaE	Linne clay loam, 15 to 30 percent slopes	0.1	0.0%
LcD	Linne clay loam, 9 to 15 percent slopes, MLRA 15	0.2	0.0%
LcF	Linne clay loam, 30 to 45 percent slopes	2.3	0.4%
Mx	Mocho silty clay loam, 0 to 2 percent slopes, MLRA 14	20.4	3.1%
SaA	Salinas loam, 0 to 2 percent slopes, MLRA 14	185.3	28.3%
SaC	Salinas loam, 2 to 9 percent slopes	0.9	0.1%
SdA	Salinas silty clay loam, 0 to 2 percent slopes, MLRA 14	220.1	33.6%
SdC	Salinas silty clay loam, 2 to 9 percent slopes, MLRA 14	10.6	1.6%
SnC	Santa Ynez gravelly fine sandy loam, 2 to 9 percent slopes	0.7	0.1%
SnD	Santa Ynez gravelly fine sandy loam, 9 to 15 percent slopes	1.5	0.2%
TdF	Terrace escarpments, loamy	32.5	5.0%
Totals for Area of Interest		**655.6**	**100.0%**

FIGURE 2-7: Groundwater Monitoring Well Locations

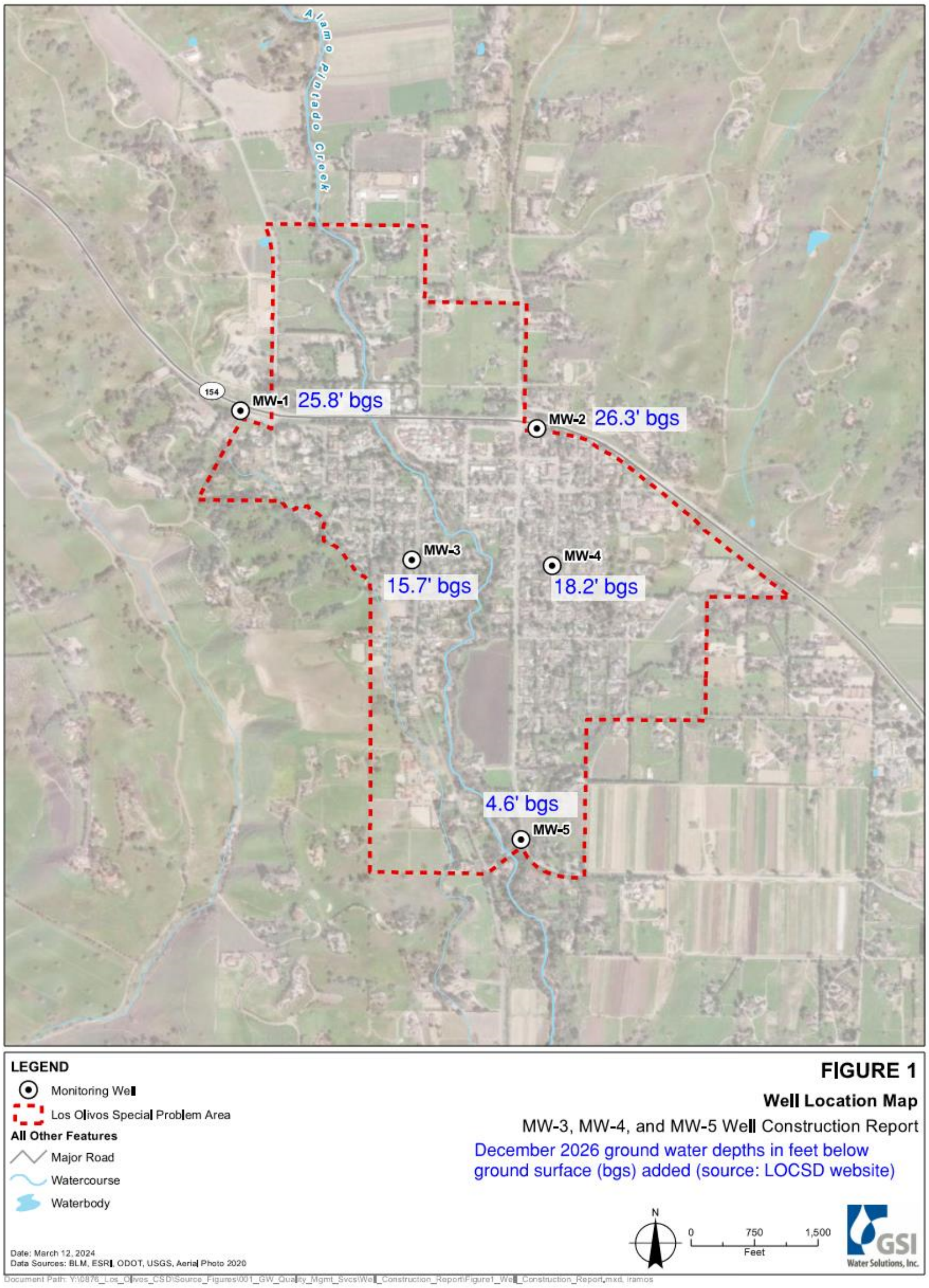


FIGURE 2-8: FEMA Flood Hazard Area – Collection System

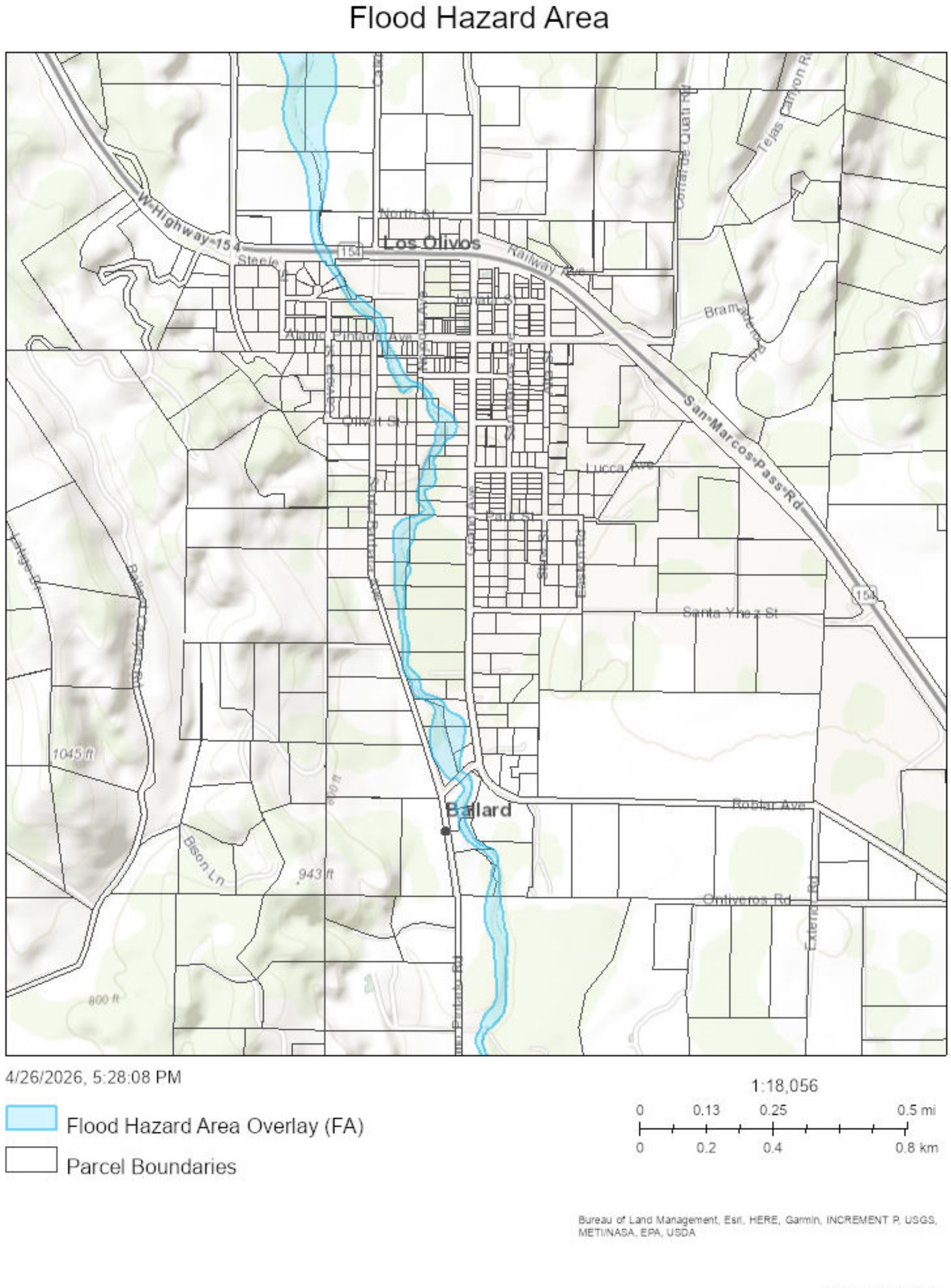


FIGURE 2-9: FEMA Flood Hazard Area – Conveyance System

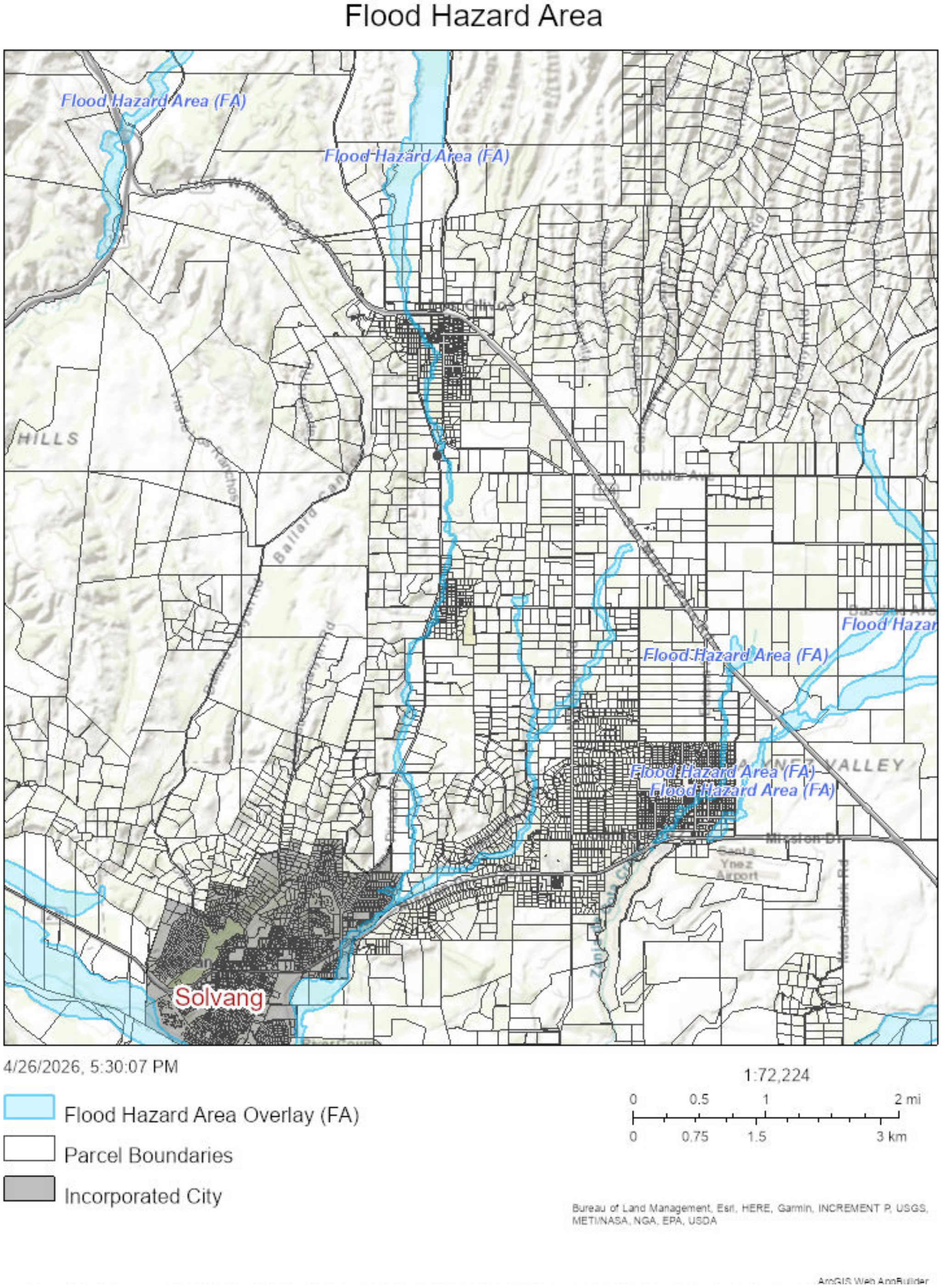
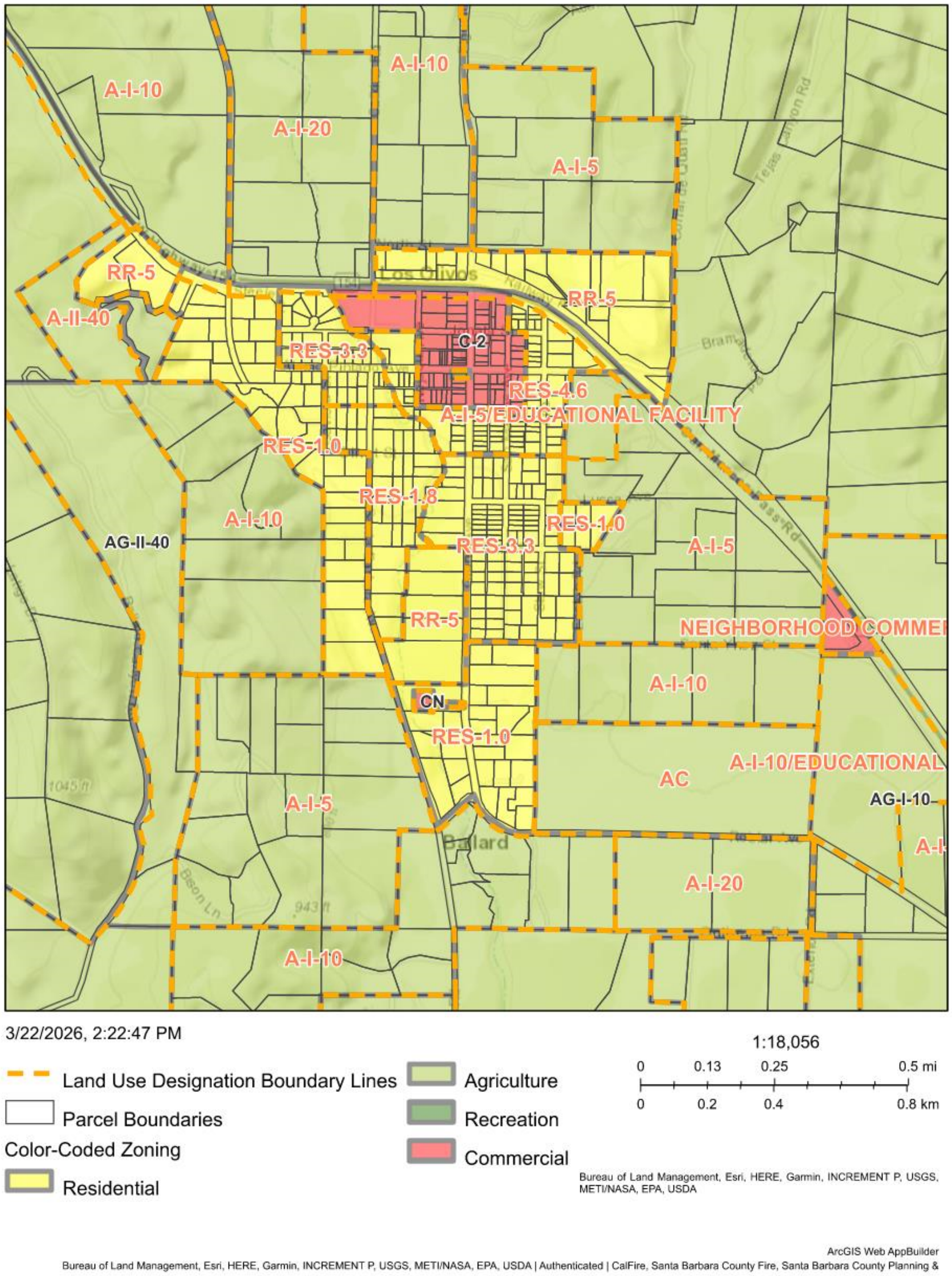


FIGURE 2-10: Zoning and Land Use



CHAPTER 3
EXISTING CONDITIONS OVERVIEW

This Chapter provides an overview of the existing conditions that are pertinent to the preliminary design of the wastewater collection and conveyance systems, including review of existing septic systems, available utility records, and other infrastructure throughout the project area. All figures are located at the end of this chapter.

DATA SOURCES

The following sources were used to form an understanding of the current wastewater treatment and disposal facilities within the study area:

- Record Drawings provided by LOCSD and the County of Santa Barabara
- Topographic Survey
- Topographic Survey from Stantec Basis of Design Report
    - Aerial Survey Mapping of the Alamo Pintado Road corridor
    - Field Survey of Key Areas
- Septic Tank Location Questionnaire results facilitated by LOCSD
- Previous Referenced Studies
- Water Usage Data provided by ID1
- GIS Data
- County of Santa Barbara Land Use and Zoning Map
- USDA Natural Resources Conservation Service

EXISTING PRIVATE WASTEWATER DISPOSAL SYSTEMS

As the LOSCD does not currently have a community wastewater disposal system, wastewater disposal is handled by the private property owners on individual parcels for both commercial and residential land uses. Based upon previous studies, available water data, and information provided by LOCSD, there are 358 existing private on-site wastewater treatment systems of various capacities, age, and effectiveness. Approximately 17% of these existing septic systems are on commercial parcels while 83% serve private residences. During the tourist season, many of the commercial sites in the downtown core utilize portable toilets to serve the tourist population due to insufficient capacity within their septic systems.

Septic System Data Collection and Locations

In October 2025, the District sent out a questionnaire to all property owners within their database requesting septic tank location, recent septic service or maintenance records, and any plans or building permit information. The District received information back on approximately 25% of the existing septic systems. The existing septic system locations provided to the District by the property owners are shown in red in FIGURE 3-1. Based on a review of the questionnaires received, approximately 40% of systems are in the rear yard, 40% are in the front yard, and 20% are in the side yard.

The septic tank locations gathered from the questionnaire were inputted into a CAD drawing by Wallace Group for use in approximating the location and depth of future service lateral connections to the collection system. The information gathered from the questionnaire has preliminarily guided the depth of the gravity sewer collection system and most critically, the sewer mains that are furthest upstream with the shallowest potential set the initial depth used for the design. During the final design phase, Wallace Group will survey all septic systems to confirm the depth required for the sewer collection system. Wallace Group will also evaluate options to install grinder pumps or STEP systems at specific properties that could potentially require the entire collection system to be designed at a significantly greater depth.

The condition of the existing septic and wastewater disposal systems within the private residential areas of the District is generally unknown, as only 25% of the District's property owners responded to the questionnaire. The District is concerned that many of the existing private septic systems need inspection, maintenance/pumping, and repair. For the design of the gravity system, it is assumed that all existing septic tanks will be required to be pumped, cleaned and properly abandoned in place once a connection to the sewer collection system is made. For the design of the STEP system, it is assumed that all septic systems will need to be pumped, cleaned and abandoned in place and a new fully contained STEP system will be installed adjacent to the existing septic system. Due to the high potential of inflow and infiltration (I/I), it is our recommendation that existing septic tanks are not used in a STEP system.

TOPOGRAPHICAL MAPPING

Wallace Group began the survey task by reviewing the existing topographic survey included in the Stantec preliminary design. Wallace Group prepared an exhibit indicating locations where additional field surveys would be needed to verify the accuracy of the previous survey and would also support future survey needs required for final design. The additional field effort also included locations where there were obvious changed surface conditions (i.e. new infrastructure constructed) from the original Stantec survey. Our survey team performed a field survey of existing monuments that will be critical to confirming existing rights-of-way, property boundaries within the District, and survey verification during detailed design. This field work also included surveying of existing storm drains and bridge crossings to support critical design points in the wastewater collection system.

For the proposed conveyance system along Alamo Pintado Road corridor beginning near the intersection of Roblar Avenue, Santa Barbara Avenue, and Alamo Pintado Road and continuing south to the point of connection to the existing City of Solvang wastewater collection system near the intersection of Alamo Pintado Road and Creekside Place, Stantec's preliminary design was based on readily available Google Earth imagery and topographic information and did not include topographic survey. Wallace Group contracted with Aerotech Mapping, Inc. to perform aerial based topographical mapping of the proposed conveyance system corridor. This field work also included surveying of existing storm drains and bridge crossings to support critical design points in the conveyance system.

EXISTING UTILITIES

Existing Utilities Within District

Wallace Group began gathering data for the existing utilities (water, storm drain, electrical, and communications) within the District's service area by using CivilGrid's utility mapping and record request services for the utility companies operating within the study area. The CivilGrid data confirmed that the following utility providers had facilities within the study area:

- California Department of Technology (Fiber)
- CalTrans District 5 (Electric)
- CalTrans District 5 (Storm Drain)
- CalTrans District 5 (Telecommunications)
- Comcast (Telecommunications)
- County of Santa Barbara (Storm Drain)
- Frontier (Telecommunications)
- Pacific Gas & Electric (Overhead Electric)
- Santa Ynez River Water Conservation Improvement District 1 (Water)
- Southern California Gas Company (Gas)

Caltrans and the County of Santa Barbara provided as-built drawings of facilities within the study area while Southern California Gas Company, Comcast, and Frontier provided schematic level atlas information of existing facilities. Pacif Gas & Electric acknowledged existing overhead utilities within the study are a but did not provide any record information. Additionally, LOCSD provided record drawings of existing roadways and underground utilities in the study area. California Department of Technology did not provide any record information on the Fiber utilities within the project area.

LOCSD and Wallace Group met with Santa Ynez River Water Conservation District, Improvement District 1 (ID1) to request record drawings of existing water facilities. ID1 provided atlas maps and GIS based information on the location of existing facilities including material, size, fire hydrants, service laterals, and valves but did not provide record drawings. Therefore, the water main locations shown on the plans are based on valve locations only. Depth to the water mains shown in the profile are preliminarily based on an assumed 3-feet of cover and/or an excel file from ID1 that had included a list of valves and depth to nut. Please note, ID1 could not confirm the accuracy of this excel file. The horizontal location and depth of the water mains will be verified during final design via potholing.

Wallace Group design staff visited the project site on January 27, 2026, to observe existing conditions and look for surface evidence of existing underground utilities such as manhole lids, vault lids, valve boxes, above ground utility cabinets, and overhead utilities. The CAD files were updated based on the field observations.

It should be noted: Existing utility information used for the 30% design is based upon record information and requires potholing at critical locations prior to final design. Also, much of ID1's water mains are Asbestos Cement Pipe (ACP). ACP is very brittle and prone to fractures with ground disturbance. Wallace Group will provide a contingency within the cost estimate for water main replacement as it is anticipated that there could be significant impacts to the water system which will result in repairs to the water distribution system during construction.

Existing Utilities Along Conveyance Corridor

The record drawings obtained from LOCSD showed the presence of underground utilities (storm drain, water, and gas) and existing overhead facilities (telephone, electric) within the Alamo Pintado Road corridor in the area of the conveyance system.

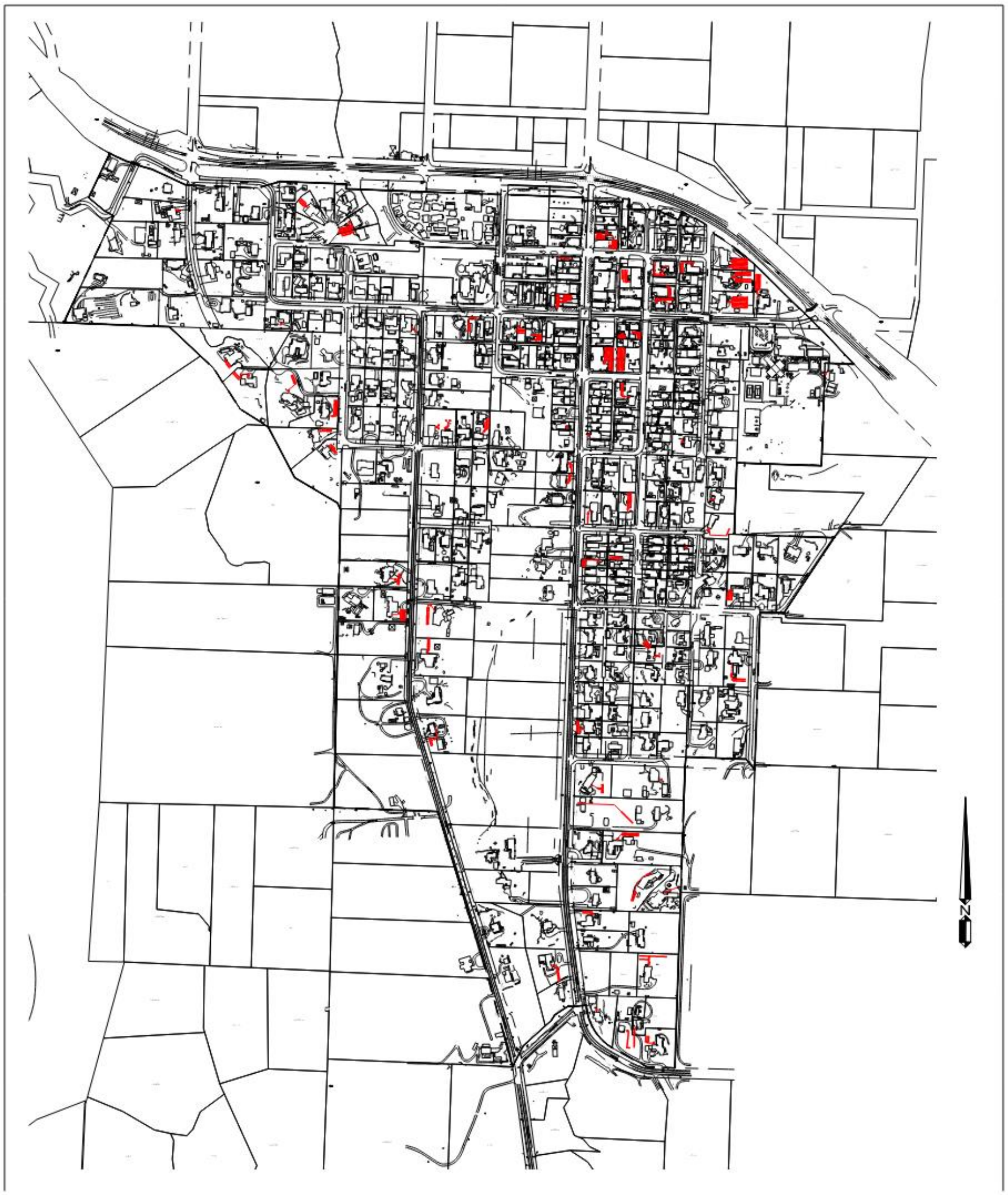
The Stantec design also included the approximate locations of existing underground and overhead utilities along Alamo Pintado Road. After reviewing the Stantec survey and identifying critical areas where additional information on existing utilities was needed, Wallace Group survey crews walked the entire corridor between January 28th and January 30th to supplement the aerial mapping by confirming locations of surface utility features such as power poles, water valves, gas meters etc, as well as locate and measure the invert of the proposed point of connection to the City of Solvang sewer collection system. Utility crossings along the conveyance alignment are proposed to be potholed during final design.

EXISTING BRIDGES

Three Santa Barbara County-maintained bridges exist within the proposed collection and conveyance systems and could potentially be utilized for utility crossings if permitted by the County. At Wallace Group's request, Santa Barbra County shared recent bridge inspection reports and scour analyses for the existing bridges in question, which is summarized below. Additionally, during the field survey work in January 2026, Wallace Group survey crews located and measured pertinent features of the existing bridges.

- Bridge 51C-080 This bridge is located at "Lansing's Crossing", near the junction of Alamo Pintado Rd, Santa Barbara Ave, Grand Ave, and Roblar Ave. It has a 34-ft wide deck and spans 57.5 feet.
- Bridge 51C-078 This bridge is located along Alamo Pintado Rd, just south of Adobe Canyon Rd. It has a 40-ft wide deck and spans 67 feet.
- Bridge 51C-077 This bridge is located along Alamo Pintado Rd, just north of Lolland Falster Rd. It has a 40-ft wide deck and spans 80 feet.

FIGURE 3-1: Existing Septic System Locations



612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011
F 805 544-4294
www.wallacegroup.us
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LOS OLIVOS COMMUNITY SERVICE DISTRICT EXISTING SEPTIC SYSTEM LOCATION EXHIBIT	
	JOB No. : 1565-02
	DRAWING :
	DRAWN BY: CPK
	DATE : 3/25/2026
	SCALE : 1" = 800'

CHAPTER 4
ASSUMPTIONS AND DESIGN CRITERIA

This Chapter presents the design considerations, and a review of relevant wastewater design standards included in the preliminary design.

INTRODUCTION

LOCSD has not developed a published set of engineering standard details or specifications for wastewater collection and disposal systems. Design criteria recommended in this report and used for the 30% progress plans is based upon industry standards, County of Santa Barbara Engineering Standards, Wallace Group's experience, and intended to comply with jurisdictional agency standards.

ASSUMPTIONS

The following provides a summary of changes made to both the collection system and conveyance system design as compared to previous designs.

Collection System

The following are the recommended design changes for the collection system:

Private sewer lateral:

- Previous assumption: The BODR assumed that private property owners would be responsible for connection of their private sewer lateral to the collection main.
- Wallace Group modification: Preliminary design includes construction of a service lateral from the collection main to the property line of the private parcel by the Contractor selected by the District to build the collection system. This allows the service laterals to be constructed concurrently with the sewer main which reduces impacts to existing paving and surfacing in the roadways and affords the District better control and oversight of the connections to the main. The property owner will be responsible for the service lateral from the property line to their house or business.

Sewer Main Sizing:

- Previous assumption: The BODR and preliminary plans included gravity sewer collection mains with 6-inch minimum diameters based upon pipe capacity and flow velocities.
- Wallace Group modification: For ease of maintenance, cleaning, and the ability to insert a CCTV camera into the collection mains, Wallace Group preliminary plans use a minimum pipe diameter of 8 inches, which is consistent with industry standards.

Depth of Sewer Lateral Cover:

- Previous assumption: The BODR assumed a minimum depth of cover for the private sewer laterals to be 4 feet below the existing grade at the property line for the gravity sewer for all services regardless of the septic tank location.
- Wallace Group modification: It is Wallace Group's expectation that the depth of the private sewer laterals will vary for each parcel dependent upon the location of the existing septic tank (front or

back of the parcel). The proposed design has accounted for septic system locations shown in the returned septic system questionnaires, specifically on critical parcels to ensure that the depth of the gravity sewer main is deep enough to allow property owners to connect their sewer laterals based on the location of their septic tank and minimum slope requirements. As previously noted, in final design, Wallace Group will survey all septic tanks to verify locations and depths to ensure that the depth of the sewer collection system has sufficient depth to allow property owners to connect their laterals without a grinder pump system. During final design, Wallace Group will identify any properties and make recommendations for specific properties that may have a large impact on the overall sewer collection system depth. Wallace Group may recommend a grinder pump for these connections.

Conveyance System

The following are the recommended design changes for the conveyance system:

Force Main Pressure Rating

- ❖ Previous assumption: The BODR and preliminary plans specify DR 21 HDPE (100psi rating) for the force main.
- ❖ Wallace Group modification: For added resilience against pressure surges and protection from damage during construction, we recommend DR 11 HDPE (200 psi rating).

Gravity Sewer Conveyance System

- ❖ A gravity conveyance system was not analyzed in the Stantec study due to concern of unauthorized lateral connections to the conveyance system. Though not in the original scope of work, LOCSD expressed interest in evaluating the feasibility of a gravity conveyance system. More information on the gravity conveyance system and lift station can be found in Chapter 7.

Existing Septic Systems

The following assumptions have been made to develop the Engineer's Opinion of Probable Cost (see Chapter 9) for the existing septic systems on private property:

Gravity Sewer Collection System Scenario:

- ❖ The existing septic tanks will be pumped, cleaned, and abandoned in place.
- ❖ The costs associated with these upgrades will be borne by the private property owner and are included in the cost for the sewer lateral on the private property cost breakdown.

STEP System Scenario:

- ❖ The existing septic tanks will be pumped, cleaned, and abandoned in place and a new fully contained STEP tank and pump system will be installed adjacent to the existing septic tank.
- ❖ The parcel has adequate space to include a new fully contained tank and effluent pump.
- ❖ For the purposes of the cost analysis, we have assumed that the retrofit of existing septic tanks to add effluent pumps is not feasible due to the unknown conditions of existing septic tanks and high potential for I/I.

- There is an added cost to prepare a legal description and easement document as it is recommended that the District maintain easement access to all STEP systems for long-term operations and maintenance.
- The costs associated with these upgrades will be borne by the private property owner and are included in the cost for the sewer lateral on the private property cost breakdown.

Private Sewer Laterals

The following assumptions have been made to develop the Engineer's Opinion of Probable Cost (see Chapter 9) for the sewer laterals on private property:

Gravity Sewer Collection System Scenario:

- The location of the future private sewer lateral will remain on the same side of the lot as the existing septic tank.
- Based on our experience we do anticipate that some parcels will not be able to flow by gravity (due to unforeseen obstructions/constraints) and will require grinder pumps. These parcels will be identified during final design.
- The final design will provide a balance of keeping the gravity system as shallow as possible to minimize construction costs versus minimizing the number of grinder pumps required on private properties.
- Easements are not required for the gravity lateral.
- The minimum depth of the private sewer lateral at the property line or point of connection to the District provided service lateral is estimated based upon a minimum 12-inches of cover at the septic tank location with a minimum slope of 2.0% (per CBC) to the point of connection.
- The Private Owner lateral costs presented in Chapter 9 are an average of the estimated costs and do not include surface restoration beyond standard groundcover. It is anticipated that properties with septic systems in the front will have a lower cost to connect to the sewer collection system than parcels with septic systems located on the side yard or in the backyard.

STEP System Scenario:

- The location of the future private sewer lateral will remain on the same side of the lot as the existing septic tank.
- The lateral will be under pressure, therefore the location of the septic tank does not have an impact on the depth of the sewer collection system.
- The minimum depth of the private sewer lateral at the property line or point of connection to the District provided service lateral is estimated based upon a minimum 12-inches of cover at the septic tank location with a minimum slope of 2.0% (per CBC) to the point of connection.
- The private sewer lateral will have a depth of three feet from the outlet of the septic tank with effluent pump to the point of connection to the District provided service (property line).

Existing and Future Flow Rates

Please refer to Chapter 5 for a discussion of wastewater flow estimates.

Infiltration and Inflow

The potential for infiltration and inflow (I/I) will need further consideration as the design progresses due to the shallow groundwater throughout the study area. However, I/I is typically lower for new construction and will not have a significant near-term impact on flow rates. Furthermore, I/I is assumed to be lower for a pressure main system as compared to an aging gravity system.

COLLECTION SYSTEM DESIGN CRITERIA

Table 4-1 provides a summary of the design criteria used in the preparation of the 30% progress plans for the gravity main and pressure main collection system alternatives. Additional detail for the design criteria follows the table.

TABLE 4-1. DESIGN CRITERIA FOR PROPOSED SEWER COLLECTION SYSTEMS

COLLECTION SYSTEM ALTERNATIVE	STANDARD	CRITERIA
GRAVITY	PIPE SIZE	8" min. diameter for mains, 4" min. diameter for service laterals
	PIPE MATERIAL	PVC SDR 35
	MINIMUM SLOPE	0.40 % min. for mains, 1.00% min. for service laterals
	MINIMUM DEPTH OF COVER	5.0 feet min. below existing grade for mains, 4.0 feet min. @ property line for laterals
	MINIMUM CLEARANCE FROM EX. UTILITIES	10 feet horizontally from ex. waterlines 4 feet horizontally from ex. storm drains 1 foot vertically under ex. Utilities (California Code of Regulations, Title 22, Section 64572, Water Main Separation)
	MAXIMUM DISTANCE BETWEEN MANHOLES	400 feet
PRESSURE MAIN (STEP)	PIPE SIZE	2" min. diameter for mains, 1" min. diameter for residential service laterals, size varies for commercial service laterals
	PIPE MATERIAL	Fusible HDPE or PE
	MINIMUM DEPTH OF COVER	5.0 feet min. below existing grade for mains, 4.0 feet min. @ property line for laterals
	MINIMUM CLEARANCE FROM EX. UTILITIES	10 feet horizontally from ex. waterlines 4 feet horizontally from ex. storm drains 1 foot vertically under ex. utilities (California Code of Regulations, Title 22, Section 64572, Water Main Separation)

Pipe Size and Materials – Gravity Mains

Gravity mains are proposed to be constructed of PVC SDR 35 with pipe sizes ranging from 8” to 10” diameter. While the pipe size could be reduced to 6” diameter for some of the residential areas, Wallace Group recommends an 8” diameter pipe as the minimum, for ease of maintenance, cleaning, and to accommodate a closed-circuit video camera. The cost difference between 6-inch and 8-inch pipe is minimal but has a long-term operational and maintenance impact with 8-inch being significantly easier to maintain. The maximum pipe diameter was calculated based upon the estimated wastewater flows at the most downstream point in the collection system, assuming a minimum slope of 0.40% and a maximum water depth to diameter ratio of 60% during peak flows (d/D of 0.60).

Pipe Size and Materials – Pressure Mains (STEP System)

The pressure mains for the STEP system are proposed to be Fusible HDPE or PE. The pressure mains will range in size from 2”-4” diameter and are currently shown as 4” diameter in the 30% progress plans for simplicity and planning purposes. Pipe sizing for the pressure mains will need further refinement and has very little impact on the overall construction cost for the STEP system.

Minimum Slopes and Velocities- Gravity Mains

Minimum pipe slopes have been preliminarily designed at 0.40% based upon an 8” PVC flowing half-full with a minimum velocity of 2-3 feet per second. It should be noted that some residential streets that have minimum slopes will likely not meet the minimum velocity requirements, but provisions have been made for cleaning of the collection system in the life cycle analysis. No maximum velocity design criteria has been set for preliminary design however, maximum velocity will be considered with final engineering design of the collection system.

Minimum Clearances from Existing Utilities

In accordance with Title 22 Drinking Water Regulations, the wastewater collection system mains have been designed to maintain a minimum 10-foot horizontal clearance (measured from outside of pipe to outside of pipe) from existing waterlines and a minimum 4-foot horizontal clearance from storm drains. The intent of the design is to provide a minimum 3-foot horizontal clearance from existing dry utilities (electrical, communication, telephone, fiber optic, etc).

The preliminary design of the wastewater collection system intends to maintain a minimum vertical clearance of 1-foot at utility crossing locations with the new collection main (gravity and STEP system) crossing under the existing utility.

Please note that further investigation of existing utilities is required with the final engineering design, which will refine the design of the sewer collection system.

Minimum Depth of Cover

Based upon our experience, discussions with ID1, and industry standards, it is assumed that the existing waterlines are constructed with 3-feet of cover from existing grade. To maintain a vertical separation of 1-foot minimum and allow for the proposed wastewater collection mains to cross under the existing utilities, a minimum depth of 5-feet below existing grade was used in the preliminary design of the gravity and pressure main collection systems. This will need further refinement during later phases of the design once potholing information is obtained.

Private Service Laterals - Gravity

The District will provide a single 4-inch diameter service lateral for each parcel which will be connected to the sewer main with a wye connection and extend to the private property line by the District's Contractor. Private gravity sewer laterals within private property will be required to follow current California Building Code regulations with a minimum slope of 1.0%. The depth of the lateral at the property line will vary based upon the distance from the septic tank to the property line. The current design evaluated the septic tank locations on critical properties to determine the most conservative depth required that will allow all property owners to connect via gravity to the sewer main. Critical properties include properties that were at the at low points, the end of a cul-de-sac, or were setback from the road with a long driveway, furthest away from a main connection, or accessed via easement. However, data was not provided on all properties and therefore, additional research and refinement of the sewer main depth will be required in future design phases. This further investigation may determine that grinder pumps may be required for some properties that may have obstructions that impact the sewer lateral.

Private Service Laterals – Pressure Main

The District will construct and provide a single 1-inch diameter lateral service for each residential property. The service lateral to be constructed by the District for each commercial parcel and the school will vary between 1"-4" diameter depending upon estimated wastewater flow from each site. The District provided service lateral will be connected to the sewer main with a wye connection and extend to the private property line by the District's Contractor.

CONVEYANCE SYSTEM DESIGN CRITERIA

This section describes the design criteria used in the preparation of the 30% progress plans for the conveyance system. The conveyance system is the sewer main that will convey wastewater from LOCSD to the City of Solvang sewer collection system. Wallace Group evaluated both a gravity conveyance system and a pressure (force main) conveyance system. There are design constraints that are still being evaluated that may make the gravity system infeasible, but at this time, these constraints are not fully vetted and therefore a gravity system is still being considered. Criteria for both gravity main and pressure main conveyance systems are included.

Pipe Size and Materials

If a force main is used, we recommend HDPE and installed via horizontal directional drilling or traditional open trench methods. The pressure main will likely be 6" diameter, and although the normal working pressure is expected to be relatively low, we recommend a minimum pressure rating of 200 psi to mitigate against potential pressure surges from pumping transients. A comprehensive transient analysis is recommended during the detailed design to better understand the potential impacts of transient effects.

If a gravity main is utilized for conveyance to Solvang, we recommend SDR 35 PVC using conventional open cut trench methods. Sizing of the main will be based on minimum slopes and is shown to be 12" diameter in the preliminary plans.

Minimum Velocities and Slopes

For the force main alternative, we assumed a minimum velocity of 3.5 feet per second. Note that many agencies' standards allow lower velocities, however for a pipeline this long we recommend the higher velocity for self-cleaning. For the gravity conveyance alternative, we used a minimum slope criteria of 0.40% similar to the collection system.

Minimum Clearances from Existing Utilities

Minimum clearances from existing utilities for the conveyance system (gravity and pressure main systems) are the same as those described above for the collection system.

Minimum Depth of Cover

Similar to the collection system, a minimum depth of 5-feet below existing grade was used in the preliminary design of the conveyance system.

Flow to Lift Station

Please refer to Chapter 6 for a discussion of wastewater flow estimates.

Equalization and/or Emergency Storage Volume

The City of Solvang has requested the District incorporate equalization storage at the lift station site to off-set peak diurnal flows being sent to the City. Additional discussions with the City are required to further verify the need and volume of storage required. Wallace Group does recommend that both lift stations have sufficient emergency storage volume based on the amount of time necessary for operations staff to respond to an emergency or power failure during a peak flow event. Industry standards typically recommend an hour of emergency storage. See Chapter 6 and 7 for more discussion on the Lift Station design.

CHAPTER 5
WASTEWATER FLOW ESTIMATE

This Chapter summarizes the review of the wastewater flow projections for Los Olivos.

INTRODUCTION

There are currently around 350 septic systems per the Los Olivos Wastewater Management Plan 2010 (WMP), with a total of 391 parcels within the LOCSD boundary, and 27 parcels outside the service area boundary. The area is a mix of residential and commercial properties with large rural residential, viticulture, and agricultural lots surrounding the downtown commercial area.

The BODR describes wastewater connections to occur in three phases, where both Phase I and II will connect to the new sewer collection system immediately, and Phase III properties will connect over time when their septic systems finally fail. This evaluation focuses on the total wastewater flow projections for Phases I, II and III and assumes the entire District will be connected as part of the project and future development to occur over time.

WASTEWATER FLOW ESTIMATE

Existing Service Area

The prior wastewater studies do not state a service area population or population forecast for Los Olivos. The Santa Barbara County Association of Governments (SBCAG) 2050 Regional Growth Forecast 2050 (for Santa Barbara County) was reviewed; however, specific population data for Los Olivos is not available due to the community's small size. Population for Los Olivos is lumped in with "other unincorporated areas".

A brief internet search was conducted for Los Olivos demographics, and based on several sources, the current population is estimated to be around 939 people, even though population was reported as 1,202 people from the 2020 Census. For the purposes of this study, the current service area (permanent) population is assumed to be 1,000 persons. Due to the specific characteristics of this community, it is difficult to project future population.

Available ID1 water data (from 2019) suggests there are 358 existing water service accounts. Based on this, it was calculated that there are 33 undeveloped parcels (391-358) that will connect in the future. Of the 358 existing parcels, 17% (60) of the parcels are commercial, while 83% (298) of the parcels are residential. Wallace Group also did an independent review of vacant parcels within the collection system service area, and accounted for a total of 20 vacant parcels, of which 19 are residential zoning, and one is commercial zoning. Given the disparity between these two approaches to identify vacant parcels, the more conservative numbers (of vacant parcels) were used to project future flows. Using these same percentages, it is projected that 27 future residential connections are anticipated, and up to 6 commercial establishments will connect in the future. Based on an assumed household density of 3, the future population of Los Olivos (that will be served by the sanitary sewer collection system) is not expected to exceed 1,100 persons.

Potable Water Demand

Los Olivos is served potable water from the Santa Ynez River Water Conservation District, Improvement District No. 1 (ID1). It is noted that the majority of commercial businesses, in particular, restaurants and wine tasting rooms, must use portable toilets to service customers due to failing septic systems, thus their true water use is not known.

Potable water demands can prove useful in assessing wastewater demands. The 2019 water meter data was analyzed, and it is apparent that many of the residential properties irrigate their property with ID1 potable water. A water demand per capita evaluation was attempted (to be used in part to project wastewater flows), but it was found not to be viable due to the large number of agricultural demands mixed in with domestic water demand.

Wallace Group also received ID1 water use data for winter-time usage for Years 2023 through 2025 (December-February each year). ID1 noted that this demand data includes domestic water, rural residential/limited Ag, but excludes commercial Ag, Fire Flows and temporary water service (construction meters). As with the 2019 data, the water usage demand for the winter months was highly variable, likely due to rural residential agricultural irrigation demands. The domestic/residential water demand for these three years of winter-time usage was averaged, and it was determined that the "baseline" potable water demand for the service area is 132,000 GPD. Given that the majority of parcels are relatively large, it is assumed that the wastewater generation to potable water usage ratio is 75% (75% of potable water usage turns into domestic sewage). This value equates to ~100,000 GPD total for the domestic component of wastewater flow, or 308 GPD/parcel (and ~100 GPCD using a density factor of 3.0).

Using these numbers is still well above industry standards. If wastewater flow generation is estimated on a per capita basis, and a conservative value of 80 GPCD is assumed, which is more in line with industry standards, this would equate to 88,000 GPD for the domestic component of flow, or 270 GPD/parcel. This latter potable water demand will be used as the basis for estimating wastewater flows that will be served by the sewer collection system and eventually conveyed to the City of Solvang WWTP. This value is still considered conservative, but more representative than the 308 GPD/parcel (100 GPCD).

From the 2019 water meter data, the commercial property water demands were reviewed, and the following was observed:

- Data was reported for the months of June, July, August, December, January, February (2019).
- In general, the total water usage per day was relatively low for a commercial establishment, ranging from 268 GPD to 677 GPD (monthly average). This may be due to a larger number of wine tasting venues, and fewer full-service restaurants. This is also due to the fact that many of the commercial establishments must use portable toilets for sanitary service, due to failing septic systems. The peak month factor for the aggregate of 60 parcels was determined to be 2.35.
- The largest demand for a single commercial establishment was 4,971 GPD, and this demand occurred in August. It is expected that this account is the Hotel. The peak month factor for this single account was 11.4, and this demand occurred in July.
- Peak day factor could not be evaluated since we only have monthly water meter data.

Peaking Factor Evaluation

Diurnal flow variations, and flow variations due to wet weather flows, are critical to the proper sizing of gravity sewer systems and sewer lift stations. Actual diurnal peaking factors are not known since the existing sewer flows all discharge to individual septic systems. The only peaking factor that can be specifically evaluated is peak month flow. Other peaking factors must be developed based on industry standards and reference information.

The Stantec BODR indicates that the summer tourist population is up to three times the permanent population during summer tourist season. For Wallace Group's calculation of wastewater flows, any "population" resulting from commercial establishments (restaurants, wine tasting, lodging) are included in the commercial flow element. Based on this, a 3.0 peak day to average day factor seems appropriate. However, as noted earlier, for the Hotel, the peak month factor was determined to be 11.4. It is assumed that the Hotel peak day factor would not be more than around 12.0. In other words, during the maximum month of July, the Hotel is at or near full occupancy for the entire month.

It is noted that the peak hour wet weather flow factor of 4.0 is very conservative given that the sewer collection system is new. However, it is noted that this factor is applied to the Average Day Dry Weather Flow (ADDWF) value (not added on top of summer peak day flows). In future years, however, as the collection system ages, inflow/infiltration (I/I) is expected to increase over time and thus should be considered to ensure the collection system and lift stations are sized to meet these future flow needs. Given shallow groundwater characteristics of the community, I/I is expected to be an issue in future years.

Recommended peaking factors are summarized in Table 5-1.

TABLE 5-1. RECOMMENDED PEAKING FACTORS

PEAKING FACTOR	PF
Average Daily Dry Weather Flow (ADDWF)	1.00
Peak Month Dry Weather Flow (PMDWF)	3.00
Peak Day Dry Weather Flow (PDDWF)	3.50
Peak Hour Wet Weather Flow (PHWWF)	4.00
PMDWF- Hotel	11.40
PDDWF- Hotel	12.00

Wastewater Flow Projection – Gravity Collection System

Wastewater flow parameters are summarized in Table 5-2. Wastewater flow values in general are rounded up (Parcel demand, Hotel demand). The residential per capita demand of 80 GPCD is considered conservative, given that some central coast communities (such as Los Osos) are seeing per capita wastewater demand of 50 GPCD and lower.

Based on the 2019 water usage data (commercial), a baseline (water) commercial demand per parcel was calculated to be 287 GPD/parcel. To account for the fact that the ID1 water demand data does not include a wastewater component (due to use of portable toilets), this demand was increased to 500 GPD/parcel based on the assumption that the commercial demand component would not be greater than that of the Hotel.

TABLE 5-2. WASTEWATER FLOW PARAMETERS

Population	1,100
Per Capita Domestic Wastewater Flow, GPD	80
Total Parcels	391
Residential Parcels	325
Commercial Parcels	65
School	1
Baseline Commercial Parcel Demand, GPD	500
Hotel Baseline Demand, GPD	500

Wastewater flows are summarized in Table 5-3, and the ADWF projection is relatively consistent with Stantec's projections. There is a large discrepancy in peak day dry weather flow between the Stantec Report and Wallace Group's projections; however, this may be due to differences in terminology. It is noted that Wallace Group's projected wastewater flows are slightly lower than Stantec's projected wastewater flows. Given that we do not have actual wastewater flow data, and the fact that water meter data might be skewed by use of portable toilets currently used throughout the commercial establishments, erring on the conservative side may be prudent.

In addition, there were discrepancies in estimates of vacant lots to be developed, between the prior Stantec BODR and recent review by Wallace Group. The larger values of vacant parcels to develop were used to be conservative. It has also been noted that development of existing developed commercial lots could expand once a sewer collection system is in place, thus increasing sewer flows.

It should be noted that final negotiations with the City of Solvang on rates and charges should have some flexibility built in to reflect actual flows since the evaluation provided is conservative and actual flows could be substantially lower.

TABLE 5-3. SUMMARY OF WASTEWATER FLOWS

Wastewater Flow Component	Flow, gallons per day[3] ADWF	PMDWF	PDDWF	PHWWF	PHWWF, GPM
Residential WW Demand[1]	88,000	88,000	88,000	352,000	244
Commercial WW Demand[2]	32,000	96,000	112,000	128,000	89
Hotel WW Demand	500	5,700	6,000	2,000	1.4
TOTAL	120,500	189,700	206,000	482,000	335
Stantec Report Wastewater Flow Projection	120,400		385,000		334

[1]Based on Parcel Demand of 270 GPD
[2]Excludes Mattei's Tavern
[3]Flow parameters are defined as follows:
ADWF=average dry weather flow
PMDWF=peak month dry weather flow
PDDWF=peak day dry weather flow
PHWWF=peak hour wet weather flow

Wastewater Flow Projection - STEP Collection System

While average daily flows with a STEP collection system will be similar to those of a gravity collection system design, peaking factors are expected to be lower due to lack of potential for significant I/I effects during wet weather periods since it is assumed that all septic tanks will be replaced with fully contained tank and pump systems. If existing septic tanks are proposed to be used, this assumption is no longer valid. Regen prepared an estimate of wastewater loading with a STEP system in their 2024 Basis of Design Report using a peak flow factor of 2.0 versus the 4.0 used for gravity collection. For purposes of the preliminary collection and conveyance system designs discussed in this report, we used the wastewater flow projections for a gravity collection system since they are higher and considered more conservative. The pumping capacity of Santa Barbara Lift Station may be reduced slightly if a STEP collection system is chosen.

The STEP system will have a different diurnal curve as compared to the gravity collection system. Typical residential collection systems see peak flows in the early morning and midafternoon. In a STEP system design, since storage is occurring on each parcel, the flows are pumped into the collection system at varying times, thus the typical early morning peak is not predictable. When pumps turn on, the flow from a parcel is much greater than a gravity flow rate causing a spike in the diurnal curve. If multiple STEP systems are running concurrently, the flow rates could be higher than a gravity system. Therefore, the diurnal curve will be more jagged and unpredictable than a gravity system. This will be discussed further in the summary of findings in Chapter 10.

CHAPTER 6
WASTEWATER COLLECTION SYSTEM DESIGN AND ANALYSIS

This Chapter presents the design and construction considerations of the options for wastewater collection and conveyance systems. All figures are located at the end of this chapter.

GRAVITY COLLECTION SYSTEM

This section describes the design and construction considerations for the gravity collection system.

Open Trench Construction

Most of the gravity collection mains will reside within existing County roadways with existing residences and commercial buildings lining the roads. To maintain vehicular access to the existing structures and avoid potential conflicts with existing utilities, it is not possible to use open trenches with 1:1 side slopes for construction of the pipeline, thus construction will require vertical trench cuts with shoring. Production of pipeline construction (linear ft/day) can be expected to slow by 20% when trenches are deeper than 5 feet, 30% when trenches are deeper than 8 feet, and 40% when trenches are deeper than 10 feet. The construction cost estimate accounts for sewer depth as a factor affecting the estimated per linear cost.

The information we obtained for the existing water distribution system suggests that asbestos cement pipe (ACP) exists throughout Los Olivos. Aging ACP can be very brittle and has been known to break when trenching near it. We anticipate that if open trench construction methods are used, segments of ACP will need to be repaired, particularly at intersections where the new sewer crosses under the existing water main. It will be challenging to support the existing ACP while constructing the sewer main.

Groundwater / Dewatering

From the groundwater monitoring information available on the Los Olivos Community Services District's website (https://www.losolivoscsd.com/groundwater-information), groundwater elevations have been observed as high as five feet below existing grade. As the minimum pipe depth for the gravity collection system is 5 feet below existing grade, it is expected that groundwater will be encountered during most trenching operations making it necessary to dewater the sewer main trenches prior to and during construction. Dewatering operation will most likely consist of a system of dewatering wells with pumps spaced as needed along the trench to create workable conditions for pipeline construction. The groundwater would be pumped to settling tanks prior to discharging into the creek which requires permitting through the Regional Water Quality Control Board (RWQCB) and inclusion in the Stormwater Pollution Prevention Plan. We recommend that RWQCB permitting be processed by the District during the detailed design phase rather than including permitting in the Contractor's responsibilities. As part of the permitting process, we recommend sampling the groundwater for ammonia and fecal coliform. These constituents may impact the approved dewatering process from the RWQCB and could result in additional dewatering costs. Dewatering costs will be significant during construction and have been added into the construction cost estimate. Alternative trench materials such as drain rock in the bedding of the trench will be evaluated further in final design and these additional costs are not currently included in the construction cost estimate.

As construction duration has not been evaluated at this time and could potentially be more than one year, scheduling to avoid construction activities outside of the rainy season when groundwater levels may be lower is not feasible.

Bridge and Creek Crossings

The proposed collection system is bisected by Alamo Pintado Creek. Wastewater collected on the east side of the creek will need to cross the creek so that it can be conveyed down Alamo Pintado Road on the west side of the creek. Stantec evaluated two options for crossing the creek at Lansing's Crossing. One option considered a conventional gravity sewer undercrossing, and the other option considered the addition of a lift station on the east side of the Creek, referred to as the Grand Lift Station, to pump wastewater in a force main that would be attached to the Bridge.

This report evaluates a third option of attaching a gravity sewer directly to the bridge at Lansing's Crossing. Note that the County of Santa Barbara is still reviewing the possibility of attaching to the bridge, however we decided to consider this option as it presents the key benefits of eliminating the need for the Grand Lift Station, as well as avoiding some of the permitting and construction hurdles associated with crossing underneath the creek via horizontal directional drilling (HDD). The current cost estimate presented in Chapter 9 includes the cost of the Grand Lift Station as the connection to the bridge is still being evaluated by the County.

Based upon FEMA FIRM 060331-0813, the 100-year water surface elevation (WSE) of Alamo Pintado Creek is 743 feet. From record drawings, the bottom of the existing bridge is approximately 1 to 2 feet above the 100-year WSE. The proposed sanitary sewer manholes on either side of the creek have rim elevations 4 to 5 feet above the 100-year WSE. If the gravity sewer main were able to be attached to the side of the bridge, it would be required to be above the flood elevation. At the bridge crossing, the gravity sewer would be encased in a steel sleeve for protection from the elements and for ease of replacement if needed in the future. Please refer to Sheet C-408 of the 30% Gravity Collection System Plans.

SEPTIC TANK WITH EFFLUENT PUMP (STEP) COLLECTION SYSTEM

This section describes the design and construction considerations for the STEP collection system.

Pressure Main and Gravity Main Comparison

While gravity flow collection systems can have lower operations and maintenance cost because no pumping is required, these collection systems can become deep in flatter terrain or when the collection systems extend over long distances due to the need to maintain minimum pipe slopes and minimum flow velocities to promote self-cleaning. Deep construction, especially in the southern area of the District will likely require more extensive dewatering during construction. The minimum slope requirements of gravity collection systems can also prove difficult in avoidance of conflicts with existing utilities.

Pressure main design provides more flexibility to make field adjustments to avoid exiting utilities and requires smaller diameter pipe than gravity systems thus the initial construction costs are lower. Due to the shallower construction of a pressure system, it is assumed that there will be less groundwater dewatering required and will also reduce construction costs.

Inflow and Infiltration

The proposed STEP system includes new sealed effluent tanks with integrated pumps. The STEP system design does not incorporate use of existing facilities as the condition of the existing septic tanks is unknown. Use of existing facilities could result in higher I/I.

Open Trench Construction

Like the gravity collection system, open trench construction of the pressure main would necessitate shoring and dewatering. It is anticipated that the STEP sewer main construction would have a slightly smaller trench width and therefore, the amount of pavement repair/replacement with this option would be much less than the gravity collection system. HDPE or PE piping can be used in open trench construction.

Horizontal Directional Drilling Construction

Construction of the pressure main by horizontal directional drilling (HDD) reduces the overall disturbance of existing pavement requiring less pavement repair along the pressure main. The excavation will be limited to the drill pits for the construction of the pressure main possibly reducing the amount of dewatering needed for construction. However, the sewer lateral connections to the pressure main would still require open cut trenching from the main back to the property line. HDD installation could also require the overall depth of the main to be deeper than the open cut trenching as the main would need additional vertical clearance (2 to 3 feet) under the existing utilities due to the additional pressure that could be exerted on the fragile existing utility pipes during the HDD installation. This would result in more expensive future repairs since the depth of the main will be greater than if constructed via open cut trenching.

Bridge and Creek Crossings

Similar to the gravity collection system, a STEP collection system would need to cross Alamo Pintado Creek at Lansing's Crossing. As Stantec noted in their prior study, the pressure main of the STEP system could potentially attach to the bridge at Lansing's Crossing (County Bridge 51C-080), if allowed by the County.

If the County does not allow bridge attachment then the pressure main of the STEP system would be constructed under the Alamo Pintado Creek via horizontal directional drilling (HDD). More investigation is needed to determine the design constraints of HDD, including geotechnical investigations and updated scour analyses, and review jurisdictional agencies such as CDFW and RWQCB to determine the minimum depth of cover from the flowline of the creek to the top of pressure main. A frac-out plan would also be required as part of the environmental permitting process.

Open trench construction of the pressure main through the creek is not feasible due to the need for dewatering, a larger area of disturbance within the creek that would likely cause increased permitting and mitigation measures as compared to the horizontal directional drilling option.

COLLECTION SYSTEM LIFT STATION

Stantec's report identified the potential need for a lift station on the east side of Alamo Pintado Creek at the intersection of Grand Avenue and Alamo Pintado Road, to move wastewater from the east side of the creek to the west side. This lift station is referred to as the Grand LS and is separate from the Santa Barbara LS which would be located on the west side of the creek and used to convey LOCSD wastewater to Solvang. The lift station described in this section is the Grand LS. For discussion of the Santa Barbara LS, see Chapter 7.

Design Flows

Influent flows to the Grand LS are presented below. For the purpose of this report, peak wet weather flow (PWWF) is considered the same as the Grand LS pump duty point shown in Stantec's report. Average daily flow to Grand LS is estimated using PWWF with a peak factor of 4.0. Note that if a STEP collection system is utilized for the area east of Alamo Pintado Creek instead of gravity collection, then the Grand LS is likely not required, as the pressurized main of the STEP system could be attached to the bridge or directionally drilled to cross underneath the creek, just like the force main described below.

TABLE 6-1. DESIGN FLOW SUMMARY

	ADF (GPM)	PWWF(GPM)
Gravity Collection	61.6	246.6
STEP Collection	Not Applicable	Not Applicable

Key Grand Lift Station Features

Stantec described several key features for the lift stations in their March 2025 Report. The following list summarizes Wallace Group's recommended features for the Grand Lift Station, including some variations from Stantec's preliminary design.

- Cylindrical precast concrete wet well with liner – We recommend a 6-ft diameter circular concrete wet well as opposed to the 8-ft diameter wet well proposed by Stantec. A 6-ft diameter wet well is large enough for the pumps, enables a larger bandwidth for controls, will be easier to clean, and easier to construct.
- Duplex submersible pumps with non-clog impeller, 'across the line' start and redundant level measurement – for the Grand LS we recommend a conventional across the line start controlled by liquid level in the wet well. Variable frequency drive (VFD) controls for this lift station are not necessary for this lift station. Level can be measured by pressure or ultrasonic transducer, with conventional float as backup.
- Connection for backup generator – due to space constraints within the proposed lift station site we do not anticipate enough room for a dedicated generator onsite full time. However, due to proximity to the Santa Barbara LS, a backup generator located at the Santa Barbara LS could be sized to serve both.
- Conventional motor controls with redundant level measurement – for the Grand LS we recommend a conventional across the line start controlled by liquid level in the wet well. Level can be measured by pressure or ultrasonic transducer, with conventional float as backup.
- Concrete valve vault with isolation and check valves. The piping and valves should be arranged that either check valve could be removed for service while the pump station is still in service. Note that a flow meter is not necessary at the Grand LS since one will be included at the Santa Barbara LS.
- Emergency Storage – Stantec's recommendations did not include emergency storage for the Grand Lift Station. We recommend that the Grand Lift Station be designed with emergency

storage, in case there is a power outage or other failure, to give operators more time to respond before the wet well spills (especially considering this lift station's proximity to Alamo Pintado Creek). Typically, we recommend designing for at least 60 minutes of response time during peak flows. For the PWWF listed above, this amount of emergency storage could be provided by (2) 10-ft diameter auxiliary wet wells. In some cases, and when approved by the system owner, the collection system can be designated as emergency storage, thus reducing the additional volume of storage needed at the lift station site.

- Bypass Pump Connection – We recommend a dedicated connection point for a portable bypass pump in the event that there is a total pump failure. A typical bypass connection consists of 4" camlock with check and isolation valves for pumping directly into the force main. Stantec's recommendations did not include a bypass pump connection.
- Provision for future odor control – Stantec noted that the Grand LS should not require odor control as it will not be holding wastewater for any extended period of time. While we agree that it should not require odor control, we recommend stubbing out pipe from the wet well, leaving electrical breaker capacity, and reserving space near the wet well for the odor control equipment, in case it is ever desired in the future.

LIFT STATION SITING

Stantec originally identified a location for the Grand LS at the northwest corner of the intersection at Grand Ave, Alamo Pintado Rd, and Roblar Ave. This location is within existing public ROW and would not require easement or acquisition, though it is fairly constrained by existing utilities, some of which will likely need to be relocated to facilitate construction of the lift station. In general, we concur with this location, however a location across the street on private property as shown in FIGURE 6-1 may be more advantageous. This would require property acquisition, which could increase initial construction costs but could result in ease of operations and maintenance. Further discussion on siting the Grand Lift Station should be discussed during final design.

Force Main Alignment, Profile, And Sizing

The Grand LS force main will follow one of two different alignments, depending upon whether or not it can be attached to the existing bridge at Lansing's Crossing (SB County Bridge 51C-80). If the County approves the bridge attachment, then the force main would be routed to the downstream side of the bridge as described by Stantec, where it would be attached or hung from the bridge such that the bottom of the force main does not extend any lower than the bottom of the bridge girder. At the bridge crossing, the force main would be encased in a steel sleeve for protection from the elements and for ease of replacement if needed in the future.

If the County does not approve the bridge attachment, then the recommended force main alignment is to go underneath the creek via HDD methods. The downstream side of the bridge would be preferred due to the presence of existing overhead utilities on the upstream side, however there may not be adequate ROW available on the downstream side of the bridge to facilitate construction; a boundary survey to confirm ROW during detailed design is recommended if the force main will not be attached to the bridge.

Note that the existing bridge at Lansing's Crossing appears to have damage to its wing walls and/or abutment. For this reason, it may be prudent to plan for HDD installation for this crossing, in case the bridge attachment will complicate any future repairs.

FIGURE 6-1: Emergency Storage Concept at Lift Station

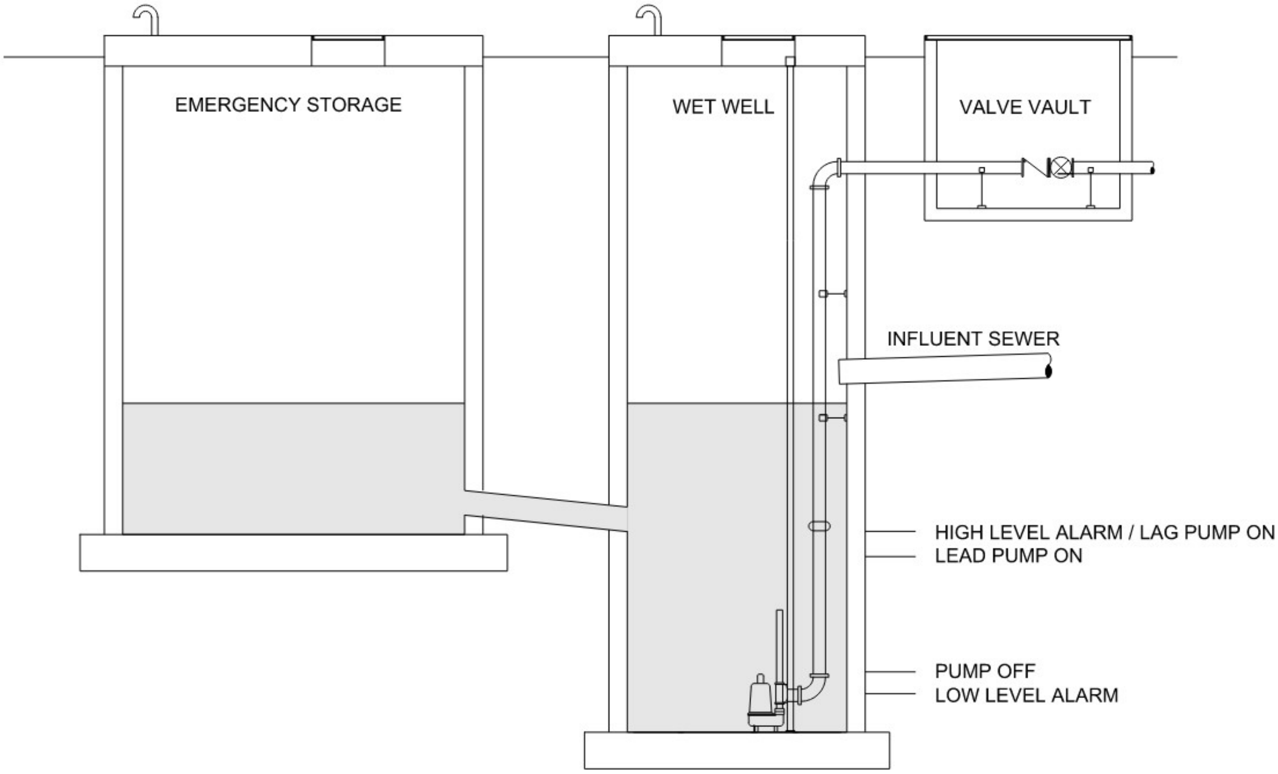
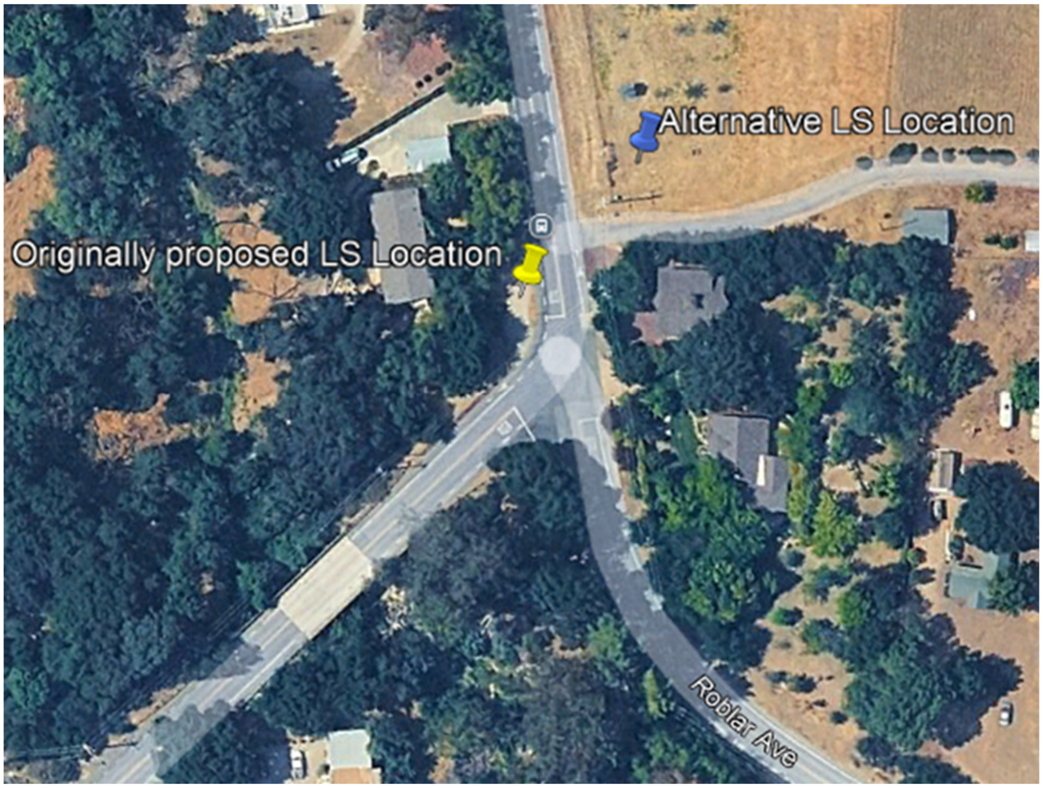


FIGURE 6-2: Grand Lift Station Siting Alternatives



Chapter 7
CONVEYANCE TO THE CITY OF SOLVANG

This Chapter presents the design and construction considerations of the options for the wastewater conveyance system to the City of Solvang WWTP. All figures are located at the end of this chapter.

INTRODUCTION

Prior studies evaluated multiple wastewater solutions within the District boundaries (advanced onsite wastewater treatment systems, MBR treatment & disposal, etc). Along the same timeline, LOCSD was engaging in discussion with City of Solvang regarding the potential connection to their collection system for treatment at their existing treatment plant. Ultimately, the District decided that conveyance to Solvang was the preferred solution for its wastewater disposal and formally adopted this approach through LOCSD Resolution 25-01.

Once wastewater is collected within the LOCSD boundaries, it will be conveyed to the City of Solvang's existing collection system, approximately 3.4 miles away. This preliminary report evaluates two approaches for conveying wastewater from the Los Olivos collection system to the City of Solvang's existing collection system:

- Pumped conveyance
- Gravity conveyance

PUMPED CONVEYANCE

Pumped conveyance (i.e. sewer lift station and force main) was studied previously by Stantec. Wallace Group reviewed Stantec's report and has compiled our recommendations in this report. Note that the lift station described in this Chapter of the report is the lift station located near the intersection of Santa Barbara Avenue and Alamo Pintado Road, referenced as the Santa Barbara LS in Stantec's report. Stantec identified the potential need for another lift station on the east side of Alamo Pintado Creek at the intersection of Grand Avenue and Alamo Pintado Road, referenced as the Grand LS. This report discusses the Grand LS in Chapter 6, as part of the collection system.

Design Flows

Peak design flows to the Santa Barbara LS will vary depending upon the chosen collection system. During the kickoff meeting for Wallace Group's design, LOCSD expressed interest in evaluating two main options: 1) gravity collection for all parcels; and 2) STEP collection for all parcels. As noted previously in Chapter 6, peak design flows from the STEP system are anticipated to be less than gravity collection because of the reduced opportunity for inflow and infiltration. In addition, the STEP system would not have solids present in the flow which would ultimately reduce future operations and maintenance but does not affect the current design considerations. For purposes of this preliminary design memo, only the design flows from the gravity collection system were used in the lift station analysis.

TABLE 7-1. DESIGN FLOW SUMMARY

	ADF (GPD)	Peak Flow(GPM)
Gravity Collection	120,400	334
STEP Collection	91,181	134

Key Santa Barbara Lift Station Features

Stantec described several key features for the lift stations in their March 2025 Report. The following list summarizes Wallace Group's recommended features for the Grand Lift Station, including some variations from Stantec's preliminary design.

- ❖ Cylindrical precast concrete wet well with liner – We recommend a 6-ft diameter circular concrete wet well as opposed to the 8-ft diameter wet well proposed by Stantec. A 6-ft diameter wet well is large enough for the pumps, enables a larger bandwidth for controls, will be easier to clean, and easier to construct.
- ❖ Duplex submersible pumps with non-clog impeller, VFD controls and redundant level measurement – The force main for the Santa Barbara lift station runs downhill to Solvang, which could lead to damaging effects on the pump if not carefully considered during design. To mitigate some of the challenges associated with pumping downhill, we recommend the use of variable frequency drives (VFDs) to control the speed of the motors. Note that a comprehensive transient analysis of the pump and force main system should be performed to better understand the potential for damaging transient effects.
- ❖ Concrete valve vault with isolation and check valves and flow meter. The piping and valves should be arranged that either check valve could be removed for service while the pump station is still in service. The agreement between LOCSD and City of Solvang for treatment of LOCSD's wastewater will likely be based on annual flow, which can be quantified by a flow meter installed on the force main at the lift station. The flow meter can be located within the valve vault or in its own dedicated vault structure.
- ❖ Emergency storage – Similar to the discussion in Chapter 6 for the Grand Lift Station, we recommend including dedicated emergency storage at the Santa Barbara lift station.
- ❖ Dedicated bypass pump connection – There will likely be an occasion where bypassing the lift station will be necessary, either due to pump failure or other maintenance activities. The provision of a dedicated bypass connection will enable operators to connect a portable pump directly to the force main while other components of the lift station are being maintained.
- ❖ Permanent standby generator – a standby generator is recommended for the Santa Barbara LS to provide backup power in the event of a power outage. The fuel (diesel, natural gas) and configuration (stationary, portable) of the generator have their own advantages and disadvantages which can be investigated further during final design. Note that the standby generator could be sized to serve both the Santa Barbara and Grand Lift Stations.

- Odor control – We do not anticipate significant odor concerns at this lift station due to the relatively small collection system, however it is advisable to provide for some type of odor control such that in can be implemented easily if odors become an issue.

Lift Station Siting

Stantec's preliminary design located the Santa Barbara LS within the public right of way at the intersection of Alamo Pintado Road (shown by the yellow pin in FIGURE 7-1). Upon review of existing utilities and record maps, we recommend shifting the lift station north approximately 200 feet (shown by the red pin in FIGURE 7-1). The public right of way appears wide enough to facilitate construction of the lift station, however it should be noted that the boundary has not been field located. Furthermore, an existing water main appears to run in the shoulder of the road and could affect the feasibility of constructing the lift station at this location. Further investigation is required to confirm the preferred location is viable. An additional location, shown by the blue pin in FIGURE 7-1 can be explored in the preferred location is determined to be infeasible.

Lift Station Analysis

Review of influent flows and pump cycling suggests that a 6-ft diameter, 22-ft deep wet well with a design pumping capacity of 334 GPM provides a good balance between operability and cycling time. The addition of auxiliary storage allows for a smaller wet well that is not oversized for average daily flows.

Force Main Alignment, Profile, And Sizing

The Santa Barbara force main will travel south along Alamo Pintado Road approximately 3.4 miles before discharging into an existing manhole within the City of Solvang's collection system (MD-114), located near Sunny Fields. The alignment is generally expected to fall within the paved roadway, however there may be sufficient shoulder available to align outside of the pavement, which could reduce construction costs. Based on publicly available elevation data, ground elevations along the force main alignment appear to decline gradually from 750 feet at the lift station site to 510 feet at MD-114. For the purposes of this preliminary report, we recommend sizing the force main for 3-5 feet per second (fps) during normal pumping operation to promote sufficient cleansing velocity in the pipe, which can be achieved by a 6" HDPE DR 11 (4.8 fps) force main.

Pumping downhill requires careful design to mitigate potentially damaging transient effects, such as pressure surges and air entry/release. We recommend that a comprehensive transient analysis be performed during detailed design to better understand these effects. For the preliminary cost estimate, we assume that the pipeline will be DR 11 (200psi) HDPE to buffer against damage from pressure variations during operation and that air & vacuum valves will be necessary along the pipeline to enable air to escape during pipeline filling and air to enter during pipeline draining. Due to the relatively small volume of wastewater being pumped compared to the volume of the pipeline itself, it is unlikely that the force main will ever be completely full, unless it becomes plugged. A long force main such as this one needs to be designed with regular maintenance in mind. Pressure cleanouts and/or a pigging stations should be considered in the design to enable operators to clear buildup of solids that can be expected to occur from time to time. Higher rates of corrosion and odor should be expected at air relief valves and at the point of connection to the City of Solvang's gravity collection system.

The proposed force main alignment crosses Alamo Pintado Creek twice. At each crossing, the preferred approach is to attach to the County's existing bridge. If the County approves the bridge attachment, then the force main would be routed to the downstream side of the bridge, where it would be attached or hung from the bridge such that the bottom of the force main does not extend any lower than the bottom of the bridge girder. Depending upon the requirements of the County or District, the pipe crossing the bridge may need to be encased in a steel casing that runs the length of the bridge.

If the County does not approve the bridge attachment, then the recommended force main alignment is to go underneath the creek via HDD methods. The depth at which the force main crosses underneath would need to be determined during final design, based on soils data and anticipated scour depths.

GRAVITY CONVEYANCE

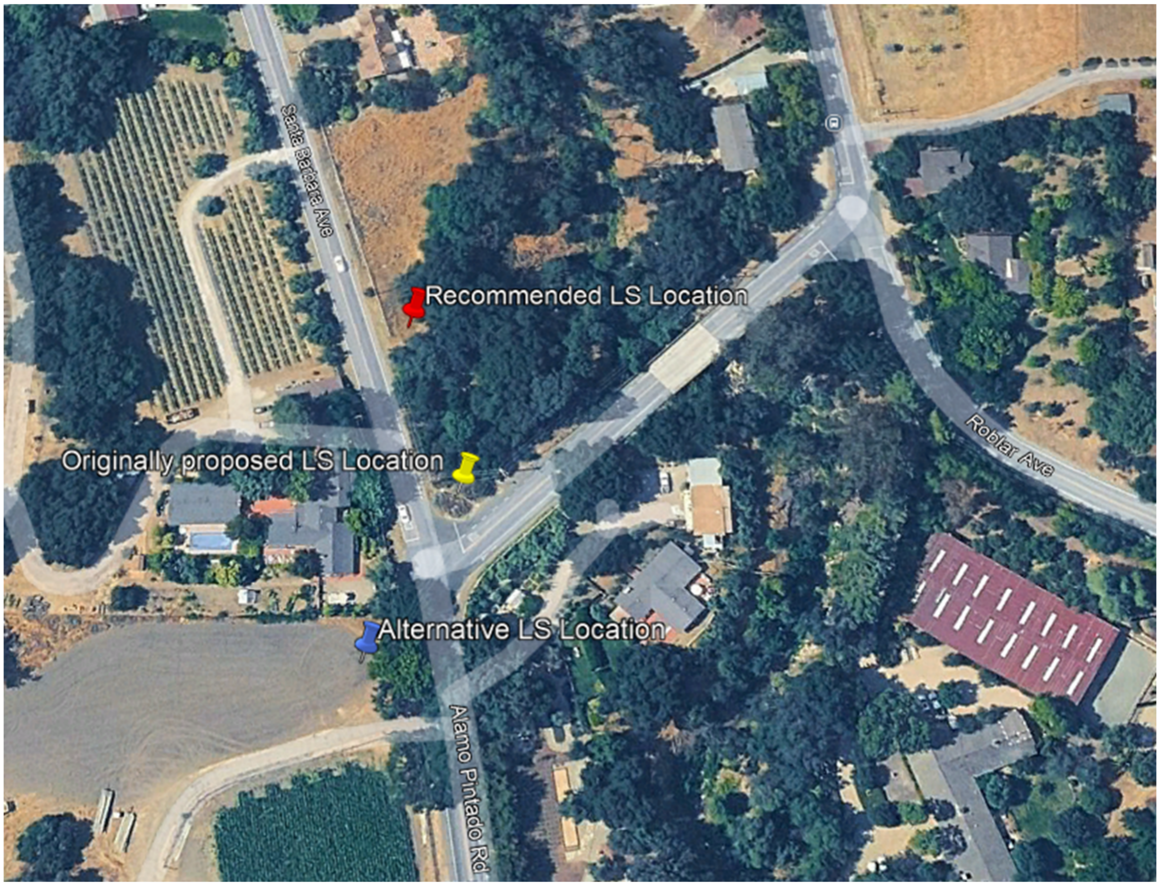
Gravity conveyance is an attractive concept given the natural gradual fall in elevation between Los Olivos and the City of Solvang, however it was not previously studied due to concerns over unauthorized connections to the gravity main outside of the District boundaries. During the initial stages of this preliminary design process, LOCSD expressed a willingness to re-evaluate a gravity approach as an alternative to the force main.

The feasibility of gravity conveyance to the City of Solvang largely depends upon approval of Santa Barbara County to attach the sewer line to the three existing Alamo Pintado Creek bridge crossings. Inverted siphons are not recommended due to the small pipe size required to maintain adequate cleansing velocity, and conventional gravity sewer under-crossings are presumably cost prohibitive due to the need for long runs of sewer exceeding 15-feet deep. At the time this report was prepared, the County was still reviewing the request for bridge attachment.

If Santa Barbara County is amenable to bridge attachment, then a gravity conveyance system appears to be a feasible alternative to pumped conveyance given the natural downhill profile between Los Olivos and the City of Solvang. Preliminary analysis suggests that a 10" main would be sufficient for peak buildout flows. Gravity conveyance eliminates the need for pump stations and their associated maintenance; however, the capital cost is likely to be higher and require on-going maintenance. Concerns over solids accumulation and buildup can be mitigated mostly through appropriate design to provide sufficient cleansing velocities, as well as with robust O&M procedures including regular cleaning.

It should also be noted that a gravity conveyance system is not as conducive to flow equalization as a lift station option. If forthcoming agreements with City of Solvang include a requirement of flow equalization, we recommend a pumped approach.

FIGURE 7-1: Santa Barbara Lift Station Siting Alternatives



Chapter 8
IMPACTS ON THE CITY OF SOLVANG

Conveying wastewater from LOCSD to the City of Solvang will introduce impacts to the City of Solvang's existing collection system and wastewater treatment plant. The extent of impacts to the existing collection system, based on flows projected by Stantec, was previously studied by WSC and documented in a technical memo dated December 2024. Impacts to the treatment plant were studied by Carollo and documented in a separate memo dated November 2024. This chapter summarizes the key impacts and discussions to date, as they relate to this preliminary design effort. As of the date of this report, an agreement between the City and LOCSD has not been established to set the terms of the connection and treatment. Further negotiations with the City of Solvang are required.

WASTEWATER TREATMENT PLANT UPGRADES

The existing wastewater treatment plant is a sequencing batch reactor (SBR) with a permitted capacity of 1.5 MGD and currently operates at around 0.7 MGD. Based on projected flows from LOCSD, Carollo determined that two phases of upgrades would be required before LOCSD could connect. The first phase consisted of aeration upgrades. These upgrades are completed. The second phase is currently in design and is projected to bid for construction by Q4 of 2026. The Carollo memo anticipated that the upgrades would be completed by April 2028. Currently, the City of Solvang expects the upgrades to take 2.5 years to complete, implying that the WWTP would not be ready for LOCSD's wastewater until Q2 of 2029.

Note that Carollo's analysis was based upon Phase III buildout flows from LOCSD which were presented as average daily maximum month flows (ADMMF) of 133,800 GPD or 0.13 MGD . If the timing of the WWTP upgrade poses a constraint on the septic to sewer project, we recommend revisiting this analysis to review the WWTP's ability to treat near term (Phase I and Phase II) flows.

Additional discussions with the City of Solvang are also required if the District pursues a STEP system in lieu of the gravity system. It is anticipated that the flows from the STEP system will be slightly lower than the gravity system and will have lower concentrations of BOD and TSS. However, STEP systems have higher levels of hydrogen sulfide which will impact the City's sewer collection system and may be a source of significant odor at the point of connection and therefore, odor control measures will need to be included in the design.

SANITARY SEWER COLLECTION SYSTEM UPGRADES

LOCSD contracted with WSC Consulting to evaluate the potential impacts of discharging LOCSD wastewater into the City of Solvang's existing collection system. WSC identified four Capital Improvement Projects (CIPs) that would need to be completed before LOCSD could connect, and are summarized in the following table excerpted from WSC's technical memorandum:

Project	Description	Driver	Cost
Alamo Pintado Phase 1	Upsize pipe from 8" to 12" from manhole MD-068 to manhole MD-104	Addition of Los Olivos flows under existing conditions	$275,500
Fjord Drive	Upsize pipe from 14" to 18" from manhole MC-005 to manhole MC-018. Upsize pipe from 10" to 12" from manhole MC-033 to manhole MC-020.	Solvang currently experiences a capacity issue here when the Alisal Lift Station is actively discharging. Addition of Los Olivos flows worsens this constraint.	$1,248,300
River Course Golf Course	Upsize main SWP0248 from 12" to 15".	Addition of Los Olivos flows under buildout conditions. No constraint under existing conditions.	$138,300
Alamo Pintado Phase 2	Upsize main SWP0134 from 8" to 12". Upsize pipe from 8" to 10" from manhole MD-105 to manhole MD-114	Addition of Los Olivos flows under buildout conditions. No constraint under existing conditions.	$1,079,000

WSC had noted in Solvang's Sewer Master Plan that a number of sewer mains appear to have low slopes based on the GIS data available, and that these low slopes are causing some of the capacity concerns associated with accepting Los Olivos' flow. We recommend that these 'low slope' sewers be confirmed by licensed land surveyors, and if any considerable differences are found compared to GIS data, that the sewer model be re-run to verify if upgrades are necessary.

During a coordination meeting with LOCSD and City of Solvang on November 19th, 2025, City staff cautioned that Fjord Drive is very congested and that upsizing the existing sewer may not be feasible. Alternative approaches to upsizing the sewer main, including investigating connecting to Santa Ynez Community Services District's sewer main should be further investigated during the next phase of design. The investigation should include surveying the manhole inverts along the low slope sewer discussed in section 5.2.2 of WSC's technical memorandum. Note, costs for upgrades to the City's sewer collection system are not currently included in the cost estimate but will be required prior to connection to the City of Solvang.

Equalization

At the November 19th meeting the City also expressed the desire for LOCSD to include equalization in the design of the new sewer collection and conveyance system, regardless of whether or not the CIPs are implemented. Stantec studied the potential for equalization by analyzing the amount of storage capacity that would be required to send wastewater during periods of low flow (7:30pm-2:30am), and found that, based on average daily flow, a minimum of 94,000 gallons of equalization storage would be required. For reference, this would be equivalent to approximately ten (10) 12-ft diameter wet wells. Not only is this amount of storage extremely costly (both in construction costs and the maintenance required for frequent cleaning), holding wastewater for long periods of time brings concerns of odors, higher hydrogen sulfide levels, and complaints from surrounding residents. Considering that the transit time between Los Olivos and Solvang is at least 90 minutes, peak hour flows coming from Los Olivos will likely be dampened somewhat during transit to Solvang's collection system. We recommend further discussion with City staff to better understand the desire for equalization, especially if CIPs are implemented that address peak flow constraints. Note, at this time, equalization storage costs are not included in the cost estimate. The lift station costs do include costs for emergency storage which is recommended at both lift stations.

CHAPTER 9
LIFE CYCLE COST ANALYSIS

A Life Cycle Cost Analysis (LCCA) is a useful tool in evaluating multiple project alternatives because it considers costs for owning and operating a system beyond the initial capital costs, however it should be considered only one of many factors in selecting a project alternative. Other qualitative factors, such as stakeholder acceptance, should also be considered as part of the final decision. A list of positive and negative findings for each alternative can be found in Chapter 10.

Wallace Group prepared a LCCA using methods consistent with those used by governmental agencies for cost effectiveness evaluations of project alternatives. The analysis compares the net present value of different project alternatives by considering up front capital costs as well as annual costs and periodic costs, along a timeline of 30-years. This method uses a 'real' discount rate, which alleviates the need to account for inflation in various cost inputs. For this analysis we used a real discount rate of 2.0% in accordance with OMB Circular No. A-94 Appendix C (Revised March 6, 2026).

The project scenarios considered in this LCCA are as follows:

- Scenario 1 – Gravity Collection + Pumped Conveyance – this scenario describes a project in which all parcels discharge wastewater to a gravity sewer collection system, where wastewater flows to the southern end of the District boundary, where it is intercepted by a set of sewer lift stations (one of the east side of Alamo Pintado Creek, and one on the west side), before being pumped to Solvang via a 3.4-mile long sanitary sewer force main. All gravity sewer bridge/creek crossings in this scenario are assumed to be bridge attachments.
- Scenario 2 – STEP Collection + Pumped Conveyance – this scenario describes a project in which all parcels are converted to septic tank effluent pump (STEP) systems, where wastewater is conveyed in a pressurized main network to a sewer lift station at the southern end of the District boundary and eventually pumped to Solvang. Under this scenario, only one lift station is necessary on the west side of Alamo Pintado Creek, as it is assumed that pressure main on the east side of the creek could cross the creek via either bridge attachment or HDD undercrossing. Note, if equalization storage is not required, this final lift station may be eliminated from the final design.

Wallace Group also analyzed the anticipated life cycle costs of the gravity conveyance system described in Chapter 7 and found that the 30-year life cycle costs were similar to Scenario 1 with pumped conveyance. Because this scenario is not part of the scope of work, we have not included a full detail of the cost analysis, however it can be provided separately for reference.

There are numerous variations to Scenarios 1 and 2 that could be evaluated further. Some examples include:

- ❖ Hybrid gravity/STEP collection – the District may consider a hybrid collection system approach to optimize the benefits of each type of system. This means that some properties would have STEP systems and other would have conventional gravity systems. This option allows for a shallower gravity sewer collection system to be constructed, reducing overall construction prices. However this may present challenges in community adoption due to differences in cost impacts to owners.
- ❖ Gravity under-crossings – if the County prohibits the attachment of sewer main to the three bridge crossings discussed in this report, the District may still consider a gravity conveyance option assuming crossing under the creeks, presumably through jack and bore. This variation presumably adds significant cost to the construction of the conveyance system, due to the depth of the pipeline.
- ❖ Extension of SSFM to bypass constrained Solvang sewers – during the November 19th meeting with City of Solvang, an alternative was discussed in which the LOCSD SSFM would connect downstream of the constrained City of Solvang sewers, thus eliminating the District's responsibility to fund the CIP measures discussed in Chapter 8.

EDU Analysis

In an effort to understand the proportionality of project costs between residential properties and commercial properties, we established an Equivalent Dwelling Unit (EDU) for the project, based on our estimates of peak day dry weather flow (PDDWF). For the purposes of this analysis 1 EDU = 1 residential parcel, which is anticipated to have a PDDWF of 270 gallons per day. Commercial parcels are estimated to have PDDWF of 1,720 GPD (or 6 EDUs), and the Hotel a PDDWF of 6,000 GPD (or 22 EDUs). Wallace Group has estimated a total of 761 EDUs based on the following breakdown:

- ❖ Residential: 325
- ❖ Commercial including the Hotel: 436

Please note, a separate cost allocation analysis is required for Proposition 218 purposes and final cost distributions; the estimates described here are intended to be for comparison purposes only, The costs are based on preliminary information and do not include all costs that will be associated with this project including, but not limited to financing costs, closing costs, interest, City of Solvang connection fees, etc.

Life Cycle Cost Analysis

The Life Cycle Cost Analysis is broken into two categories: 1) Capital Costs and 2) Operations and Maintenance Costs. Both are analyzed for the District and the Private Property Owner over a 30-year period. The costs are presented at Net Present Value (NPV). NPV is a financial method used to express future costs or savings in today's dollars. Because money today is worth more than the same amount in the future—due to inflation, investment returns, and opportunity cost—future expenditures are "discounted" to reflect their value today.

By converting all costs over the life of a project into Present Value, different alternatives can be compared on an equal, consistent basis. This ensures that long-term operating, maintenance, and replacement costs are evaluated fairly alongside initial capital costs.

The District's capital costs are the capital costs required to construct the sewer collection and conveyance system including lateral stub outs to each parcel's property line as well as the conveyance system to the City of Solvang. This cost does not currently include the connection fees or the construction costs for any upgrades to the City of Solvang's wastewater collection system or wastewater treatment plant. It is assumed that regardless of the alternative chosen, these costs will be the same or fairly similar and do not impact the overall decision on which alternative is chosen. A detailed breakdown of the Construction Costs is provided in Appendix A.

The O&M Costs are on-going annual expenses required to operate and maintain the sewer collection system. This annualized cost does not include money for reserves or emergency funds. These costs will be established during the rate study process. A detailed breakdown of the O&M costs is also provided in Appendix A. Both the capital costs and the O&M costs are developed for Scenario 1 and Scenario 2.

The Private Property costs include the construction of the sewer lateral to the property line for the gravity system and the sewer lateral plus the STEP system for the pressure system. These costs also include the costs for abandonment of the existing septic system on the property. Appendix A also provides a breakdown of both the capital costs and the O&M costs anticipated for the two scenarios. The Private Property costs are the costs anticipated to be funded directly by each property owner to install their private on-site facilities. Please note, the costs provided are averages and may increase or decrease depending on site conditions for private installations.

Table 9-1 is a summary table of the LCCA Results. The full cost analysis, including estimates for construction and O&M, and associated assumptions, are provided in APPENDIX A: Life Cycle Cost Analysis. When comparing to estimates provided in prior studies, note that the capital costs should only be compared and not the life cycle costs, as the prior studies did not include a life cycle analysis.

TABLE 9-1. LIFE CYCLE COST ANALYSIS SUMMARY

		Scenario 1 (Gravity Collection & Pumped Conveyance)	Scenario 2 (STEP Collection & Pumped Conveyance)
A	Capital Costs (LOCSD)	$51,180,900	$38,643,900
B	Capital Costs per EDU (LOCSD, 761 EDUs)	$67,300	$50,800
C	Private Residential Capital Costs (per EDU)	$16,400	$39,200
D	Private Commercial Capital Costs (per EDU)	$16,400	$85,600
E	30-Year Life Cycle Cost (LOCSD) - NPV	$52,893,600	$39,605,700
F	30-Year Life Cycle Costs per EDU (LOCSD, 761 EDUs) - NPV	$69,600	$52,100
G	30-Year Private Residential Life Cycle Cost – NPV (per EDU)	$18,600	$45,400
H	30-Year Commercial Life Cycle Cost – NPV (per EDU)	$18,600	$109,800
I	**Estimated Total Residential Cost (30-Years)[1] (per EDU)**	**$88,200**	**$97,500**
J	**Estimated Total Commercial Cost (30 Years)[2] (per 6 EDUs)**	**$436,200**	**$422,400**

1. Calculation for the Residential 30 Year cost: F+G
2. Calculation for the Commercial 30 Year cost: (F*6) + H

Note: the estimates listed above are intended to be for comparison purposes only. These costs are based on preliminary information and do not include all costs that will be associated with this project including, but not limited to financing costs, closing costs, interest, City of Solvang connection fees, City of Solvang capital improvement projects, etc.

CHAPTER 10
SUMMARY OF FINDINGS

LOCSD contracted with Wallace Group to provide a peer review of previous studies for both a gravity and a pressure collection system. Wallace Group has prepared 30% drawings for both the gravity and pressure systems as well as the conveyance system to reconfirm/update the designs also prepared by previous consultants. These drawings aided in the development of our Engineer's Opinion of Probable Costs discussed in detail in Chapter 9.

In addition, Wallace Group completed a 30-year Life Cycle Cost analysis to evaluate the long-term costs for both the District and the private property owners which had not been previously completed. In summary, over a 30-year period, the costs for a gravity system versus a pressure system are fairly close with the anticipated costs for the gravity system being slightly lower than a pressure system. The initial construction costs for the gravity system for the District are higher than the pressure system but the on-site construction costs for the private pressure systems are more costly than the gravity system. In addition, the long-term operations and maintenance costs for the pressure system slightly out-paces the cost of the gravity systems.

As a supplement to these findings, Wallace Group will prepare a sensitivity analysis and will submit this sensitivity analysis under separate cover. The sensitivity analysis will evaluate various items in the capital and O&M costs for both systems to determine what factors could make or not make additional impacts on the overall life cycle cost.

Assumptions Requiring Further Investigations

This CCS Report is based on many assumptions that will require further refinement as Wallace Group works through final design. Geotechnical investigations are necessary to confirm subsurface assumptions for construction methods as well as groundwater. Dewatering for construction is an unknown with significant cost implications. Depth of the gravity collection system will depend largely upon location of existing septic tanks on private lots and depth of existing utilities in the roadway, both of which will require further investigations during final design and will ultimately impact the design and costs.

Additionally, further discussions with the City of Solvang are required to better understand their needs for flow equalization. If flow equalization is not required, the Santa Barbara Lift Station could be potentially eliminated altogether in the pressure system. The elimination of the lift station from Scenario 2 will be considered in the sensitivity analysis discussed above.

Other design refinements will be evaluated as design progresses, but these refinements will affect both Scenarios equally, thus are not further discussed. These refinements will ultimately affect the Engineer's Opinion of Probable Cost, which will get updated at each design stage.

Additional Items to Consider

Since costs do not glaringly suggest one system over another, there are additional items that should be considered as the District evaluates the desired collection system methodology. Table 10-1 provides a summary of the strengths and weaknesses for both systems which could aid in the overall considerations.

TABLE 10-1. SUMMARY OF STRENGTHS & WEAKNESSES

	Scenario 1 (Gravity Collection & Pumped Conveyance)	Scenario 2 (STEP Collection & Pumped Conveyance)
Strengths	**Proven, long-established technology** Gravity sewers are widely used and well-understood by engineers, operators, and regulators.	**Lower installation cost** Uses shallower trenches and smaller diameter pipe.
	Low routine operational complexity Once installed, the system relies primarily on natural gravitational flow with minimal mechanical equipment.	**Reduced infiltration and inflow (I&I)** Sealed pressure pipes and buried tanks greatly limit unwanted water entering the system.
	Less dependence on power Except at lift stations, flow is not reliant on electrical service.	**Flexible alignment** Pipes can follow terrain with fewer constraints, reducing construction impacts.
		Lower Flows, BOD, & TSS This may reduce connection fees with the City of Solvang, but still requires negotiations
Weaknesses	**High capital cost** Deep trenching, manholes, dewatering, shoring, and utility conflicts significantly drive-up installation cost.	**Higher operational and maintenance requirements** Each connected property has pumps, floats, and electrical components that must be maintained or replaced.
	Infiltration and inflow (I&I) risk Manholes, pipe joints, and cracks are common entry points for stormwater and groundwater, increasing flows.	**Power-dependent** Pump operation requires electricity; outages can affect reliability unless backup systems are installed. Septic tanks have limited capacity before overflows will occur.
	Larger construction footprint Deep excavations cause more disruption to roads, traffic, and adjacent utilities.	**Decentralized responsibility** Homeowners or utilities must maintain individual tanks and pumps—leading to more service calls and variability in upkeep. District will likely need to obtain an easement on all properties to access the septic tanks and pumps for maintenance
		Shorter equipment life Pumps typically require replacement every 8–12 years, adding to lifecycle costs.
		Sewer odors/Higher H2S Tanks must be periodically pumped and can generate odors if not serviced properly. Higher H2S at connection point to Solvang.
		Sewer Main Break In a sewer main break, all upstream connections are impacted until system is repaired. Bypassing is more difficult.

APPENDICES

APPENDIX A: Life Cycle Cost Analysis

Life Cycle Cost Analysis (LCCA) 2026-05-06																															
All costs expressed in May 2026 dollars. Do not escalate via inflation or CCI																															
Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Discount Rate	2.00%	0.980	0.961	0.942	0.924	0.906	0.888	0.871	0.853	0.837	0.820	0.804	0.788	0.773	0.758	0.743	0.728	0.714	0.700	0.686	0.673	0.660	0.647	0.634	0.622	0.610	0.598	0.586	0.574	0.563	0.552
Scenario 1																															
Gravity collection system, with two lift stations (Santa Barbara LS and Grand LS) and force main conveyance to Solvang. Grands LS force main to be attached to bridge at Lansing Crossing. Santa Barbara LS force main to be attached to bridges at both Alamo Pintado crossings	Cost Basis																														
Capital Cost - LOCSD Responsibility																															
Soft Costs	$10,949,195	$10,949,195	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Construction Costs	$40,231,620	$40,231,620	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Annual O&M Costs - LOCSD																															
Administrative	$5,000	$0	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000
Routine LS Inspections (Grand LS & Santa Barbara LS)	$24,800	$0	$24,800	$24,800	$24,800	$24,800	$24,800	$24,800	$24,800	$24,800	$24,800	$24,800	$24,800	$24,800	$24,800	$24,800	$24,800	$24,800	$24,800	$24,800	$24,800	$24,800	$24,800	$24,800	$24,800	$24,800	$24,800	$24,800	$24,800	$24,800	$24,800
Routine Generator maintenance/testing	$6,000	$0	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000
Emergency/Misc.LS Repairs (Grand LS & Santa Barbara LS)	$12,000	$0	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000
Annual Collection System O&M	$50,000	$0	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Grand LS Electricity	$5,300	$0	$5,300	$5,300	$5,300	$5,300	$5,300	$5,300	$5,300	$5,300	$5,300	$5,300	$5,300	$5,300	$5,300	$5,300	$5,300	$5,300	$5,300	$5,300	$5,300	$5,300	$5,300	$5,300	$5,300	$5,300	$5,300	$5,300	$5,300	$5,300	$5,300
Santa Barbara LS Electricity	$6,700	$0	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700
Annual Force Main O&M	$6,000	$0	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000
Equipment Replacement Costs - LOCSD																															
Grand LS Pump Replacement - every 10 years	$30,000	$0									$30,000											$30,000									$30,000
Santa Barbara LS Pump Replacement - every 10 years	$40,000	$0									$40,000											$40,000									$40,000
Regulatory Compliance Costs - LOCSD																															
SSMP Audit - Every 3 years	$8,000	$0		$8,000			$8,000			$8,000			$8,000			$8,000			$8,000			$8,000			$8,000			$8,000			$8,000
SSMP Update - Every 6 years	$10,000	$0					$10,000						$10,000						$10,000						$10,000						$10,000
Total LOCSD Cost	$51,384,615	$51,180,815	$115,800	$123,800	$115,800	$115,800	$133,800	$115,800	$115,800	$123,800	$185,800	$115,800	$133,800	$115,800	$115,800	$123,800	$115,800	$115,800	$133,800	$115,800	$115,800	$193,800	$115,800	$115,800	$133,800	$115,800	$115,800	$123,800	$115,800	$115,800	$203,800
Total LOCSD Present Value Cost at Discount Rate	$52,893,553	$50,177,270	$111,303	$116,660	$106,981	$104,884	$118,811	$100,811	$98,834	$103,590	$152,421	$93,134	$105,500	$89,517	$87,762	$91,985	$84,354	$82,700	$93,681	$79,489	$77,930	$127,865	$74,904	$73,435	$83,186	$70,584	$69,200	$72,530	$66,513	$65,208	$112,512
Per EDU (761)	$69,505																														
Capital Cost - Residential Property Owners																															
Construction Cost	$4,861,125	$4,861,125	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Annual O&M Costs - Residential Property Owners																															
None Anticipated	$0	$0	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Equipment Replacement / Periodic Costs - Residential Property Owners																															
Lateral Cleaning/Rooting - Every 15 years	$596,000		$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$596,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$596,000.00
Total Residential Property Owner Cost	$5,457,125	$4,861,125	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$596,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$596,000.00
TotalResidential Property Owner Cost Present Value Cost at Discout Rate	$5,537,680	$4,765,809	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$442,836.78	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$329,034.25
Per Service (298)	$18,583																														
Capital Cost - Commerical Property Owners																															
Construction Cost	$978,750	$978,750	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Annual O&M Costs - Commerical Property Owners																															
None Anticipated	$0	$0	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Equipment Replacement / Periodic Costs - Commerical Property Owners																															
Lateral Cleaning/Rooting - Every 15 years	$120,000															$120,000.00															$120,000.00
Total Commerical Property Owner Cost	$1,098,750	$978,750	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$120,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$120,000.00
Total Commerical Property Owner Cost Present Value Cost at Discout Rate	$1,114,969	$959,559	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$89,161.77	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$66,248.51
Per Service (60)	$18,583																														

Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Discount Rate	2.00%	0.980	0.961	0.942	0.924	0.906	0.888	0.871	0.853	0.837	0.820	0.804	0.788	0.773	0.758	0.743	0.728	0.714	0.700	0.686	0.673	0.660	0.647	0.634	0.622	0.610	0.598	0.586	0.574	0.563	0.552
Scenario 2																															
STEP collection with one lift station (Santa Barbara LS) and force main conveyance to Solvang. East side STEP system to be connected via bridge attachment at Lansing Crossing. Santa Barbara LS force main to be attached to bridges at both Alamo Pintado crossings	Cost Basis																														
Capital Cost - LOCSD Responsibility																															
Soft Costs	$10,342,900	$10,342,900	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Construction Costs	$28,301,000	$28,301,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Annual O&M Costs - LOCSD																															
Administrative	$5,000	$0	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000
Routine LS Inspections (Santa Barbara LS only)	$12,400	$0	$12,400	$12,400	$12,400	$12,400	$12,400	$12,400	$12,400	$12,400	$12,400	$12,400	$12,400	$12,400	$12,400	$12,400	$12,400	$12,400	$12,400	$12,400	$12,400	$12,400	$12,400	$12,400	$12,400	$12,400	$12,400	$12,400	$12,400	$12,400	$12,400
Routine Generator maintenance/testing	$6,000	$0	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000
Emergency/Misc. LS Repairs (Santa Barbara LS only)	$6,000	$0	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000
Annual Collection System O&M	$30,000	$0	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000
Santa Barbara LS Electricity	$6,700	$0	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700	$6,700
Annual Force Main O&M	$6,000	$0	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000
Equipment Replacement Costs - LOCSD																															
Santa Barbara LS Pump Replacement - every 10 years	$40,000	$0									$40,000											$40,000									$40,000
Regulatory Compliance Costs - LOCSD																															
SSMP Audit - Every 3 years	$8,000	$0		$8,000			$8,000			$8,000			$8,000			$8,000			$8,000			$8,000			$8,000			$8,000			$8,000
SSMP Update - Every 6 years	$10,000	$0					$10,000						$10,000						$10,000						$10,000						$10,000
Total LOCSD Cost	$38,774,000	$38,643,900	$72,100	$80,100	$72,100	$72,100	$90,100	$72,100	$72,100	$80,100	$112,100	$72,100	$90,100	$72,100	$72,100	$80,100	$72,100	$72,100	$90,100	$72,100	$72,100	$120,100	$72,100	$72,100	$90,100	$72,100	$72,100	$80,100	$72,100	$72,100	$130,100
Total LOCSD Present Value Cost at Discount Rate	$39,605,612	$37,886,176	$69,300	$75,480	$66,609	$65,303	$80,006	$62,767	$61,537	$67,024	$91,961	$57,987	$71,043	$55,736	$54,643	$59,515	$52,521	$51,491	$63,084	$49,492	$48,521	$79,239	$46,637	$45,723	$56,017	$43,947	$43,085	$46,928	$41,412	$40,600	$71,824
Per EDU (761)	$52,044.17																														
Capital Cost - Residential Property Owners																															
Construction Cost	$11,666,700	$11,666,700	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Annual O&M Costs - Residential Property Owners																															
Electricity	$10		$10	$10	$10	$10	$10	$10	$10	$10	$10	$10	$10	$10	$10	$10	$10	$10	$10	$10	$10	$10	$10	$10	$10	$10	$10	$10	$10	$10	$10
Equipment Replacement / Periodic Costs -Residential Property Owners																															
STEP Pump Repair/Replacement every 10 years	$325,000										$325,000.00										$325,000.00										$325,000.00
Tank Pumping every 5 years	$325,000					$325,000.00					$325,000.00					$325,000.00					$325,000.00					$325,000.00					$325,000.00
Total Residential Property Owner Cost	$12,316,710	$11,666,700	$10.00	$10.00	$10.00	$325,010.00	$10.00	$10.00	$10.00	$10.00	$650,010.00	$10.00	$10.00	$10.00	$10.00	$325,010.00	$10.00	$10.00	$10.00	$10.00	$650,010.00	$10.00	$10.00	$10.00	$10.00	$325,010.00	$10.00	$10.00	$10.00	$10.00	$650,010.00
Total Residential Property Owner Cost Present Value Cost at Discount Rate	$13,501,599	$11,437,941	$9.61	$9.42	$9.24	$294,371.57	$8.88	$8.71	$8.53	$8.37	$533,234.60	$8.04	$7.88	$7.73	$7.58	$241,487.22	$7.28	$7.14	$7.00	$6.86	$437,438.10	$6.60	$6.47	$6.34	$6.22	$198,103.63	$5.98	$5.86	$5.74	$5.63	$358,851.60
Per Service (298)	$45,307																														
Capital Cost - Commercial Property Owners																															
Construction Cost	$5,133,000	$5,133,000																													
Annual O&M Costs - Commercial Property Owners																															
Electricity	$50		$50	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50
Equipment Replacement / Periodic Costs - Commercial Property Owners																															
STEP Pump Repair/Replacement every 5 years	$180,000					$180,000.00					$180,000.00					$180,000.00					$180,000.00					$180,000.00					$180,000.00
Tank Pumping every 5 years	$180,000					$180,000.00					$180,000.00					$180,000.00					$180,000.00					$180,000.00					$180,000.00
Total Commercial Property Owner Cost	$5,493,050	$5,133,000	$50.00	$50.00	$50.00	$360,050.00	$50.00	$50.00	$50.00	$50.00	$360,050.00	$50.00	$50.00	$50.00	$50.00	$360,050.00	$50.00	$50.00	$50.00	$50.00	$360,050.00	$50.00	$50.00	$50.00	$50.00	$360,050.00	$50.00	$50.00	$50.00	$50.00	$360,050.00
Total Commercial Property Owner Cost Present Value Cost at Discount Rate	$6,582,744	$5,032,353	$48.06	$47.12	$46.19	$326,108.38	$44.40	$43.53	$42.67	$41.84	$295,366.41	$40.21	$39.42	$38.65	$37.89	$267,522.45	$36.42	$35.71	$35.01	$34.32	$242,303.33	$32.99	$32.34	$31.71	$31.09	$219,461.59	$29.88	$29.29	$28.72	$28.16	$198,773.12
Per service (60)	$109,712																														

Cost Estimate (2026_05_06)								
	Scenario 1				Scenario 2			
	Gravity collection system, with two lift stations (Santa Barbara LS and Grand LS) and force main conveyance to Solvang. Grands LS force main to be attached to bridge at Lansing Crossing. Santa Barbara LS force main to be attached to bridges at both Alamo Pintado crossings				STEP collection with one lift station (Santa Barbara LS) and force main conveyance to Solvang. East side STEP system to be connected via bridge attachment at Lansing Crossing. Santa Barbara LS force main to be attached to bridges at both Alamo Pintado crossings			
	QTY	**Unit**	**Unit Rate**	**Total**	**QTY**	**Unit**	**Unit Rate**	**Total**
Construction Costs - LOCSD Responsibility								
General								
Mobilization	1	LS	$1,000,000	$1,000,000	1	LS	$1,000,000	$1,000,000
Potholing	1	LS	$2,500,000	$2,500,000	1	LS	$2,500,000	$2,500,000
Construction Survey	1	LS	$400,000	$400,000	1	LS	$400,000	$400,000
Traffic Control	1	LS	$400,000	$400,000	1	LS	$400,000	$400,000
Dewatering	1	LS	$1,500,000	$1,500,000	1	LS	$750,000	$750,000
Shoring Sheeting & Bracing	1	LS	$750,000	$750,000	1	LS	$250,000	$250,000
Collection System								
8" sewer collection trench & backfill < 10-ft depth	20900	LF	$360	$7,524,000				
8" sewer collection trench & backfill > 10-ft depth	10200	LF	$400	$4,080,000				
10" sewer collection trench & backfill < 10-ft depth	1100	LF	$380	$418,000				
10" sewer collection trench & backfill > 10-ft depth	600	LF	$420	$252,000				
48" manhole < 10-ft depth	74	EA	$20,000	$1,487,400				
48" manhole > 10-ft depth	111	EA	$24,000	$2,664,000				
4" STEP Pressure main installation					32000	LF	$290	$9,280,000
Grand Lift Station	1	LS	$782,000	$782,000				$0
Lansing Crossing - Bridge Attachment	80	LF	$400	$32,000	80	LF	$400	$32,000
Lansing Crossing - HDD undercrossing								
Conveyance System - Los Olivos to Solvang								
Santa Barbara Lift Station	1	LS	$1,050,000	$1,050,000	1	LS	$1,050,000	$1,050,000
6" SSFM HDD	18000		$330	$5,940,000	18000		$330	$5,940,000
SSFM Air/Vac	5		$10,000	$50,000	5		$10,000	$50,000
SSFM Pigging Station	1		$50,000	$50,000	1		$50,000	$50,000
Alamo Pintado Creek Crossing #1 - Bridge Attachment	90	LF	$400	$36,000	90	LF	$400	$36,000
Alamo Pintado Creek Crossing #1 - HDD Undercrossing								
Alamo Pintado Creek Crossing #2 - Bridge Attachment	80	LF	$400	$32,000	80	LF	$400	$32,000
Alamo Pintado Creek Crossing #2 - HDD Undercrossing								
10" sewer collection trench & backfill < 10-ft depth								
48" manhole < 10-ft depth								
Subtotal LOCSD Construction Costs				$30,947,400				$21,770,000
Construction Contingency			30%	$9,284,220			30%	$6,531,000
Total LOCSD Construction Costs				$40,231,620				$28,301,000
Construction Costs - Owner Responsibility								
Gravity lateral connection to back of property - Residential	149	EA	$15,000	$2,235,000		EA		$0
Gravity lateral connection to back of property - Commercial	30	EA	$15,000	$450,000		EA		$0
Gravity lateral connection to front of property - Residential	149	EA	$7,500	$1,117,500		EA		$0
Gravity lateral connection to front of property - Commercial	30	EA	$7,500	$225,000		EA		$0
STEP lateral to back of property - Residential		EA		$0	149	EA	$12,000	$1,788,000
STEP lateral to back of property - Commercial		EA		$0	30	EA	$12,000	$360,000
STEP lateral to front of property - Residential		EA		$0	149	EA	$6,000	$894,000
STEP lateral to front of property - Commercial		EA		$0	30	EA	$6,000	$180,000
STEP tank install - Residential		EA		$0	298	EA	$18,000	$5,364,000
STEP tank install - Commercial		EA		$0	60	EA	$50,000	$3,000,000
Subtotal Residential Owner Construction Costs				$3,352,500				$8,046,000
Construction Contingency			30%	$1,005,750			30%	$2,413,800
Engineering			15%	$502,875			15%	$1,206,900
Total Residential Owner Construction Costs				$4,861,125				$11,666,700
Subtotal Commercial Owner Construction Costs				$675,000				$3,540,000
Construction Contingency			30%	$202,500			30%	$1,062,000
Engineering			15%	$101,250			15%	$531,000
Total Commercial Owner Construction Costs				$978,750				$5,133,000
LOCSD Soft Costs								
Adminstrative & Legal	1	LS	$250,000	250000	1	LS	$250,000	250000
Permits								
CEQA/NEPA	1	LS	$120,000	$120,000	1	LS	$120,000	$120,000
SB County (pavement impacts, bridge attachment)	1	LS	$50,000	$50,000	1	LS	$50,000	$50,000
CDFW (drainage crossing)	1	LS	$50,000	$50,000	1	LS	$50,000	$50,000
City of Solvang (connection fee)	1	LS	$50,000	$50,000	1	LS	$50,000	$50,000
RWQCB (groundwater discharge during construction)	1	LS	$50,000	$50,000	1	LS	$50,000	$50,000
Land Acquisition	0	AC	$2,500,000	$0	0	AC	$2,500,000	$0
Utility Access Easement	0	EA	$5,000	$0	298	EA	$5,000	$1,490,000
Prop 218	1	LS	$200,000	$200,000	1	LS	$200,000	$200,000
Environmental Monitoring	322	DAY	$1,000	$322,100	275	DAY	$1,000	$275,000
Regulatory Compliance (SSMP, SERP, SOPs, FOG)	1	LS	$70,000	$70,000	1	LS	$70,000	$70,000
Engineering (Final design and ESDC)			15%	$4,642,110			15%	$3,265,500
Construction Management, Inspection, and Testing			15%	$5,144,985			15%	$4,472,400
Total LOCSD Soft Costs				$10,949,195				$10,342,900

Construction - Unit Cost Assumptions		
Construction Soft Costs		
Adminstrative & Legal	$250,000	Stantec[1] included 250k for Legal & Admin. Keep in mind the project associated with Stantec's estimate included construction of WWTP and emergency outfall
Permits		
CEQA/NEPA	$120,000	Stantec[1] included 120k for CEQA/NEPA and Environmental permitting. Assuming that this project will be MND and not EIR (EIR will be higher)
SB County (pavement impacts, bridge attachment)	$50,000	
CDFW (drainage crossing)	$50,000	
City of Solvang (connection fee)	$50,000	
RWQCB (groundwater discharge during construction)	$50,000	
Land/fee Acquisition ($/acre)	$2,500,000	Stantec[1] included $400k, for LS land acquisition and $1M for easements
Easement Acquistion ($/parcel)	$5,000	For STEP systems
Prop 218	$200,000	Stantec[1] did not include Prop 218 costs explicitly (perhaps included in admin/legal?)
Environmental Monitoring ($/day)	$1,000	Stantec[1] did not include environmental costs explicitly (perhaps included in admin/legal?). Assuming $1000/day for monitoring
Regulatory Compliance (SSMP, SERP, SOPs, FOG)	$70,000	From Bill Callahan email[7]
Construction General Costs		
Mobilization/demob	$1,000,000	Stantec[1] and Regen[3] included $2M for mob/demob/road permits/bonds/insurance
Potholing	$2,500,000	Stantec[1] and Regen[3] included $250k for potholing, WG assumption - 1,000 potholes at $2500 each
Construction Survey	$400,000	Stantec[1] and Regen[3] included $250k for construction survey
Traffic Control	$400,000	Stantec[1] and Regen[3] included $330k for Traffic Control, including signed/stamped TCP
Dewatering - Gravity Collection Construction + Pumped Conveyance (Sce	$1,500,000	Stantec[1] did not include Dewatering costs explicitly. This estimate is very rough and can vary widely
Dewatering - Step Collection Construction + Pumped Conveyance (Scena	$750,000	Assuming STEP construction dewatering will be about half of the gravity construction, due to shallower/fewer excavation
Dewatering - Gravity Collection Construction + Gravity Conveyance (Scer	$2,250,000	Assuming this will be about 1.5x the dewatering cost of scenario 1
Shoring Sheeting & Bracing (gravity collection)	$750,000	Stantec[1] did not include Sheeting/Shoring/Bracing explicitly. Could be that they included with trenching unit costs but they did not elude to it in the description
Shoring Sheeting & Bracing (STEP collection)	$250,000	Assuming STEP construction shoring will be about a third of the gravity construction, due to shallower/fewer excavations
Open Trench Construction		
Gravity sewer, 8" total (LF)	31058	From Ralph's quantity export, file dated 2026-03-10[5]
Collection System Gravity sewer, 8" less than 10' depth (LF)	20900	From spot check depth analysis[6], 67% of pipe is average less than 10' depth
Collection System Gravity sewer, 8" greater than 10' depth (LF)	10200	
Collection System Gravity sewer, 10" total (LF)	1626	From Ralph's quantity export, file dated 2026-03-10[5]
Collection System Gravity sewer, 8" less than 10' depth (LF)	1100	From spot check depth analysis[6], 67% of pipe is average less than 10' depth
Collection System Gravity sewer, 8" greater than 10' depth (LF)	600	
Conveyance System Gravity sewer, 10" (LF)	17700	From Ralph's quantity export, file dated 2026-03-10
Conveyance System Gravity sewer, 8" less than 10' depth (LF)	17700	100% is less than 10' if allowed to attach to bridge. If not, reduce by 3200 to account for deep sewer
Conveyance System Gravity sewer, 8" greater than 10' depth (LF)	3200	Only use if bridge attachment is not allowed. Roughly estimated from plot, could be firmed up if needed
8" SDR < 10' deep, includes pavement restoration	$360	Based on recent bid data
8" SDR > 10' deep, includes pavement restoration	$400	Based on recent bid data
10" SDR < 10' deep, includes pavement restoration	$380	Based on recent bid data
10" SDR > 10' deep, includes pavement restoration	$420	Based on recent bid data
Manhole Construction		
48" Manhole (EA)	111	From Ralph's quantity export, file dated 2026-03-10[5]
48" Manhole, less than 10' depth (EA)	74	From spot check depth analysis[6], 67% of pipe is average less than 10' depth
48" Manhole, greater than 10' depth (EA)	37	
48" Manhole less than 10' deep	$20,000	From Tony S estimate and recent bid data
48" Manhole greater than 10' deep	$24,000	From Tony S estimate and recent bid data

Lift Stations		
Grand LS	$782,000	Based on Flygt quotes from similar projects and recent bid data
Santa Barbara LS	$1,050,000	Based on Flygt quotes from similar projects and recent bid data
Bridge Attachment		
Pipe in casing with anchors ($/LF)	$400	Rough guess - probably in line with gravity construction due to extra time needed for anchors/supports
Lansing's Crossing (ft)	80	
Alamo Pintado Road Crossing #1 (ft)	90	
Alamo Pintado Road Crossing #2 (ft)	80	
HDD Construction		
6" HDPE Force Main to Solvang (LF)	18000	From Ralph's quantity export, file dated 2026-03-10[8]
6" HDPE Force Main to Solvang ($/LF), includes pavement restoration	$330	Based on recent bid data, includes pavement restoration
4" STEP Pressure Distribution System (LF)	32000	From Ralph's quantity export, file dated 2026-03-10
4" STEP Pressure Distribution System ($/LF), includes pavement restorat	$290	6" HDD unit cost adjusted down per suggestion from Rob M
Air Vac		
SSFM Air Vac (EA)	5	From Stantec Estimate
SSFM Air Vac ($/EA)	$10,000	From Stantec Estimate
SSFM Pigging Station		
Pigging Station (EA)	1	San Juan Bautista project included a pigging station about every 2.5 miles
Pigging Station ($/EA)	$50,000	Rough guess based on San Juan Bautista detail

Lateral Connections (Private Property Work)		
Total Existing Residential Septic Systems (EA)	298	Based on Flow Projection Memo[9]
Total Existing Commercial Septic Systems (EA)	60	Based on Flow Projection Memo
Reconnection to back of lot - Residential (EA)	149	Based on review of septic system survey data, approximately 50% of the systems are in the back of the lot
Reconnection to back of lot - Commercial (EA)	30	
Reconnection to front of lot - Residential (EA)	149	Based on review of septic system survey data, approximately 50% of the systems are in the back of the lot
Reconnection to front of lot - Commercial (EA)	30	
Gravity lateral to front of lot - ($/EA)	$7,500	includes trench/backfill + basic surface restoration
Gravity lateral to back of lot ($/EA)	$15,000	includes trench/backfill + basic surface restoration
STEP lateral to front of lot	$6,000	assumes HDD
STEP lateral to back of lot	$12,000	assumes HDD
STEP tank, electrical mods, etc - Residential	$18,000	
STEP tank, electrical mods, etc - Commercial	$50,000	
Markups and Contingencies		
Construction Contigency	30%	Stantec[1] assumed 30% for construction continency
Construction Management, Inspection, and Testing	15%	Stantec[1] assumed 15% for construction management and compaction testing
Detailed Engineering & Engineering Services During Construction	15%	Stantec[1] assumed 15% of construction cost for engineering services (final design and ESDC)

Operations & Maintenance (O&M) - Unit Cost Assumptions		
Residential PG&E electricity rate blended ($/kWh)	$0.39	From PG&E new rates starting March 2026[2]
Residential PG&E baseline charge ($/day)	$0.79	From PG&E new rates starting March 2026[2]
Commercial PG&E customer charge ($/meter/day)	$0.82	From PG&E new rates starting March 2026, Assuming Commercial A-1, with poly-phase service[3]
Commercial PG&E electricity rate blended ($/kWh)	$0.41	From PG&E new rates starting March 2026, Assuming Commercial A-1, with poly-phase service[3]
Routine LS Inspections	$12,400.00	Weekly and Quarterly inspections (ESR Estimate)
Routine LS Generator Inspection & Testing	$6,000.00	Monthly (ESR estimate)
Miscellaneous LS Repairs	$6,000.00	Per Lift Station, from FRM Email
Gravity Collection System Annual O&M	$50,000.00	From interpretation of FRM Email[10]
Gravity Conveyance to Solvang Annual O&M	$18,000.00	
STEP Collection System Annual O&M	$30,000.00	
Force Main Conveyance to Solvan Annual O&M	$6,000.00	
Administrative	$5,000.00	Average from Woodlands Mutual Water Company Sewer Budget (2023-2025)
Permits & Fees	$3,000.00	Average from Woodlands Mutual Water Company Sewer Budget (2023-2025)
SSMP Audit	$8,000.00	Email from Bill Callahan[7]
SSMP Update	$10,000.00	Email from Bill Callahan[7]
Equipment Replacement / Periodic Costs		
Grand LS Pumps -	$30,000	Based on quotes from Flygt for similar project
Santa Barbara LS Pumps	$40,000	Based on quotes from Flygt for similar project
STEP Pump Replacement - Residential	$1,000	
STEP Pump Replacement - Commercial	$3,000	
STEP Tank Pumping - Residential	$1,000	
STEP Tank Pumping - Commercial	$3,000	
SSMP Audit	$8,000	Email from Bill Callahan[7]
SSMP Update	$10,000	Email from Bill Callahan[7]
Gravity Sewer Lateral Cleaning/Repair	$2,000	

Miscellaneous Assumptions/Values for Cost Estimate		
NPV Analysis		
Discount Rate (real, %)	2.00%	OMB Circular No. A-94, revised March 6, 2026[4]
Equivalent Dwelling Units		
Total Equivalent Dwelling Units	761	
Production Rate		These are used to estimate working days
Production Rate - gravity sewer trench/backfill (ft/day)	150	Feet per day
Production Rate - pressure sewer HDD (ft/day)	200	Feet per day
Production Rate - potholing	4	Potholes per day
Estimate of Working Days		These estimates are used for Environmental monitoring only
Potholing (days)	25	assuming 100 potholes
Collection System - open cut (days)	207	
Collection System - HDD (days)	160	Assumes digups for lateral connections are happening at the same time as the HDD work
Conveyance System - open cut (days)	118	
Conveyance System - HDD (days)	90	
Gravity lateral to front of lot (days)	2	
Gravity lateral to back of lot (days)	4	
STEP lateral to front of lot (days)	1	
STEP lateral to back of lot (days)	2	
STEP tank, electrical mods, etc (days)	4	
Paving - collection system (days)	60	
Paving - conveyance system (days)	15	

Cost Estimate References
[1]Preliminary Cost Estimate for Los Olivos Septic to Sewer System, Prepared by Stantec, Dated 28-June-22. Note that Stantec's estimate included costs for WWTP construction, however these costs were ignored for the purpose of the current estimate
[2]https://www.pge.com/tariffs/en/rate-information/electric-rates.html#accordion-a84c67dc1e-item-e10eec0cc5
[3]https://www.pge.com/tariffs/en/rate-information/electric-rates.html#accordion-a84c67dc1e-item-e10eec0cc5
[4]https://www.whitehouse.gov/wp-content/uploads/2023/12/CircularA-94AppendixC.pdf
[5]\\wlg-fs01\projects\1565-0002 WW Collection & Conveyance\06 - Reports and Calculations\01 Estimates\01 Engineer's Estimate\Utility Quantities\Gravity Collection Pipe & Strc.xlsx
[6]\\wlg-fs01\projects\1565-0002 WW Collection & Conveyance\06 - Reports and Calculations\01 Estimates\01 Engineer's Estimate\Utility Quantities\Gravity Collection Pipe Depth.xlsx
[7]\\wlg-fs01\projects\1565-0002 WW Collection & Conveyance\06 - Reports and Calculations\01 Estimates\01 Engineer's Estimate\Reference Info\Regulatory Compliance_SSMP_etc costs.pdf
[8]\\wlg-fs01\projects\1565-0002 WW Collection & Conveyance\06 - Reports and Calculations\01 Estimates\01 Engineer's Estimate\Utility Quantities\Pressure Conveyance Pipe & Strc.xlsx
[9]\\wlg-fs01\projects\1565-0002 WW Collection & Conveyance\06 - Reports and Calculations\03 Wastewater Flow Projection Review
[10]FRM estimates $68k for annual maintenance of gravity collection system with 2 lift stations and force main. Backed out estimated cost of LS and Force main maintenance to arrive at $50k