Technical Memorandum

Date:	12/20/2024
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Prepared By:	Adam Donald, PE
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Project:	2582-11920 Solvang Wastewater Treatment Plant and Infrastructure Analysis
Subject:	Los Olivos CSD Flow Impacts on Solvang Wastewater Treatment Plant

1.0 Executive Summary

Water Systems Consulting (WSC) evaluated the impact of adding wastewater flows from the Los Olivos Community Services District (Los Olivos) to the City of Solvang's (Solvang) collection system for treatment at Solvang's wastewater treatment plant. For the purposes of evaluating the collection system, WSC utilized Solvang's collection system hydraulic model with the addition of flow projections prepared for Los Olivos by Stantec in 2022 (Table 1-1).

Table 1-1: Los Olivos Flow Projections

Development Condition Number	Development Condition	Average Dry Weather Flow (gpd[1])	Peak Hour Flow (gpd[1])
1	Existing (Phase I Residential and Commercial)	43,800	175,200
2	Residential Buildout (Phase I+II)	54,500	218,000
3	Overall Buildout (Phase I+II+III)	117,752	471,008
4	Buildout + Inflow (Phase I+II+III+ADU)	120,400	481,600

[1]gpd = gallons per day

These flows were added to the City's collection system model and evaluated using the capacity criteria in Solvang's Sewer Master Plan, which are outlined in Section 4.1.

Based on the evaluation criteria, four potential capacity projects were identified to accommodate Los Olivos' flow in Solvang's collection system. These are summarized in Table 1-2 and shown in Figure 1-1. More information on these projects can be found in Section 5.0.

Table 1-2: Recommended Projects

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

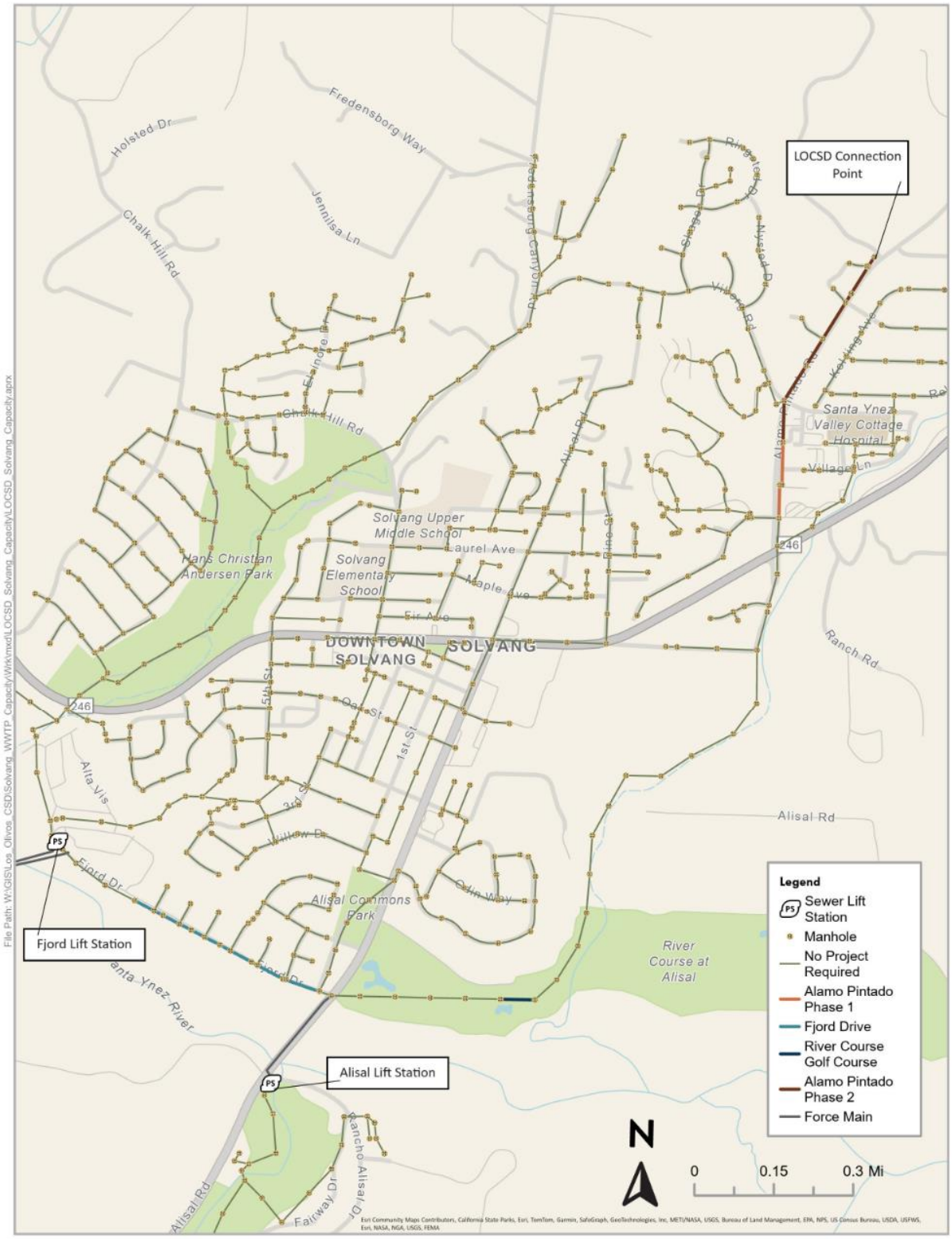


Figure 1-1: Recommended Projects

2.0 Introduction

In June 2024, Los Olivos Community Services District contracted with Water Systems Consulting to evaluate the impacts of adding Los Olivos' wastewater to the City of Solvang's collection system for treatment at the City of Solvang's wastewater treatment plant. Los Olivos currently treats their wastewater through septic systems but there is mutual interest in having Solvang treat Los Olivos's wastewater. The goal of this analysis is to understand what capacity upgrades would be required in Solvang's collection system to allow Los Olivos to have their wastewater treated by Solvang.

This analysis utilized Solvang's collection system hydraulic model. WSC developed and calibrated this model in 2022 as part of Solvang's Sewer Master Plan. For the purposes of this analysis, the model was assumed to be calibrated and that no major infrastructure changes in Solvang's collection system have occurred since the completion of Solvang's Sewer Master Plan.

3.0 Los Olivos CSD Loading

3.1 Loading Estimate

Since Los Olivos currently treats their wastewater using septic systems, there is no metering data to represent their current wastewater loading. In January 2022, Stantec Consulting Services, Inc. (Stantec) prepared the Wastewater Collection and Treatment Basis of Design Report to provide design criteria for a wastewater collection and reclamation system and treatment plant to serve Los Olivos. These design criteria represent the best estimation of existing and buildout flows and loading that would be conveyed to the Solvang's wastewater treatment plant and is shown in Table 3-1. Stantec estimated the peak hour wet weather flow (PHWWF) has a peaking factor of 4.0 relative to the average dry weather flow. This is consistent with what was observed within Solvang's collection system.

Table 3-1: Los Olivos Flow Projections, Prepared by Stantec

Development Condition Number	Development Condition	Average Dry Weather Flow (gpd[1])	Peak Hour Flow (gpd[1])
1	Existing (Phase I Residential and Commercial)	43,800	175,200
2	Residential Buildout (Phase I+II)	54,500	218,000
3	Overall Buildout (Phase I+II+III)	117,752	471,008
4	Buildout + Inflow (Phase I+II+III+ADU)	120,400	481,600
[1]gpd = gallons per day			

For the purposes of loading the hydraulic model, each development condition (as shown in Table 3-1) was added to the appropriate model scenario as a point load at Solvang manhole MD-114, which is located near Sunny Fields Park and is assumed to be the point of connection for a Los Olivos wastewater pipeline. A peaking factor of 4.0 was applied to the average dry weather flow in Table 3-1 to evaluate the peak hour wet weather flow scenarios for existing and buildout development conditions.

3.2 Sensitivity Analysis Loading

Los Olivos hired Regen AEC, PLLC (Regen) to prepare a Basis of Design Report looking at alternative collection system configurations that utilized both gravity sewer and pressurized effluent sewer to serve Los Olivos. The Regen report was completed in May 2024. The Regen analysis utilized pressurized effluent sewers[1], which tend to have lower infiltration and inflow than gravity sewers since any infiltration or inflow must overcome the pressure in the pipeline to enter the system. This assumption resulted in wastewater flows prepared by Regen being lower than that used in the Stantec analysis. However, the flow projections prepared by Stantec were used for the analysis of impacts to Solvang's collection system (this Technical Memorandum) since the Stantec flow projections are more conservative. However, the Regen analysis flow projections were utilized in a sensitivity analysis to determine how sensitive the recommended projects (Section 5.0) are to variable wastewater flow projections.

The Regen analysis looked at four options for providing wastewater collection service to Los Olivos. These options are summarized in Table 3-2. The peak hour flows of each scenario were

[1] Pressurized effluent sewers utilize grinder pumps at each individual user's location to pump sewage into a small diameter force main. The pumped flow allows the sewers to be smaller diameter and at a lower depth of cover than a gravity system but require ongoing pumping costs.

evaluated with Solvang's existing loading to perform a sensitivity analysis. The results of the sensitivity analysis are provided in Section 4.2.6.

Table 3-2: Regen Analysis Loading

Option	Description	Peak Hour Flow (gpm[1])	Peak Hour Flow (gpd[2])
A	Gravity sewer for collection of wastewater within Zones 1 & 2 (commercial) and effluent sewer within Zones 3, 4, 5, & 6.	308	443,520
B	Effluent sewer in all zones.	134	192,960
C	Gravity sewer for collection of wastewater within Zones 1 & 2 (commercial) and effluent sewer within Zones 3, 4, & 5, and advanced onsite systems in Zone 6.	287	413,280
D	Effluent sewer in Zones 1, 2, 3, 4, & 5 and advanced onsite systems in Zone 6.	113	162,720

[1]gpm = gallons per minute
[2]gpd = gallons per day

4.0 Hydraulic Modeling Results

This section establishes the evaluation criteria and summarizes the results of the hydraulic modeling effort. The hydraulic modeling effort focused on the flow projections from the Stantec basis of design report as discussed in Section 3.1. No pipe segments were identified as over-capacity under average annual flow conditions; therefore, the results below are focused on PHWWF conditions.

4.1 Evaluation Criteria

To evaluate capacity constraints, the evaluation criteria from Solvang's Sewer Master Plan were utilized to provide a consistent metric in determining when a pipe is undersized. These criteria are presented in Table 4-1 and Table 4-2.

Table 4-1: Pipeline Evaluation Criteria

Pipe Size	Maximum Depth/Diameter (d/D)
10" diameter and smaller	0.50
Greater than 10" diameter	0.75

Table 4-2: Pump Evaluation Criteria

Parameter	Criteria
Pump Capacity	Capacity should be sufficient to meet PHWWF, with one pump available as a backup.

SewerGEMS has multiple calculations for d/D within its results. For the purposes of this analysis, the “dnormal/D” value was utilized. This parameter calculates the normal depth in the pipe under steady flow conditions and does not consider backwater flow in the pipe.

4.2 Pipeline Capacity Evaluation

The hydraulic model was used in conjunction with the gravity pipeline evaluation criteria, described in Table 4-1, to identify capacity deficiencies in the collection system under the various flow scenarios. Modeling flow scenarios are shown in Table 4-3. No pipe segments were identified as overcapacity under the average annual flow scenarios; therefore, the results below are focused on PHWWF scenarios.

For the purposes of this memo, the results are focused solely on the pipes that are impacted by the addition of Los Olivos wastewater flows. These impacted mains are highlighted in Figure 4-1.

Table 4-3: Modeling Flow Scenarios

Scenario	Description
Baseline Existing Average	Existing average annual flow for Solvang only
Baseline Existing PHWWF	Existing peak hour wet weather flow for Solvang only
Existing Average	Existing average annual flow for Solvang with the addition of Los Olivos existing average dry weather flows (Development Condition 1)
Existing PHWWF	Existing peak wet weather flow for Solvang with the addition of Los Olivos existing peak wet weather flows (Development Condition 1)
Baseline Buildout Average	Buildout + infill average annual flow for Solvang only
Baseline Buildout PHWWF	Buildout + infill peak hour wet weather flow for Solvang only
Buildout Average	Buildout average annual flow for Solvang with the addition of Los Olivos buildout average dry weather flows (Development Condition 3)
Buildout PHWFF	Buildout peak wet weather flow for Solvang with the addition of Los Olivos buildout peak wet weather flows (Development Condition 3)
Buildout + Infill Average	Buildout + infill average annual flow for Solvang with the addition of Los Olivos average dry weather buildout + infill flows (Development Condition 4)
Buildout + Infill PHWWF	Buildout + infill peak wet weather flow for Solvang with the addition of Los Olivos buildout + infill peak wet weather flows (Development Condition 4)

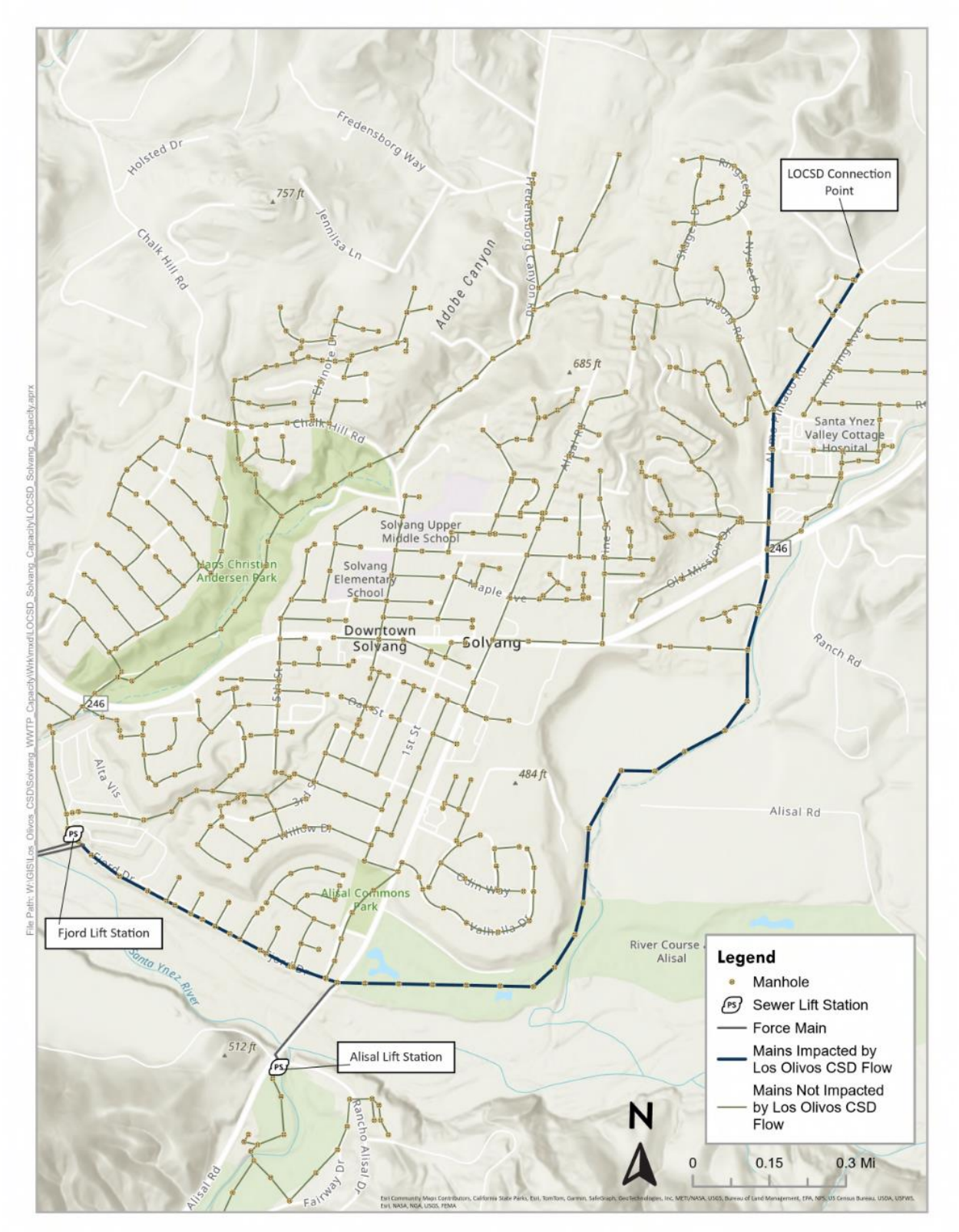


Figure 4-1: Mains impacted by Los Olivos's flows

4.2.1 Baseline Existing Peak Hour Wet Weather Flow

The baseline existing PHWWF scenario identifies the capacity constrained mains within Solvang's current collection system amongst the mains that would be impacted by the addition of Los Olivos's wastewater to Solvang's collection system. This scenario identified nine mains (0.32 miles) along Fjord Drive that exceed the capacity criteria under existing conditions (Figure 4-2). These five mains are triggered for two primary reasons: (1) they have low slopes and (2) they only exceed the capacity criteria when the Alisal Force Main is actively pumping and discharging into the collection system. Solvang's master plan recommended these mains be surveyed to determine if the slopes are actually as low as Solvang's GIS indicated and that flow be monitored to determine if the peak flows are actually triggering these conditions.

4.2.2 Existing Peak Hour Wet Weather Flow

Analysis of Solvang's collection system under existing PHWWF conditions with the addition of Los Olivos's wastewater flow identified 11 pipe segments (0.43 miles) that exceed the capacity criteria. A map showing these capacity constrained pipe segments is shown in Figure 4-3. The pipes impacted by Los Olivos loading are primarily located along Fjord Drive. The additional flow above the baseline Solvang flow causes these low slope mains to exceed the capacity criteria. There is also one main exceeding capacity criteria near the proposed connection point. This area consists of end of the line mains that were not anticipating future flows and the smaller size results in a capacity constraint. A summary of the pipe segments that exceeded the capacity criteria is contained in Appendix A.

4.2.3 Baseline Buildout Peak Hour Wet Weather Flow

The baseline buildout PHWWF scenario identifies the capacity constrained mains within Solvang's collection system under full buildout conditions amongst the mains that would be impacted by the addition of Los Olivos's wastewater to Solvang's collection system. This baseline scenario assumes Solvang is fully built out including the addition of accessory dwelling units (ADUs). The baseline buildout PHWWF scenario identified nine pipe segments (0.32 miles) that exceeded the capacity criteria, all along Fjord drive. A map showing these capacity constrained pipe segments is shown in Figure 4-4. As with the existing PHWWF baseline scenario, these nine mains are triggered for two primary reasons: (1) they have low slopes and (2) they only exceed the capacity criteria when the Alisal Force Main is actively pumping and discharging into the collection system. Solvang's master plan recommended these mains be surveyed to determine if the slopes are actually as low as Solvang's GIS indicated and that flow be monitored to determine if the peak flows are actually triggering these conditions.

4.2.4 Buildout Peak Hour Wet Weather Flow

The buildout PHWWF analysis used the overall buildout flow from Table 3-1 as it is more conservative than the residential buildout flow. Analysis of the collection system under buildout PHWWF conditions identified 19 pipe segments (0.87 miles) that exceed the capacity criteria. A

map showing pipe segments with capacity constraints under buildout PHWWF conditions is shown in Figure 4-5. The pipes impacted by Los Olivos loading are primarily located near the proposed connection point as these are end of the line mains that were not anticipating future flows as well a section of trunk main that was identified as potentially capacity constrained in Solvang's Sewer Master Plan. Adding Los Olivos's loading to this trunk main, further creates a capacity concern within the trunk. A summary of the pipe segments that exceeded the capacity criteria is contained in Appendix A.

4.2.5 Buildout + Infill Peak Hour Wet Weather Flow

Analysis of the collection system under buildout + infill PHWWF conditions identified 19 pipe segments (0.87 miles) that exceed the capacity criteria. A map showing pipe segments with capacity constraints under buildout + infill PHWWF conditions is shown in Figure 4-6. The pipes impacted by Los Olivos loading are primarily located near the proposed connection point as these are end of the line mains that were not anticipating future flows as well a section of trunk main that was identified as potentially capacity constrained in Solvang's Sewer Master Plan. Adding the Los Olivos's loading to this trunk main further creates a capacity concern within the trunk. A summary of the pipe segments that exceeded the capacity criteria is contained in Appendix A.

4.2.6 Sensitivity Analysis

A sensitivity analysis was performed in the hydraulic model to evaluate the lower peak wet weather flows estimated in the Regen Basis of Design Report (Section 3.2). Each Regen loading scenario was added at Manhole MD-114 in the model and evaluated with Solvang's existing flows. The Regen results are listed below and generally aligned with the Stantec loading scenarios used in this analysis.

- Regen Option A identified the same over capacity pipes as the Buildout + Infill Peak Wet Weather Flow scenario.
- Regen Option B identified the same over capacity pipes as the Existing Peak Wet Weather Flow scenario.
- Regen Option C identified the same over capacity pipes as the Buildout + Infill Peak Wet Weather Flow scenario with the exception of mains SWP0126 and SWP0110.
- Regen Option D identified the same over capacity pipes as the Existing Peak Wet Weather Flow Scenario.

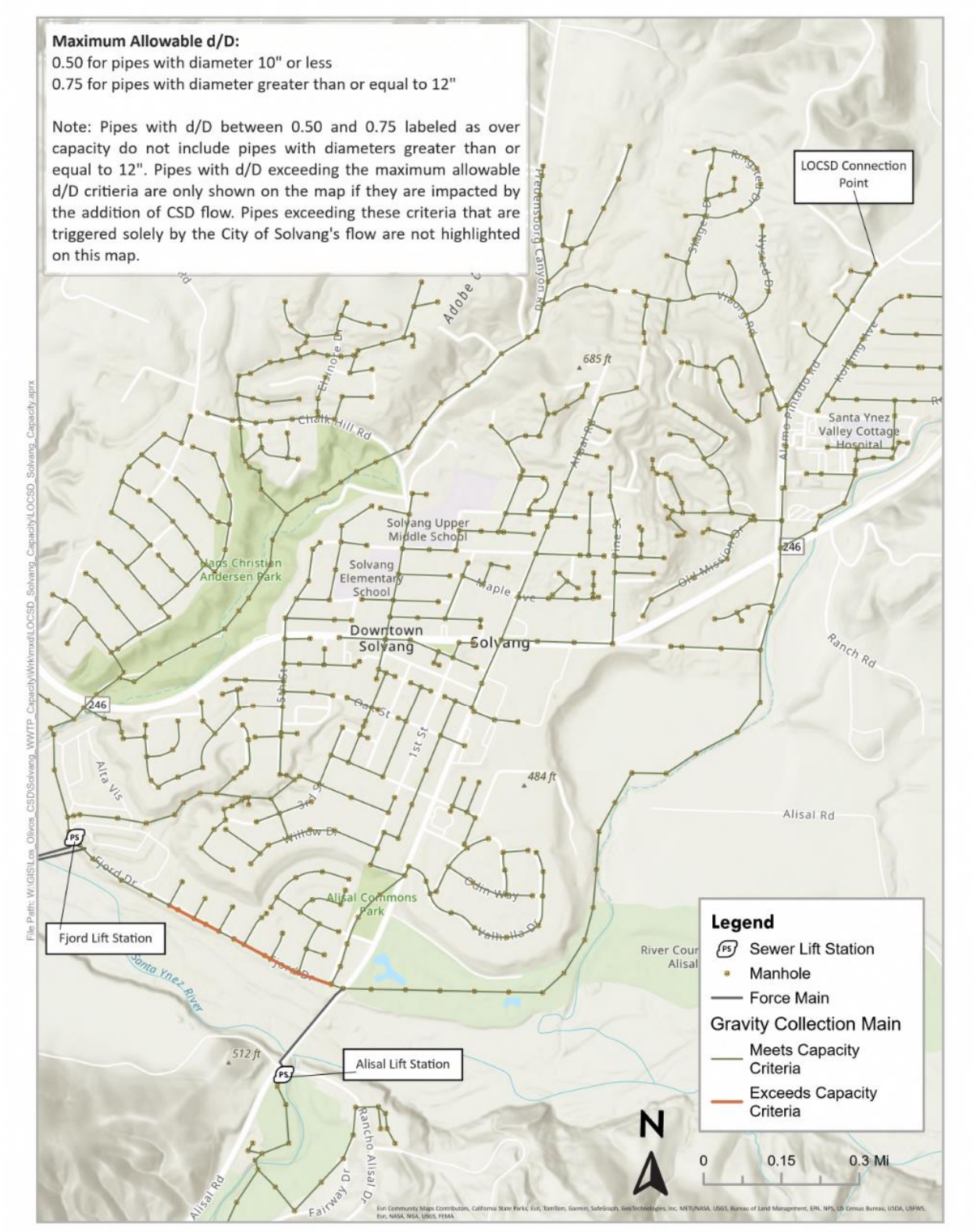


Figure 4-2: Baseline (Solvang Only) Existing PHWWF Capacity Constraints

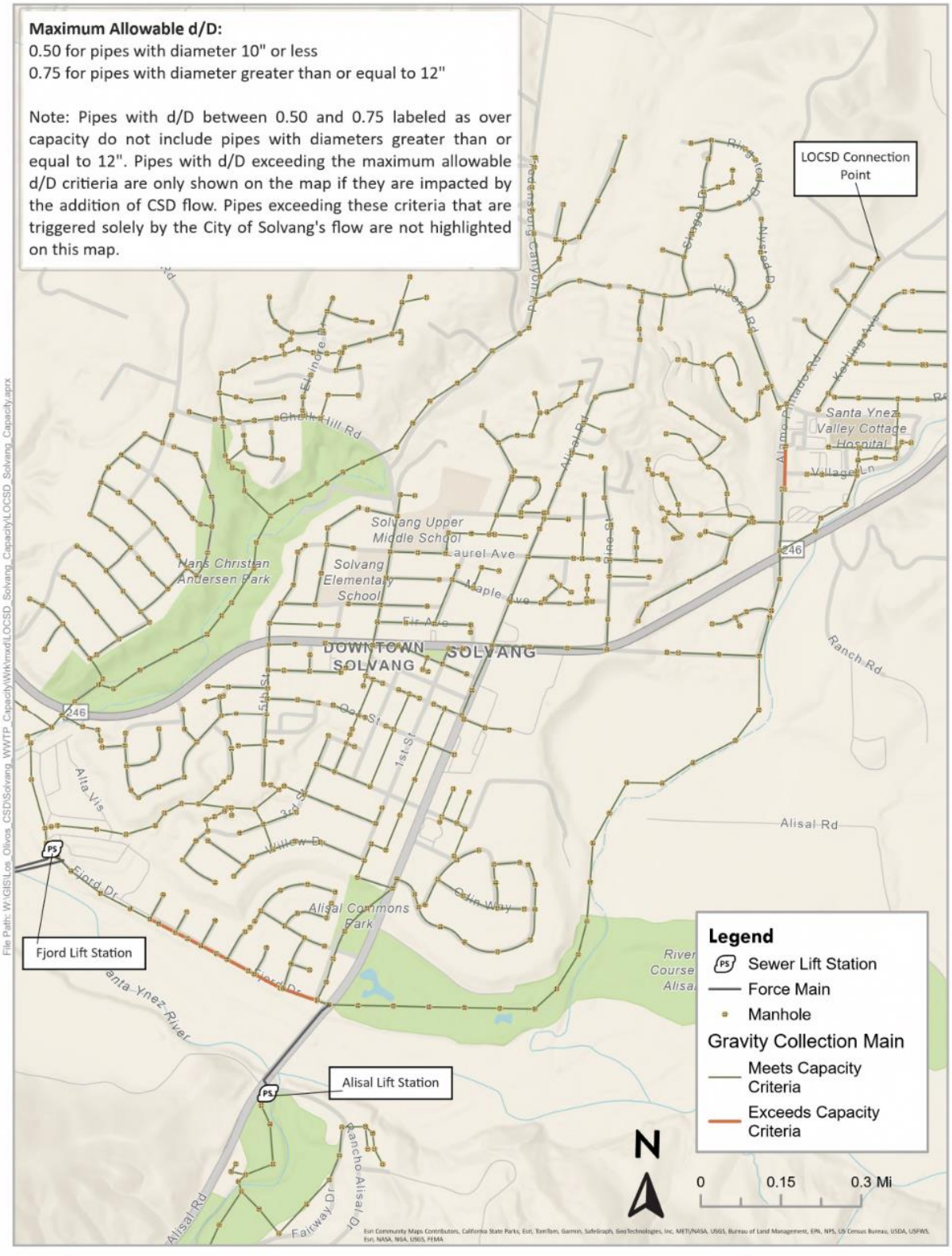


Figure 4-3: Existing PHWWF Capacity Constraints

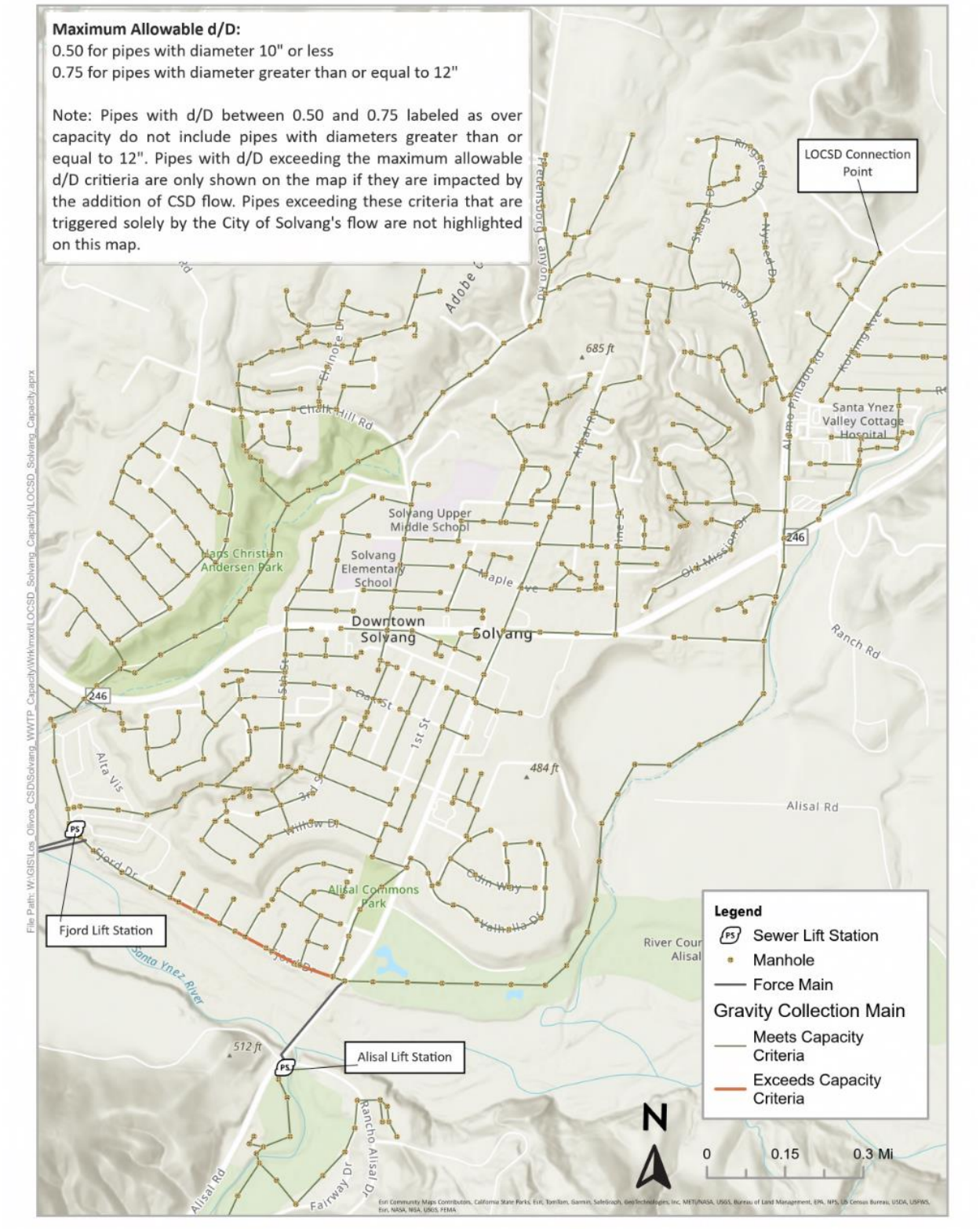


Figure 4-4: Baseline (Solvang Only) Buildout PHWWF Capacity Constraints

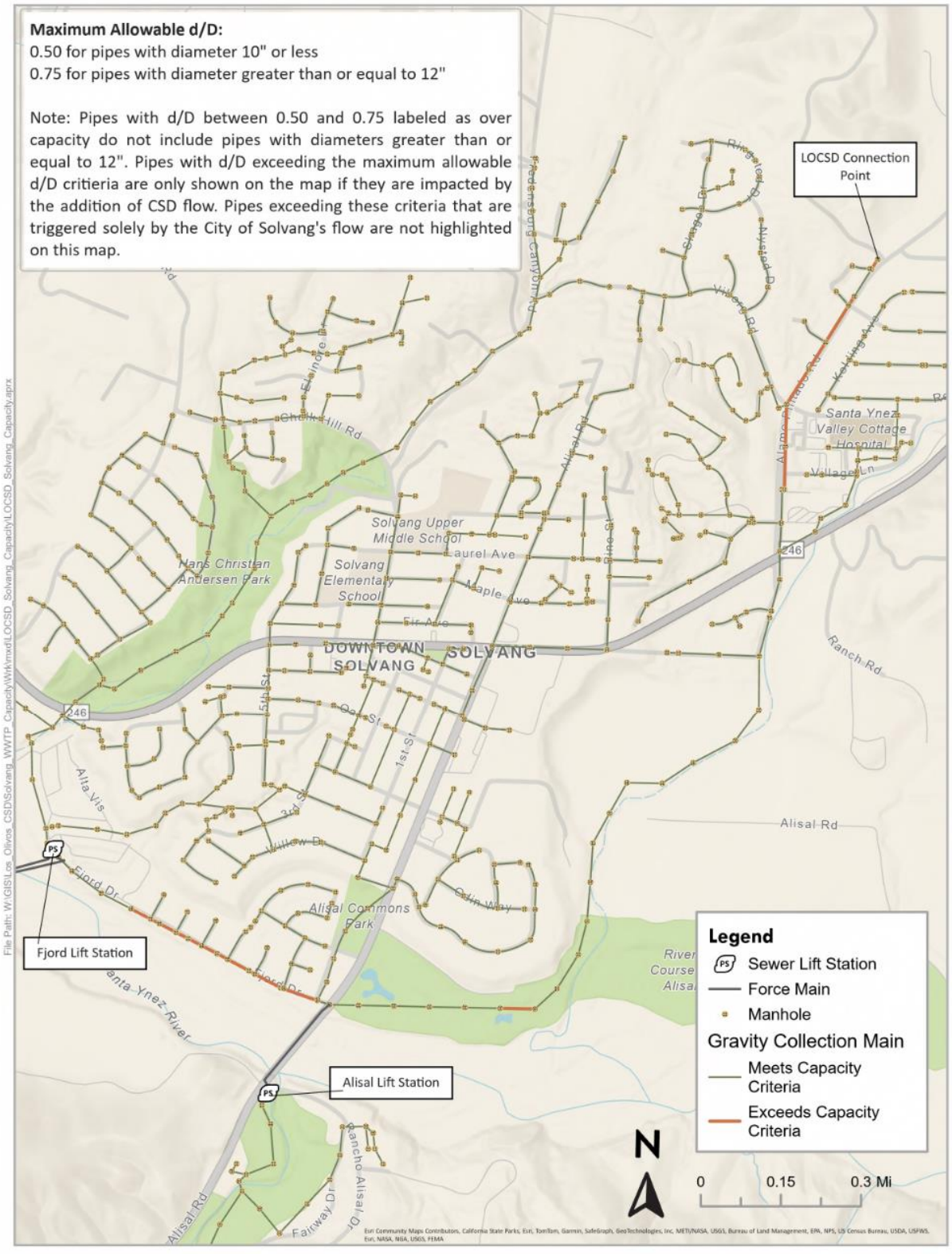


Figure 4-5: Buildout PHWWF Capacity Constraints

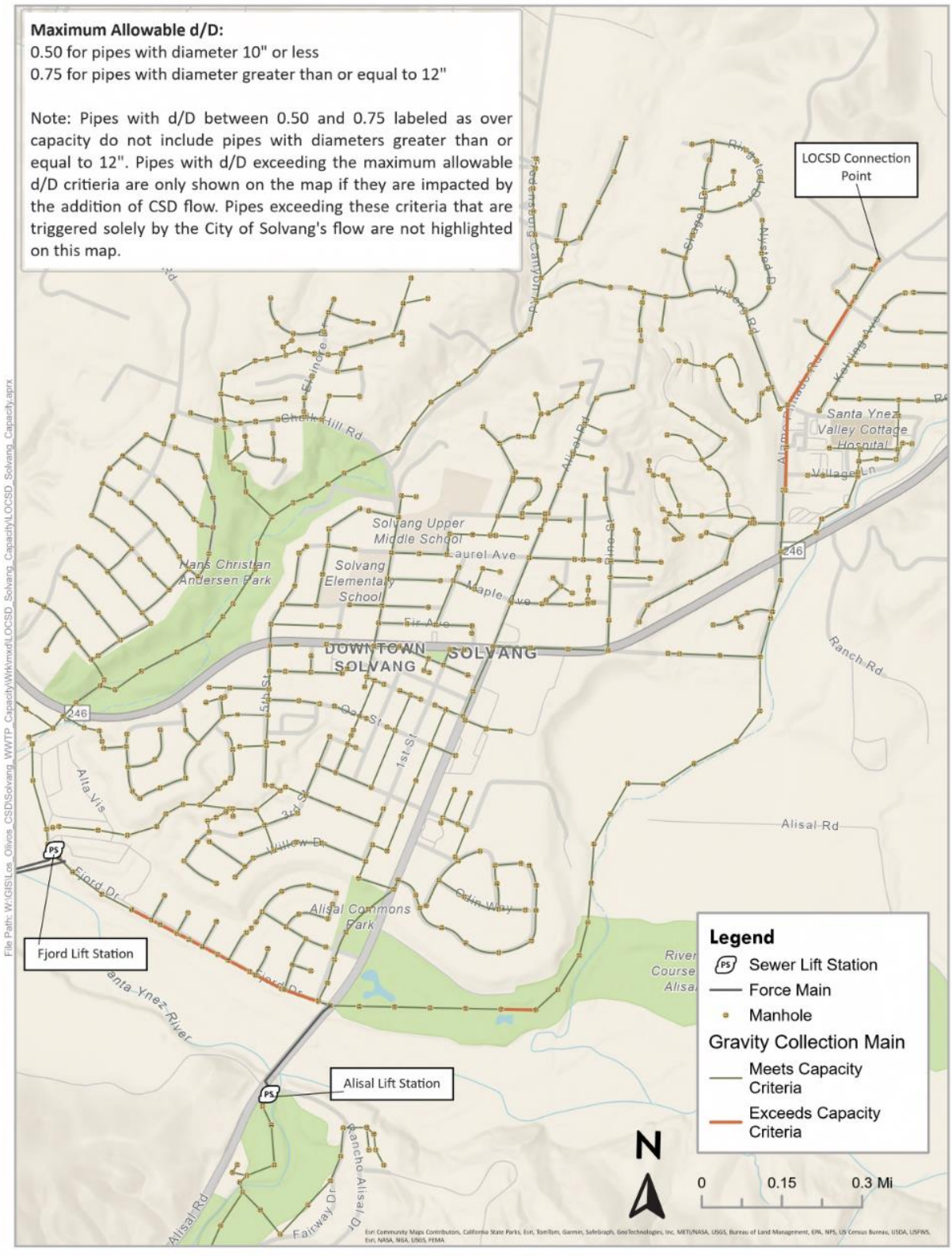


Figure 4-6: Buildout + Infill PHWWF Capacity Constraints

4.3 Fjord Lift Station Capacity Evaluation

The capacity of the Fjord Lift Station was also assessed based on the various PHWWF scenarios. PHWWF inflow rates were compared to the lift station's reliable capacity. Results of the lift station capacity evaluation are presented in Table 4-4. As shown, the Fjord Lift station has sufficient capacity to accommodate existing PHWWF, buildout PHWWF, and buildout + infill PHWWF. It should be noted that Santa Ynez Community Services District (SYCSD) owns 20% of the capacity (0.30 MGD) at Solvang's 1.5 MGD wastewater treatment plant but operational restrictions can limit their flow to 0.24 MGD. All SYCSD flow is discharged at the Fjord Lift Station prior to being pumped to the treatment plant. Even if SYCSD were to discharge their full 20% of the reliable capacity (777,600 gpd) under PHWWF conditions, the reliable capacity of Fjord Lift Station is sufficient to meet the pumping needs of Solvang and Los Olivos under existing and future buildout scenarios. No capacity upgrades are required at the Fjord Lift Station at this time. However, Solvang's Sewer Master Plan recommended upgrades at the Fjord Lift Station to address needed structural improvements and ultimately recommends the pumps at the lift station be replaced by 2032.

A sensitivity analysis was performed at Fjord Lift Station with the various Regen development conditions. Since the Regen development conditions have less overall flow than the scenarios used in this analysis, none of the Regen development conditions triggered any upgrades at the Fjord Lift Station.

Table 4-4: Fjord Lift Station Capacity and Demand Summary

Lift Station Condition	Reliable Capacity (gpm)[1]	Reliable Capacity (gpd)	Existing PHWWF (gpd)	Residential Buildout PHWWF (gpd)	Overall Buildout PHWWF (gpd)	Buildout + Infill PHWWF (gpd)	Future Capacity Available
Fjord Lift Station[2]	2,700	3,888,000	2,275,953	2,306,813	2,306,813	2,362,659	Yes
Fjord Lift Station with Santa Ynez CSD Flow[3]	2,700	3,888,000	3,053,553	3,084,413	3,084,413	3,140,259	Yes
Fjord Lift Station with Santa Ynez and Los Olivos CSD Flow[3]	2,700	3,888,000	3,228,746	3,302,413	3,555,421	3,621,853	Yes

1. Lift station reliable capacity is based on calculated lift station pump capacity with one pump in reserve.
2. Values shown do not include flows from the Santa Ynez Community Services District that are discharged into Fjord Lift Station.
3. Values shown assume Santa Ynez Community Services District is using 20% of the Fjord Lift Station's reliable capacity (777,600 gpd).

gpm = gallons per minute

gpd = gallons per day

5.0 Recommended Projects

The following sections provide an overview of the cost opinion assumptions, and the recommended projects needed in Solvang's collection system to accommodate Los Olivos discharging their wastewater into Solvang's collection system.

5.1 Cost Opinion Basis and Assumptions

The cost opinions (estimates) in this analysis have been prepared in conformance with industry practices as planning level cost opinions and are classified as Class 5 Conceptual Report Classification of Opinion of Probable Construction Costs as developed by AACE International. The purpose of a Class 5 Estimate is to provide a conceptual level of effort that is expected to range in accuracy from -25% to +50%. A Class 5 Estimate also includes an appropriate level of contingency so that it can be used in future planning and feasibility studies. The design concepts and associated costs presented in this analysis are conceptual in nature due to the limited design information that is available at this stage of project planning. These cost estimates have been developed using a combination of data from RS Means CostWorks® and recent bids, experience with similar projects, current and foreseeable regulatory requirements, and an understanding of necessary project components. As the projects progress, the designs and associated costs could vary significantly from the project components identified in this analysis.

The recommended projects and these cost opinions are based on the following assumptions:

1. The scope of this analysis was limited to addressing pipeline capacity constraints through upsizing the existing mains. All prices are based on upsizing the existing mains. In some instances, where feasible, parallel mains may provide a better solution to address the capacity constraints. This should be evaluated during the design process.
2. For projects that have applicable cost data available in the RS Means Costworks® (e.g. pipeline installation), cost data for Quarter 4 of 2024, adjusted for Santa Barbara County, is used. Material prices were further adjusted in some cases to provide estimates that align more closely with actual local bid results.
3. For projects where RS Means CostWorks® data is not available, cost opinions are generally derived from bid prices from similar projects, vendor quotes, material prices, and labor estimates, with adjustments for inflation, size, complexity, and location.
4. Cost opinions are in 2024 dollars (ENR Construction Cost Index of 13,632.23 for September 2024). When budgeting for future years, appropriate escalation factors should be applied. The past 5-year average increase of the ENR CCI 20 City Average is considered a reasonable factor to use for escalation.
5. Cost opinions are "planning-level" and may not fully account for site-specific conditions that will affect the actual costs, such as soil conditions and utility conflicts.
6. Construction Costs include the following mark-up items:

a. 25% construction contingency based on construction sub-total.

7. Total Project Costs include the following allowances:
   a. 15% of Construction Total for project development, including administration, alternatives analysis, planning, engineering, surveying, etc.
   b. 10% of Construction Total for construction phase support services, including administration, inspection, materials testing, office engineering, construction administration, etc.

5.2 Gravity Collection Mains

The modeling results (Section 4.0) identified 11 pipe segments under existing conditions, 19 pipe segments under buildout conditions, and 19 pipe segments under buildout + infill conditions that have capacity constraints and are impacted by the addition of Los Olivos's wastewater flow. Detailed descriptions of recommended projects based on these results are provided in the following subsections.

Los Olivos is interested in evaluating the feasibility of using a metering tank upstream of the Los Olivos lift station or upstream of the connection to Solvang that could allow for sufficient flow equalization to reduce the projects recommended in the following subsections. A metering tank was not evaluated as part of this evaluation. A future study is required to understand the sizing and potential feasibility of implementing a metering tank to reduce the magnitude of peak flows to potentially reduce or eliminate the need for the recommended projects. Future analysis of a metering tank should consider design and operational criteria such as (but not limited to) tank sizing, sewage age, solids handling, odor potential, and maximum downstream discharge rates. The tank size would likely need to be large enough to hold more than the peak day volume to allow for storage for several days so that discharge to the downstream system can occur at a lower rate. Long-term phasing should also be considered.

5.2.1 Alamo Pintado Phase 1

The existing 8-inch sewer main (SWP0135) along Alamo Pintado Road near Village Lane is capacity deficient under existing, buildout, and buildout + infill peak wet weather loading. The hydraulic model indicates that upsizing this main to a 10-inch main addresses the existing deficiency but is insufficient for handling buildout flows. To fully accommodate buildout flows, this main must be upsized to a 12-inch pipe. The two downstream mains (SWP0136 and SWP0137) are both 8-inch vitrified clay pipes that are recommended to be upsized to 12-inch mains for continuity.

The recommended project consists of removing the existing 8-inch sewer mains and constructing 778 linear feet of 12-inch PVC sewer in its place. The project extents are shown in Figure 5-1. Estimated project costs are shown in Table 5-1. A detailed cost opinion is provided in Appendix B.

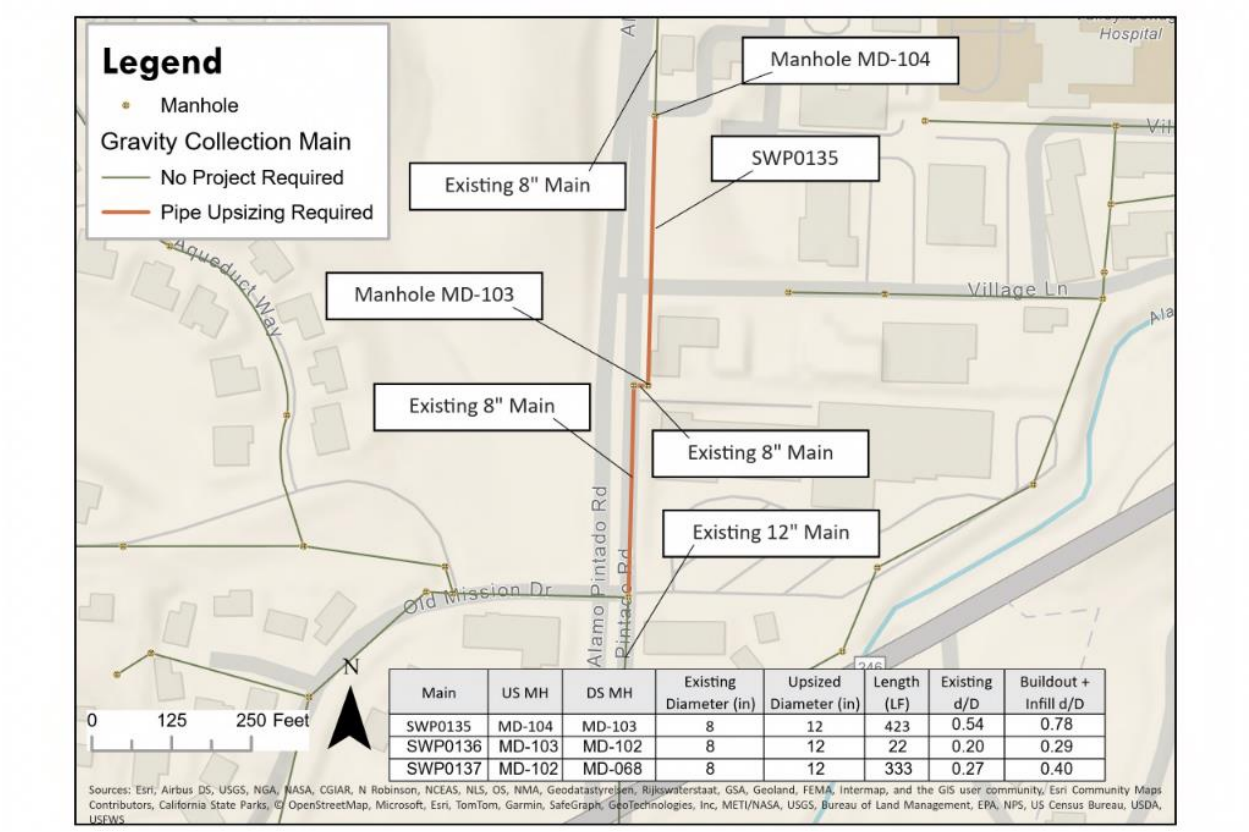


Figure 5-1: Alamo Pintado Phase 1 Map

Table 5-1: Estimated Costs for Alamo Pintado Phase 1

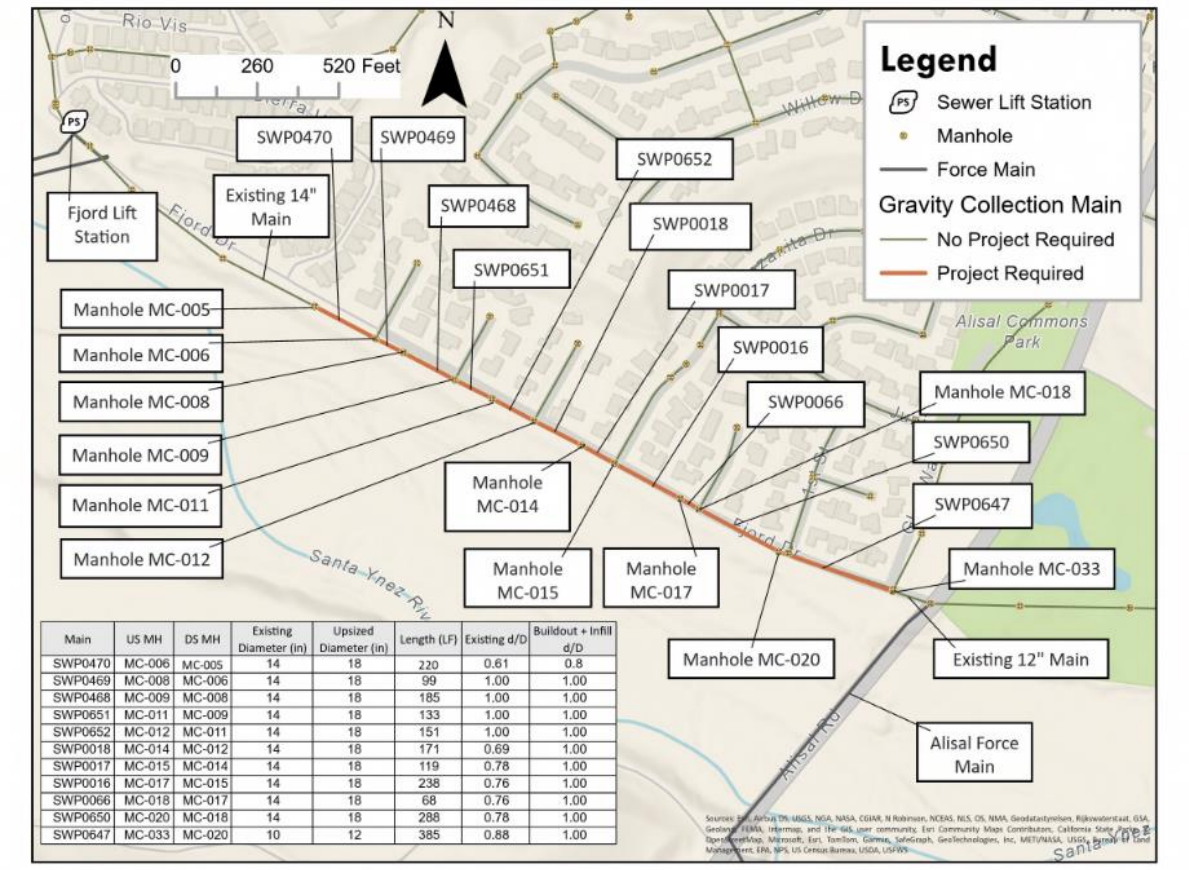
Item	Cost
Base Construction Cost	$176,500
Construction Contingency (25%)	$44,000
Construction Total	$220,500
Project Development and Implementation (25%)	$55,000
Opinion of Total Project Cost	**$275,500**

5.2.2 Fjord Drive

The existing 14-inch sewer mains between manholes MC-006 and MC-020 and the 10-inch sewer main between manholes MC-020 and MC-03 are capacity deficient under existing, buildout, and buildout + infill peak wet weather loading. Under buildout and buildout + infill peak wet weather loading, the existing 14-inch sewer main between manholes MC-005 and MC-006 is also capacity deficient. The hydraulic model indicates upsizing the 14-inch mains to 18-inch

mains and the 10-inch main to a 12-inch main addresses the capacity deficiencies. The recommended project consists of removing these existing mains and constructing 1,673 linear feet of 18-inch PVC sewer and 385 LF of 12-inch PVC sewer in its place. The project extents are shown in Figure 5-2. Estimated project costs are shown in Table 5-2. A detailed cost opinion is provided in Appendix B.

The stretch of pipe between manhole MC-008 and manhole MD-001 where the Alisal Lift Station discharges into the system was identified as having capacity constraints in Solvang's Sewer Master Plan. The master plan identified the need to survey this area as the pipes in this section consisted of low slopes and seemed to only exceed capacity criteria when the Alisal Lift Station turned on. As an alternative to upsizing the existing piping, WSC also evaluated reconfiguring the Alisal Force Main to discharge directly to Solvang's wastewater treatment plant. Modeling results indicated that this stretch of pipe remains capacity deficient with the addition of the Los Olivos flows even when the flows from the Alisal Force Main are diverted. Therefore, the optimal project for this section of pipe is to upsize the existing alignment.



Main	US MH	DS MH	Existing Diameter (in)	Upsized Diameter (in)	Length (LF)	Existing d/D	Buildout + Infill d/D
SWP0470	MC-006	MC-005	14	18	220	0.61	0.8
SWP0469	MC-008	MC-006	14	18	99	1.00	1.00
SWP0468	MC-009	MC-008	14	18	185	1.00	1.00
SWP0651	MC-011	MC-009	14	18	133	1.00	1.00
SWP0652	MC-012	MC-011	14	18	151	1.00	1.00
SWP0018	MC-014	MC-012	14	18	171	0.69	1.00
SWP0017	MC-015	MC-014	14	18	119	0.78	1.00
SWP0016	MC-017	MC-015	14	18	238	0.76	1.00
SWP0066	MC-018	MC-017	14	18	68	0.76	1.00
SWP0650	MC-020	MC-018	14	18	288	0.78	1.00
SWP0647	MC-033	MC-020	10	12	385	0.88	1.00

Figure 5-2: Fjord Drive Map

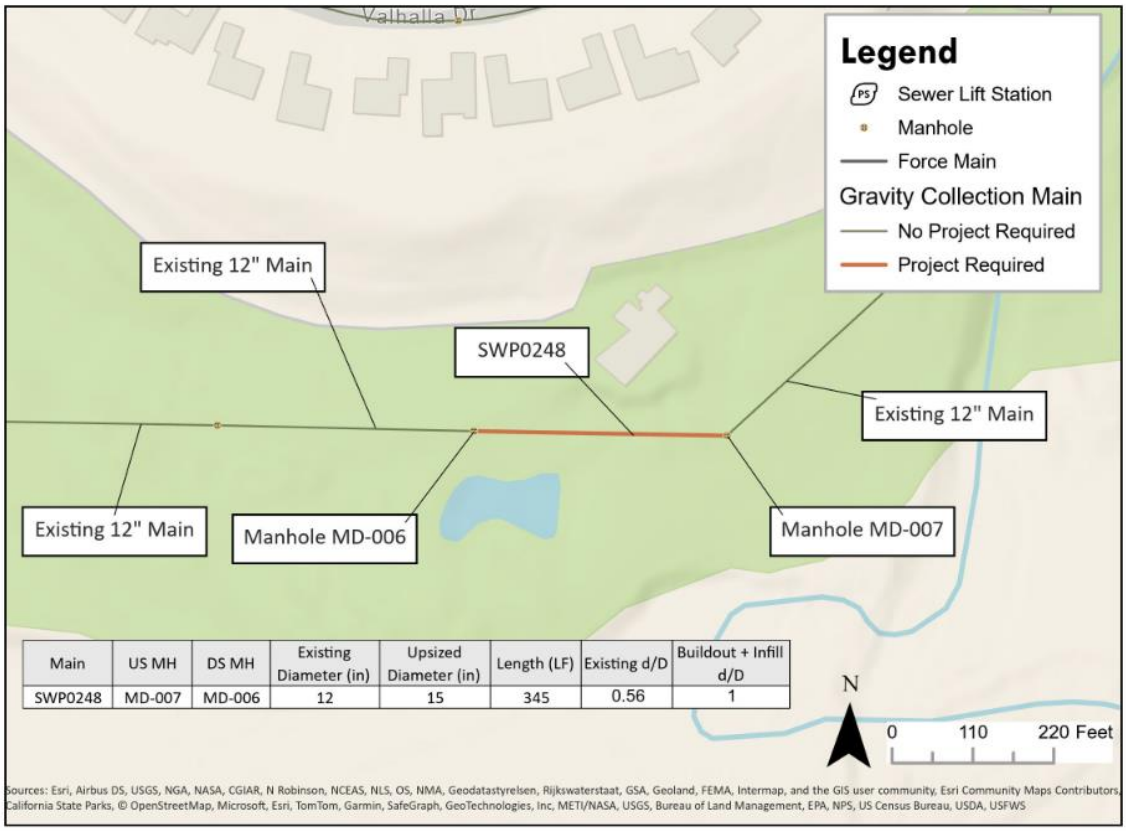
Table 5-2: Estimated Costs for Fjord Drive Improvements

Item	Cost
Base Construction Cost	$798,300
Construction Contingency (25%)	$200,000
Construction Total	$998,300
Project Development and Implementation (25%)	$250,000
Opinion of Total Project Cost	**$1,248,300**

5.2.3 River Course Golf Course

The existing 12-inch sewer main between manholes MD-006 and MD-007 runs full (d/D equal to 1) under buildout and buildout + infill peak wet weather loading. The hydraulic model indicates that upsizing this main to a 15-inch main addresses this deficiency.

The recommended project consists of removing the existing 12-inch sewer main (SWP0248) and constructing 344 linear feet of 15-inch PVC sewer in its place. The project extents are shown in Figure 5-3. Estimated project costs are shown in Table 5-3. A detailed cost opinion is provided in Appendix B.



Main	US MH	DS MH	Existing Diameter (in)	Upsized Diameter (in)	Length (LF)	Existing d/D	Buildout + Infill d/D
SWP0248	MD-007	MD-006	12	15	345	0.56	1

Figure 5-3: River Course Golf Course Map

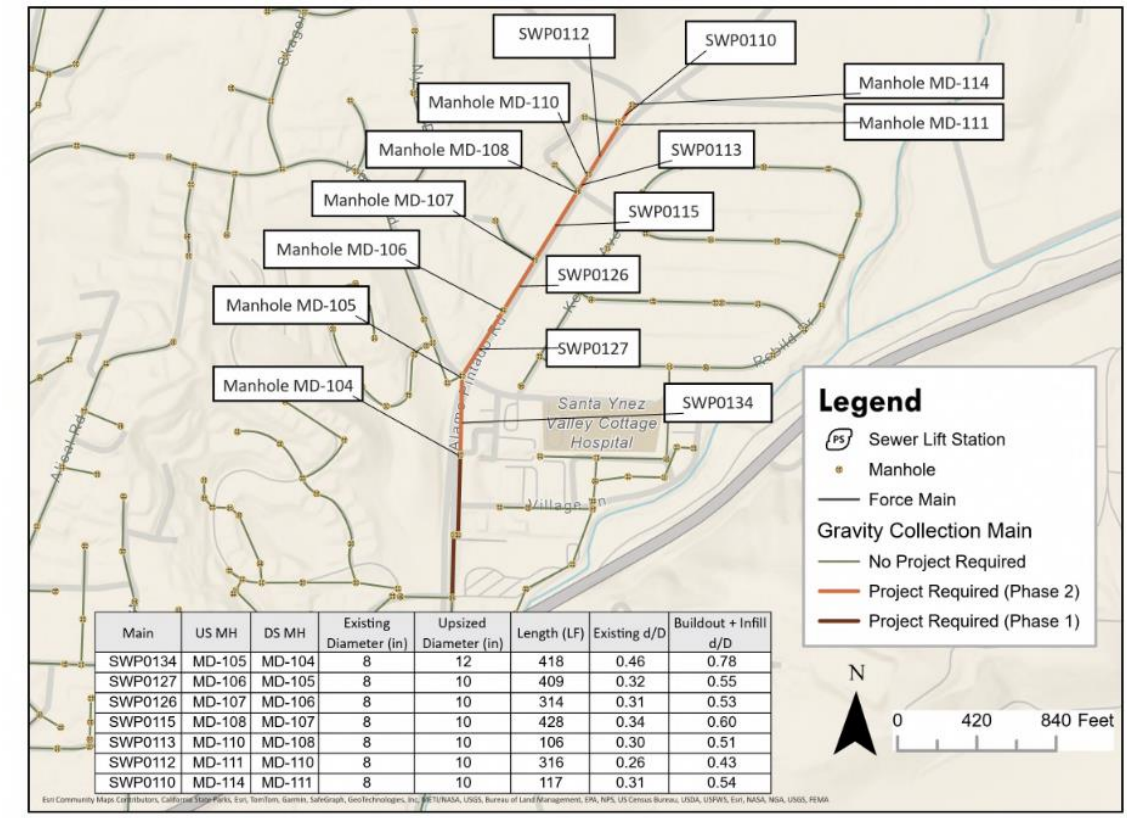
Table 5-3: Estimated Costs for River Course Golf Course

Item	Cost
Base Construction Cost	$88,300
Construction Contingency (25%)	$22,000
Construction Total	$110,300
Project Development and Implementation (25%)	$28,000
Opinion of Total Project Cost	**$138,300**

5.2.4 Alamo Pintado Phase 2

The existing 8-inch sewer mains from manhole MD-068 to manhole MD-114 along Alamo Pintado Road near Village Lane is capacity deficient under buildout and buildout + infill peak wet weather loading. The hydraulic model indicates upsizing these mains to 12-inch and 10-inch mains addresses these deficiencies.

The recommended project consists of removing the existing 8-inch sewer mains and constructing 418 linear feet of 12-inch PVC sewer and 1,691 linear feet of 10-inch PVC sewer in its place. The project extents are shown in Figure 5-4. Estimated project costs are shown in Table 5-4. A detailed cost opinion is provided in Appendix B.



Main	US MH	DS MH	Existing Diameter (in)	Upsized Diameter (in)	Length (LF)	Existing d/D	Buildout + Infill d/D
SWP0134	MD-105	MD-104	8	12	418	0.46	0.78
SWP0127	MD-106	MD-105	8	10	409	0.32	0.55
SWP0126	MD-107	MD-106	8	10	314	0.31	0.53
SWP0115	MD-108	MD-107	8	10	428	0.34	0.60
SWP0113	MD-110	MD-108	8	10	106	0.30	0.51
SWP0112	MD-111	MD-110	8	10	316	0.26	0.43
SWP0110	MD-114	MD-111	8	10	117	0.31	0.54

Figure 5-4: Alamo Pintado Phase 2 Map

Table 5-4: Estimated Costs for Alamo Pintado Phase 2

Item	Cost
Base Construction Cost	$690,000
Construction Contingency (25%)	$173,000
Construction Total	$863,000
Project Development and Implementation (25%)	$216,000
Opinion of Total Project Cost	**$1,079,000**

5.3 Sewer Lift Stations

As discussed in Section 4.3, the Fjord Lift Station is anticipated to have sufficient capacity to accommodate Los Olivos's peak wastewater flow with the station's existing firm capacity. While this does not trigger any immediate upgrades, Solvang's Sewer Master Plan identified the need to perform structural upgrades, upgrade the electrical (programmable logic controller (PLC) and modular multilevel converter (MMC)), SCADA system, and install an HVAC system for optimal variable frequency drive operation, and to replace the pumps. The time frame and the cost of these projects from the Sewer Master Plan, escalated to 2024 dollars, are shown in Table 5-5. Should Los Olivos choose to partner with Solvang and send their wastewater into Solvang's collection system, Solvang may require Los Olivos to share in the costs of these upgrades. However, the addition of Los Olivos wastewater flows does not trigger the need for any of these projects.

Table 5-5: Fjord Lift Station Project Costs

Project	Estimated Start Date Range	Estimated Cost (2024 $)
Lift Station Structural Improvements (Fjord Only) (Sewer Master Plan Project A4)	2024 - 2027	$74,000
Fjord Lift Station Cathodic Protection (Sewer Master Plan Project A5)	2024 -2027	$56,000
Fjord Lift Station Electrical, Instrumentation, and Controls Improvements (Sewer Master Plan Project B1)	2028 - 2032	$401,000
Fjord Lift Station Emergency Storage Evaluation (Sewer Master Plan Project B2)	2028 -2032	$17,000
Fjord Lift Station Pump Upgrades (Sewer Master Plan Project C1)	2033-2042	$384,000

Appendix A Los Olivos Flow Impacted Pipes Exceeding Capacity Criteria

Table A-1: Pipes Exceeding Capacity By Scenario

Pipe ID	Diameter (in)	Length (LF)	Over Capacity Under Baseline Existing PHWWF?	Over Capacity Under Existing PHWWF?	Over Capacity Under Baseline Buildout PHWWF?	Over Capacity Under Buildout PHWWF?	Over Capacity Under Buildout + Infill PHWWF?
SWP0016	14	237.5	Yes	Yes	Yes	Yes	Yes
SWP0017	14	119.4	Yes	Yes	Yes	Yes	Yes
SWP0018	14	171	No	Yes	No	Yes	Yes
SWP0066	14	68.4	Yes	Yes	Yes	Yes	Yes
SWP0110	8	116.8	No	No	No	Yes	Yes
SWP0113	8	106.3	No	No	No	Yes	Yes
SWP0115	8	428.2	No	No	No	Yes	Yes
SWP0126	8	314.2	No	No	No	Yes	Yes
SWP0127	8	409.3	No	No	No	Yes	Yes
SWP0134	8	417.7	No	No	No	Yes	Yes
SWP0135	8	423.2	No	Yes	No	Yes	Yes
SWP0248	12	344.4	No	No	No	Yes	Yes
SWP0468	14	185.3	Yes	Yes	Yes	Yes	Yes
SWP0469	14	99	Yes	Yes	Yes	Yes	Yes
SWP0470	14	219.9	No	No	No	Yes	Yes
SWP0647	10	385.3	Yes	Yes	Yes	Yes	Yes
SWP0650	14	288.2	Yes	Yes	Yes	Yes	Yes
SWP0651	14	133.2	Yes	Yes	Yes	Yes	Yes
SWP0652	14	151.1	Yes	Yes	Yes	Yes	Yes

Table A-2: Pipes Exceeding Capacity d/D Values

Pipe ID	Diameter (in)	Length (LF)	Baseline Existing PHWWF d/D	Existing PHWWF d/D	Baseline Buildout PHWWF d/D	Buildout PHWWF d/D	Buildout + Infill PHWWF d/D
SWP0016	14	237.5	76.2	88.8	78.6	100.0	100.0
SWP0017	14	119.4	77.6	100.0	80.2	100.0	100.0
SWP0018	14	171	68.6	76.3	70.3	100.0	100.0
SWP0066	14	68.4	76.4	89.4	78.8	100.0	100.0
SWP0110	8	116.8	2.6	31.0	2.6	53.5	54.2
SWP0113	8	106.3	6.0	29.7	6.1	50.3	51
SWP0115	8	428.2	8.1	34.2	8.2	58.8	59.7
SWP0126	8	314.2	8.7	31.2	9.0	52.3	53.1
SWP0127	8	409.3	9.4	32.2	9.7	54.3	55.1
SWP0134	8	417.7	25.6	46.0	26.4	75.7	77.7
SWP0135	8	423.2	29.5	53.8	30.7	100.0	100.0
SWP0248	12	344.4	43.2	59.4	45.4	100.0	100.0
SWP0468	14	185.3	100.0	100.0	100.0	100.0	100.0
SWP0469	14	99	100.0	100.0	100.0	100.0	100.0
SWP0470	14	219.9	60.8	66.6	62.3	78.0	79.7
SWP0647	10	385.3	88.1	100.0	100.0	100.0	100.0
SWP0650	14	288.2	78.0	100.0	80.7	100.0	100.0
SWP0651	14	133.2	100.0	100.0	100.0	100.0	100.0
SWP0652	14	151.1	100.0	100.0	100.0	100.0	100.0
		d/D values are given as a percentage					

Appendix B Recommended Project Cost Opinions

Opinion of Probable Construction Cost

Project CSD1: Alamo Pintado Phase 1

Los Olivos Community Services District

12/20/2024

Bid Item	Description	Quantity	Unit	Unit Price	Cost
1	Mobilization	1	LS	$ 7,900.00	$ 7,900.00
2	Sawcut & Remove	433	SY	$ 8.50	$ 3,700.00
3	Hauling Pavement	217	LCY	$ 11.10	$ 2,400.00
4	Pavement Repair	433	SY	$ 60.70	$ 26,300.00
5	Shoring	15683	SF Wall	$ 1.50	$ 23,400.00
6	Excavation-Trench	849	BCY	$ 7.30	$ 6,200.00
7	Pipe Bedding (sand import)	52	LCY	$ 46.20	$ 2,400.00
8	Bedding Compaction	42	ECY	$ 4.80	$ 200.00
9	Native Backfill & Compaction	797	ECY	$ 5.00	$ 4,000.00
10	Hauling Excavation	1019	LCY	$ 5.50	$ 5,600.00
11	Abandon Existing Main in Place - 8" Pipe	778	LF	$ 2.60	$ 2,000.00
12	12" PVC SDR 35	778	LF	$ 101.80	$ 79,200.00
13	Service Connections to 12" Gravity Main	2	EA	$ 600.00	$ 1,200.00
14	Bypass Pumping	1	LS	$ 12,000.00	$ 12,000.00
				Subtotal	$ 176,500.00
				Construction Contingency (25%)	$ 44,000.00
				Construction Total	$ 220,500.00
				Project Development & Implementation (25%)	$ 55,000.00
				Project Costs	$ 275,500.00

Opinion of Probable Construction Cost

Project CSD2: Fjord Drive

Los Olivos Community Services District

12/20/2024

Bid Item	Description	Quantity	Unit	Unit Price	Cost
1	Mobilization	1	LS	$ 36,700.00	$ 36,700.00
2	Sawcut & Remove	1237	SY	$ 8.50	$ 10,500.00
3	Hauling Pavement	619	LCY	$ 10.70	$ 6,600.00
4	Pavement Repair	1237	SY	$ 60.60	$ 75,000.00
5	Shoring	44501	SF Wall	$ 1.50	$ 66,300.00
6	Excavation-Trench	19150	BCY	$ 7.30	$ 139,800.00
7	Pipe Bedding (sand import)	156	LCY	$ 44.90	$ 7,000.00
8	Bedding Compaction	124	ECY	$ 4.00	$ 500.00
9	Native Backfill & Compaction	18994	ECY	$ 4.90	$ 93,100.00
10	Hauling Excavation	22980	BCY	$ 5.50	$ 126,400.00
11	Abandon Existing Main in Place - 10" Pipe	385	LF	$ 3.60	$ 1,400.00
12	Abandon Existing Main in Place - 14" Pipe	1673	LF	$ 5.20	$ 8,700.00
13	12" PVC SDR 35	385	LF	$ 72.70	$ 28,000.00
14	18" PVC SDR 35	1673	LF	$ 101.80	$ 170,300.00
15	Bypass Pumping	1	LS	$ 28,000.00	$ 28,000.00
				Subtotal	$ 798,300.00
				Construction Contingency (25%)	$ 200,000.00
				Construction Total	$ 998,300.00
				Project Development & Implementation (25%)	$ 250,000.00
				Project Costs	$ 1,248,300.00

Opinion of Probable Construction Cost

Project CSD3: River Course Golf Course

Los Olivos Community Services District

12/20/2024

Bid Item	Description	Quantity	Unit	Unit Price	Cost
1	Mobilization	1	LS	$ 4,000.00	$ 4,000.00
2	Sawcut & Remove	201	SY	$ 8.50	$ 1,700.00
3	Hauling Pavement	101	LCY	$ 10.90	$ 1,100.00
4	Pavement Repair	201	SY	$ 60.70	$ 12,200.00
5	Shoring	9527	SF Wall	$ 1.50	$ 14,200.00
6	Excavation-Trench	558	BCY	$ 7.30	$ 4,100.00
7	Pipe Bedding (sand import)	25	LCY	$ 44.00	$ 1,100.00
8	Bedding Compaction	20	ECY	$ 5.00	$ 100.00
9	Native Backfill & Compaction	533	ECY	$ 4.90	$ 2,600.00
10	Hauling Excavation	670	BCY	$ 5.50	$ 3,700.00
11	Abandon Existing Main in Place - 12" Pipe	344	LF	$ 4.40	$ 1,500.00
12	15" PVC SDR 35	344	LF	$ 101.90	$ 35,100.00
13	Service Connections to 15" Gravity Main	1	EA	$ 900.00	$ 900.00
14	Bypass Pumping	1	LS	$ 6,000.00	$ 6,000.00
				Subtotal	$ 88,300.00
				Construction Contingency (25%)	$ 22,000.00
				Construction Total	$ 110,300.00
				Project Development & Implementation (25%)	$ 28,000.00
				Project Costs	$ 138,300.00

Opinion of Probable Construction Cost

Project CSD4: Alamo Pintado Phase 2

Los Olivos Community Services District

12/20/2024

Bid Item	Description	Quantity	Unit	Unit Price	Cost
1	Mobilization	1	LS	$31,500.00	$ 31,500.00
2	Sawcut & Remove	1140	SY	$ 8.50	$ 9,700.00
3	Hauling Pavement	570	LCY	$ 10.70	$ 6,100.00
4	Pavement Repair	1140	SY	$ 60.60	$ 69,100.00
5	Shoring	47213	SF Wall	$ 1.50	$ 70,400.00
6	Excavation-Trench	13304	BCY	$ 7.30	$ 97,100.00
7	Pipe Bedding (sand import)	135	LCY	$ 44.40	$ 6,000.00
8	Bedding Compaction	107	ECY	$ 3.70	$ 400.00
9	Native Backfill & Compaction	13169	ECY	$ 4.90	$ 64,500.00
10	Hauling Excavation	15965	BCY	$ 5.50	$ 87,800.00
11	Abandon Existing Main in Place - 8" Pipe	2108	LF	$ 2.50	$ 5,300.00
12	10" PVC SDR 35	1691	LF	$ 101.80	$ 172,100.00
13	12" PVC SDR 35	418	LF	$ 72.80	$ 30,400.00
14	Service Connections to 10" Gravity Main	18	EA	$ 433.30	$ 7,800.00
15	Service Connections to 12" Gravity Main	3	EA	$ 600.00	$ 1,800.00
16	Bypass Pumping	1	LS	$30,000.00	$ 30,000.00
				Subtotal	$ 690,000.00
				Construction Contingency (25%)	$ 173,000.00
				Construction Total	$ 863,000.00
				Project Development & Implementation (25%)	$ 216,000.00
				Project Costs	$ 1,079,000.00