LOS OLIVOS COMMUNITY SERVICES DISTRICT **Posted: 2-21-2024**
TECHNICAL SUBCOMMITTEE MEETING
February 26, 2024 – 9:30 AM
St Mark's in the Valley Episcopal Church
2901 Nojoqui Ave, Los Olivos CA 93441
Please observe decorum and instructions from the Subcommittee Chair

Subcommittee Members: Director Fayram (Chair), Directors Parks, and General Manager Guy Savage

This meeting will be held both in-person and electronically via Zoom Meetings. In-person the meeting will be held at the following locations: St Mark's in the Valley Episcopal Church, 2901 Nojoqui Ave, Los Olivos CA 93441

The public will also be able to hear and participate electronically via Zoom by using the following links:
Zoom: https://us06web.zoom.us/j/81937722522?pwd=SWpSU0RYZFljZTBLNGphZG41TGs4dz09
By Phone: +1 669 900 6833 US (San Jose) Meeting ID: 819 3772 2522 Passcode: 914085
One tap mobile: +14086380968,,81937722522#,,,,*914085# US (San Jose)

The Los Olivos Community Services District is committed to ensuring equal access to meetings. In compliance with the American Disabilities Act, if you need special assistance to participate in the meeting or need this agenda provided in a disability-related alternative format, please call 805.500.4098 or email to losolivoscsd@gmail.com. Any public records, which are distributed less than 72 hours prior to this meeting to all, or a majority of all, of the District's Board members in connection with any agenda item (other than closed sessions) will be available for public inspection at the time of such distribution at a location to be determined in Los Olivos, California 93441.

MEETING AGENDA

1. **CALL TO ORDER**

2. **ROLL CALL**

3. **PUBLIC COMMENTS**
   Members of the public may address the Board of Directors on any items of interest within the subject matter and jurisdiction of the Board but not on the agenda today (Gov. Code - 54954.3). The public may also request future agenda topics at this time. Speakers are limited to a maximum of 3 minutes. Due to the requirements of the Ralph M. Brown Act, the Board of Directors cannot take action today on any matter not on the agenda, but a matter raised during Public Comments can be referred to District staff for discussion and possible action at a future meeting.

ADMINISTRATIVE ITEMS:
All matters listed hereunder constitute an administrative / consent agenda and will be acted upon by a single vote of the Board. Matters listed on the Consent Agenda will be read only on the request of a member of the Subcommittee, in which event the matter may be removed from the Consent Agenda and considered as a separate item. Public may comment on any of the items prior to the vote being taken by the Subcommittee.

4. **CONSENT AGENDA**
   A. **MINUTES APPROVAL**
      Approval of the minutes from February 5, 2024.

BUSINESS ITEMS:
All matters listed hereunder will be acted upon separately and public comment will be held for each item. As a Subcommittee of the full Board of Directors, Business Items may include one or more recommendations for further

discussion or action at a full Board of Directors meeting.

5. **UPDATE AND DISCUSSION ON REGEN 30% ENGINEERING DESIGN HYBRID COLLECTION CONTRACT**
   The Subcommittee will discuss progress of the contract with REGEN related to complete a 30% engineering design of a hybrid collection solution. Representatives from REGEN may be on hand, via Zoom, to update the Subcommittee and make final preparations for presenting the 15% engineering effort to the full Board of Directors on February 28, 2024. Any issues raised by the contract will also be discussed. See the October 16, 2023 Regular Meeting agenda for the LOCSD Board of Directors, starting on page 74, for more details on the contract: https://www.losolivoscsd.com/files/211066245/2023-10-16+Packet+Los+Olivos+CSD+Regular+Meeting.pdf

6. **GENERAL DISCUSSION OF COLLECTION, TREATMENT, AND DISPOSAL OPTIONS**
   The Subcommittee will discuss options for the collection, treatment, and disposal of wastewater for the District. Given the Regen contract, this discussion will focus heavily on Treatment options, including Membrane Bioreactor (MBR), connection to Solvang's treatment plant, and other solutions previously brought up by members of the public.

7. **UPDATE AND DISCUSSION ON GROUNDWATER MONITORING WELLS GRANT AND WELL INSTALLATION AND TESTING**
   The Subcommittee will discuss progress of the grant and/or implementation of three new groundwater monitoring wells and related wells testing. See the October 16, 2023 Regular Meeting agenda for the LOCSD Board of Directors for more details:
   https://www.losolivoscsd.com/files/211066245/2023-10-16+Packet+Los+Olivos+CSD+Regular+Meeting.pdf

   The week of January 29, 2024, the three new wells were drilled. Development, a process which prepares the well for samples being taken, began February 21, 2024 and was completed February 22, 2024. Discussion may cover project coordination, timelines, subcontractors, County coordination, regulator interactions, and other activities related to the implementation and testing of the three new wells and testing of the District's two existing wells. Additional information on the three new wells can be found at:
   https://www.losolivoscsd.com/district-drills-three-additional-groundwater-monitoring-wells-6ee4aedd-e69b-4137-afc1-bc072cbcb7d0

8. **DISCUSSION REGARDING POSSIBLE LOCSD CONNECTION TO THE CITY'S WASTEWATER TREATMENT PLANT AND RELATED INFRASTRUCTURE**
   The LOCSD Board of Directors wrote a letter to the City of Solvang expressing interest in connecting to the City's wastewater infrastructure. The City concurred that exploring a potential connection by the LOCSD to the City's wastewater treatment plant and related infrastructure makes sense at its January 22, 2024 City Council meeting. See the January 10, 20234 Regular Meeting agenda of the LOCSD Board of Directors for more details:
   https://www.losolivoscsd.com/files/2d9f1238c/2024-1-10+Packet+Los+Olivos+CSD+Regular+Meeting.pdf
   The Subcommittee will discuss potential connection to the City of Solvang, including technical issues raised by connection.

INFORMATIONAL ITEMS:
All matters listed hereunder are informational only, no action will be taken, and public comment not received.

9. **SUBCOMMITTEE MEMBER COMMENTS**
   Subcommittee members will give reports on any meetings that they attended on behalf of the Subcommittee and/or choose to comment on various Subcommittee activities. Subcommittee member requests for future agenda items may also be made at this time.

10. **ADJOURNMENT**

ITEM 4A – MINUTES

MINUTES

LOS OLIVOS COMMUNITY SERVICES DISTRICT **Posted: 2-1-2024**
TECHNICAL SUBCOMMITTEE MEETING
February 5, 2024 – 8:30 AM
St Mark's in the Valley Episcopal Church
2901 Nojoqui Ave, Los Olivos CA 93441
Please observe decorum and instructions from the Subcommittee Chair

Subcommittee Members: Director Fayram (Chair), Directors Parks, and General Manager Guy Savage

This meeting will be held both in-person and electronically via Zoom Meetings. In-person the meeting will be held at the following locations:
St Mark's in the Valley Episcopal Church, 2901 Nojoqui Ave, Los Olivos CA 93441

The public will also be able to hear and participate electronically via Zoom by using the following links:
Zoom: https://us06web.zoom.us/j/81937722522?pwd=SWpSU0RYZFljZTBLNGphZG41TGs4dz09
By Phone: +1 669 900 6833 US (San Jose) Meeting ID: 819 3772 2522 Passcode: 914085
One tap mobile: +14086380968,,81937722522#,,,,*914085# US (San Jose)

The Los Olivos Community Services District is committed to ensuring equal access to meetings. In compliance with the American Disabilities Act, if you need special assistance to participate in the meeting or need this agenda provided in a disability-related alternative format, please call 805.500.4098 or email to losolivoscsd@gmail.com. Any public records, which are distributed less than 72 hours prior to this meeting to all, or a majority of all, of the District's Board members in connection with any agenda item (other than closed sessions) will be available for public inspection at the time of such distribution at a location to be determined in Los Olivos, California 93441.

MEETING AGENDA

1. **CALL TO ORDER**
   Chair Fayram calls the meeting to order at: 8:33 AM.

2. **ROLL CALL**
   Present: Directors Fayram and Parks
   Absent: GM Savage

3. **PUBLIC COMMENTS**
   Members of the public may address the Board of Directors on any items of interest within the subject matter and jurisdiction of the Board but not on the agenda today (Gov. Code - 54954.3). The public may also request future agenda topics at this time. Speakers are limited to a maximum of 3 minutes. Due to the requirements of the Ralph M. Brown Act, the Board of Directors cannot take action today on any matter not on the agenda, but a matter raised during Public Comments can be referred to District staff for discussion and possible action at a future meeting.
   Chair Fayram opens the floor to public comment.
   No commenters.

ADMINISTRATIVE ITEMS:
All matters listed hereunder constitute an administrative / consent agenda and will be acted upon by a single vote of the Board. Matters listed on the Consent Agenda will be read only on the request of a member of the Subcommittee, in which event the matter may be removed from the Consent Agenda and considered as a separate item. Public may comment on any of the items prior to the vote being taken by the Subcommittee.

4. **CONSENT AGENDA**

A. MINUTES APPROVAL

Approval of the minutes from January 22, 2024.

Chair Faram opens the floor to public comment.

No public comment.

Motion to approve minutes from January 22, 2024.
Motion by: Director Parks, Second: Director Fayram
Voice vote: 2-0

BUSINESS ITEMS:

All matters listed hereunder will be acted upon separately and public comment will be held for each item. As a Subcommittee of the full Board of Directors, Business Items may include one or more recommendations for further discussion or action at a full Board of Directors meeting.

5. UPDATE AND DISCUSSION ON REGEN 30% ENGINEERING DESIGN HYBRID COLLECTION CONTRACT

The Subcommittee will discuss progress of the contract with REGEN related to complete a 30% engineering design of a hybrid collection solution. Representatives from REGEN may be on hand, via Zoom, to update the Subcommittee. Any issues raised by the contract will also be discussed. See the October 16, 2023 Regular Meeting agenda for the LOCSD Board of Directors, starting on page 74, for more details on the contract: https://www.losolivoscsd.com/files/211066245/2023-10-16+Packet+Los+Olivos+CSD+Regular+Meeting.pdf

Mr. Bounds provides an update on REGEN's progress related to the hybrid collection design contract. He has been significantly focused on costs and resulting issues. He has determined that the transport lines and force mains are a fractional cost of the overall related to the three different treatment locations. He recommends that the District focus on the remaining costs, as the difference between the various approaches (gravity, effluent, etc.).

Chair Fayram opens the floor to public comment.

Kathryn Lohmeyer-Rohrer speaks.

Mr. Bounds and the Subcommittee talk about timing and whether he will be ready for the rescheduled Regular Board meeting. Mr. Bounds comments that he is working on getting actual costs for recent installations in the Los Olivos area. Mr. Bounds says he is including costs for connecting each individual home (service connection), something the Stantec estimate did not include. The Subcommittee discusses the ramifications and issues around laterals (service connections from each home) and sewer mains. Mr. Bounds comments that he is mirroring the Stantec estimates, project reserves, and so on.

6. GENERAL DISCUSSION OF COLLECTION, TREATMENT, AND DISPOSAL OPTIONS

The Subcommittee will discuss options for the collection, treatment, and disposal of wastewater for the District. Given the Regen contract, this discussion will focus heavily on Treatment options, including Membrane Bioreactor (MBR), connection to Solvang's treatment plant, and other solutions previously brought up by members of the public.

No discussion.

Chair Fayram opens the floor to public comment.

No comment.

7. UPDATE AND DISCUSSION ON GROUNDWATER MONITORING WELLS GRANT AND WELL INSTALLATION AND TESTING

The Subcommittee will discuss progress of the grant and/or implementation of three new groundwater monitoring wells and related wells testing. See the October 16, 2023 Regular Meeting agenda for the LOCSD Board of Directors for more details: https://www.losolivoscsd.com/files/211066245/2023-10-16+Packet+Los+Olivos+CSD+Regular+Meeting.pdf

The week of January 29, 2024, the three new wells were drilled. Development, a process which prepares the well for samples being taken, is anticipated to begin February 6, 2024. Discussion may cover project coordination, timelines, subcontractors, County coordination, regulator interactions, and other activities related to the implementation and testing of the three new wells and testing of the District's two existing wells. Additional information on the three new wells can be found at:

https://www.losolivoscsd.com/district-drills-three-additional-groundwater-monitoring-wells-6ee4aedd-e69b-4137-afc1-bc072cbcb7d0
Chair Fayram comments that well development has been delayed to 2/19, due to the weather. DE Pike describes the process and how the effort came together prior to the storms.

Chair Fayram opens the floor to public comment.
No comment.

8. DISCUSSION REGARDING POSSIBLE LOCSD CONNECTION TO THE CITY'S WASTEWATER TREATMENT PLANT AND RELATED INFRASTRUCTURE

The LOCSD Board of Directors wrote a letter to the City of Solvang expressing interest in connecting to the City's wastewater infrastructure. The City concurred that exploring a potential connection by the LOCSD to the City's wastewater treatment plant and related infrastructure makes sense at its January 22, 2024 City Council meeting. See the January 10, 20234 Regular Meeting agenda of the LOCSD Board of Directors for more details: https://www.losolivoscsd.com/files/2d9f1238c/2024-1-10+Packet+Los+Olivos+CSD+Regular+Meeting.pdf
The Subcommittee will discuss potential connection to the City of Solvang, including technical issues raised by connection.
Chair Fayram comments that the item did go to the City Council, and that the City approved their staff working on exploring a potential solution.

Chair Fayram opens the floor to public comment.
No comment.

INFORMATIONAL ITEMS:
All matters listed hereunder are informational only, no action will be taken, and public comment not received.

9. SUBCOMMITTEE MEMBER COMMENTS

Subcommittee members will give reports on any meetings that they attended on behalf of the Subcommittee and/or choose to comment on various Subcommittee activities. Subcommittee member requests for future agenda items may also be made at this time.
Director Parks - None
Director Fayram - None

10. ADJOURNMENT

Motion to adjoun at 9:05 AM
Motion by: Director Parks, Second: Director Fayram
Voice vote: 2-0

Respectfully submitted:

Guy W. Savage
General Manager – Los Olivos Community Services District

Approved:

_____
Chair Fayram

ITEM 5 – 30% HYBRID DESIGN (15% CHECKPOINT)

30% HYBRID DESIGN (15% CHECKPOINT)

Preliminary Basis of Design Report

LOS OLIVOS WASTEWATER HYBRID COLLECTION ANALYSIS

Initial Draft

Prepared for:
Los Olivos Community Service District

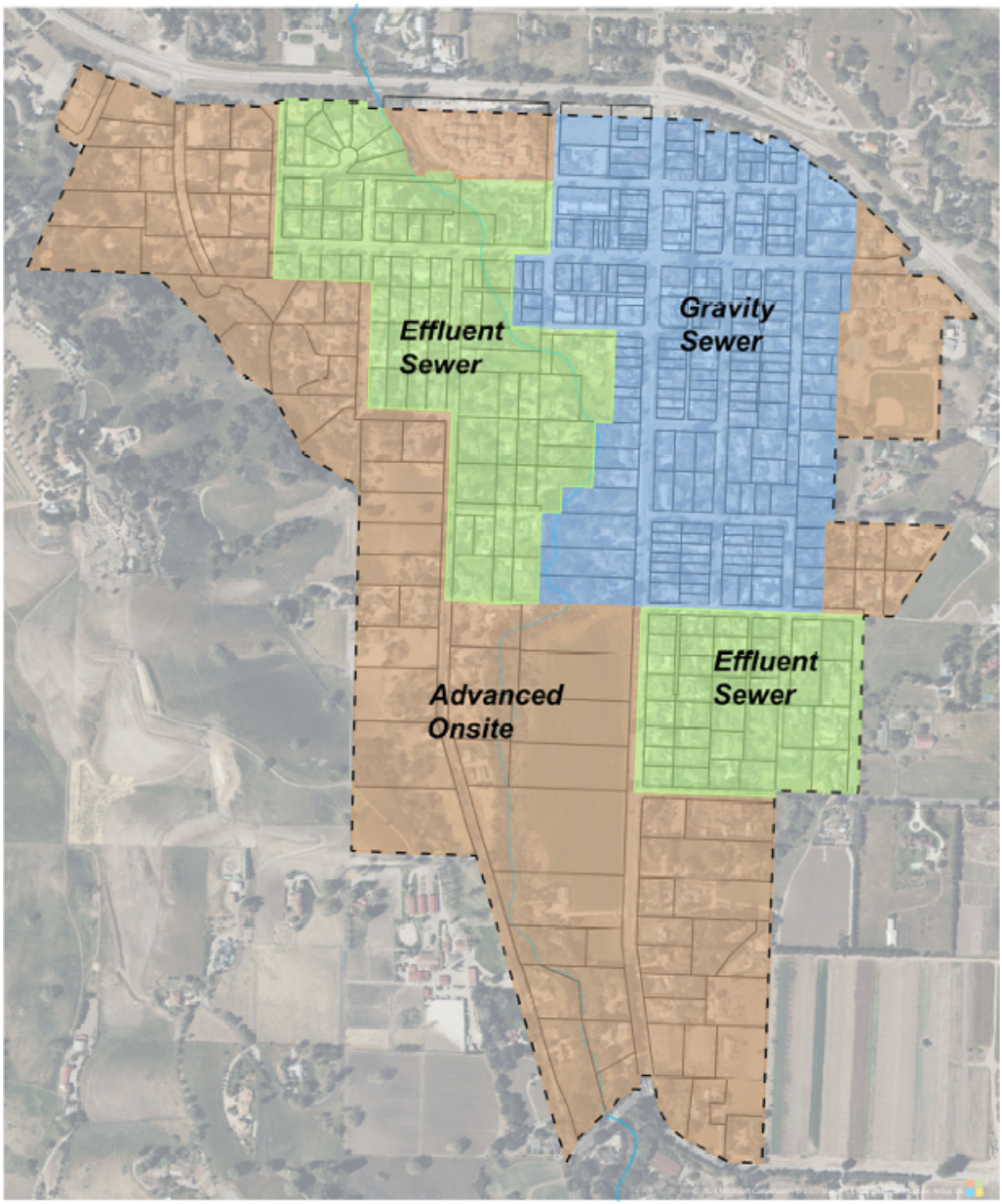
Prepared by:
Regen AEC, PLLC
220 N 10th St
Boise, Id 83702
(541) 580-2980

February 21, 2024
Rev 1.0

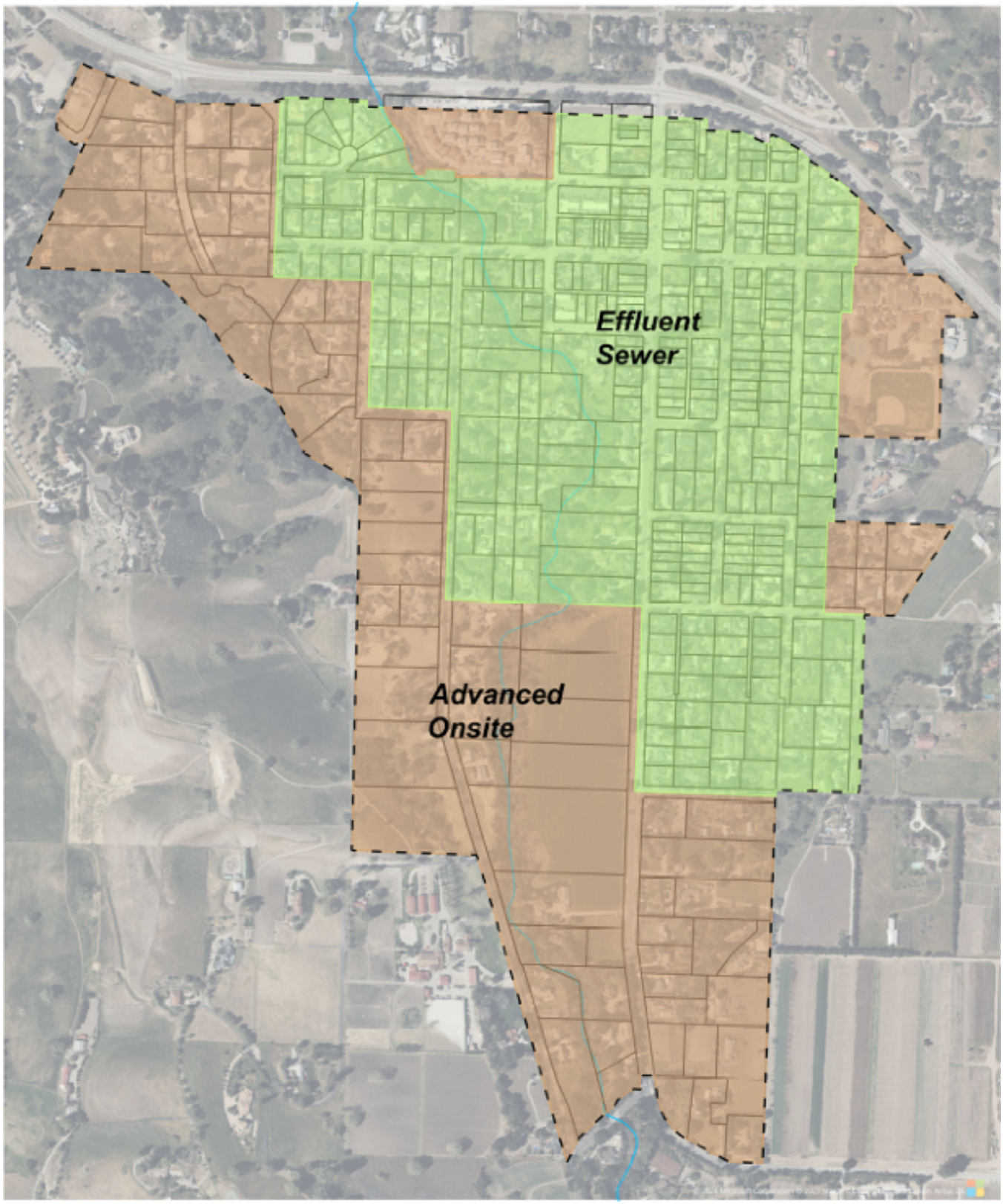
TABLE OF CONTENTS

Option B - ***Effluent Sewer for entire district (zones 1-6)***

Option C - *Gravity Sewer in central town (zones 1 & 2), Effluent Sewer in immediate area surrounding downtown (zones 3-5), Advanced Onsite Systems (zone 6)*



Option D - *Effluent Sewer in dense areas (zones 1-5), Advanced Onsite Systems (zone 6)*



EXECUTIVE SUMMARY

The purpose of this Basis of Design (BOD) is to compare alternative hybrid collection systems configuration and make an initial recommendation on the best approach for the unincorporated community of Los Olivos. This BOD has been conducted by Regen AEC (Regen) for the Los Olivos Community Service District (LOCSD) and the Los Olivos Wastewater Reclamation Program Project (LOWRPP).

INTRODUCTION

This Basis of Design (BOD) report had been developed to provide the Los Olivos Community Service District (CSD or District) with a foundational design basis for the development of a hybrid wastewater collection system design. Regen has been contracted to assist the Los Olivos Community Services District with the design of a hybrid wastewater collection system.

STUDY AREA CHARACTERISTICS

The Los Olivos area is located within Santa Barbara County off California highway 154. The proposed wastewater collection area consists of 391 parcels and roughly 840 residents. Per adopted Resolution 2019-04, the Los Olivos Wastewater Reclamation Program Project (LOWRPP) was initiated to help identify strategies to provide viable wastewater collection and treatment for the residents and business owners within the District.

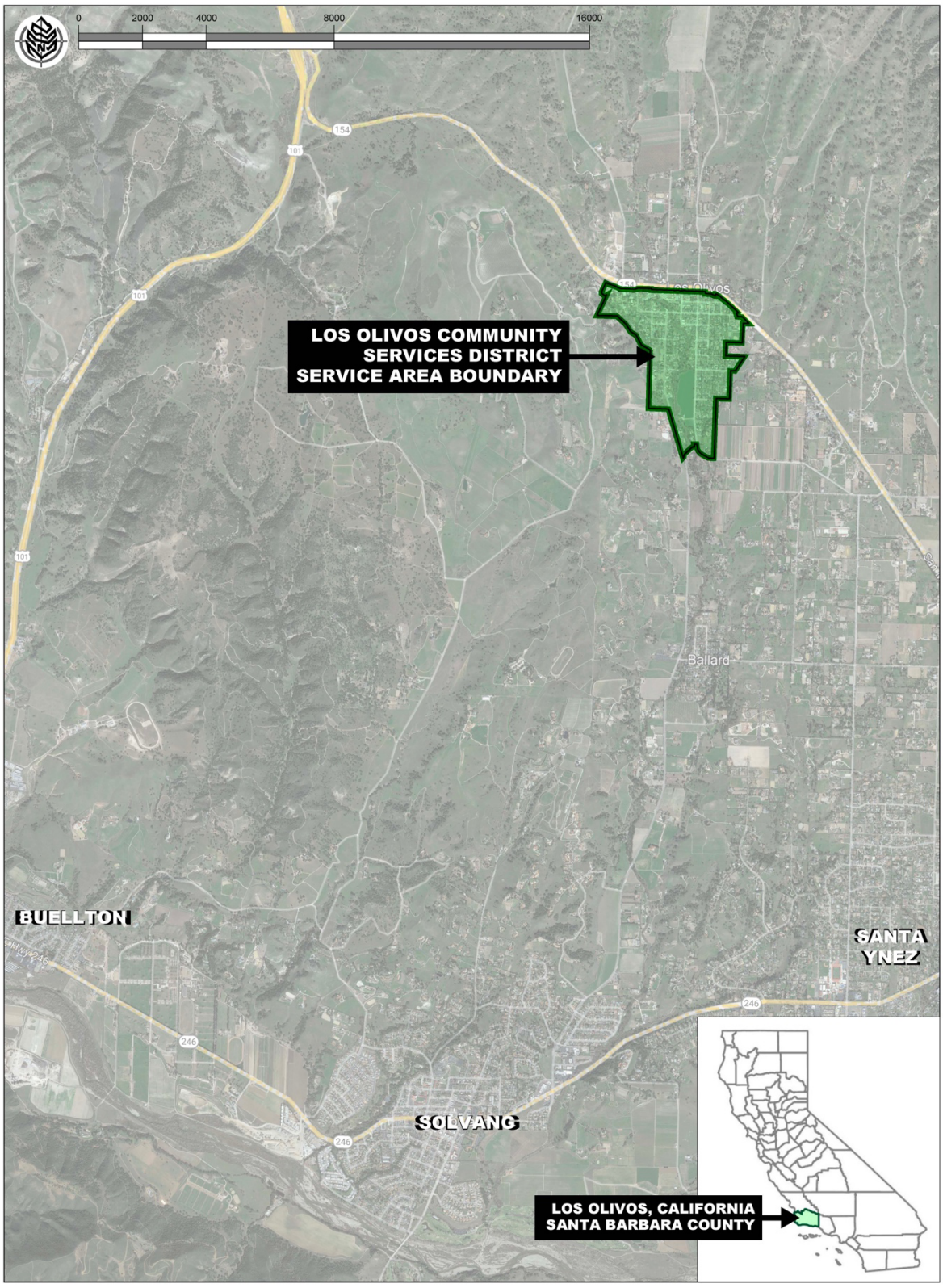


Figure 1 – Vicinity Map

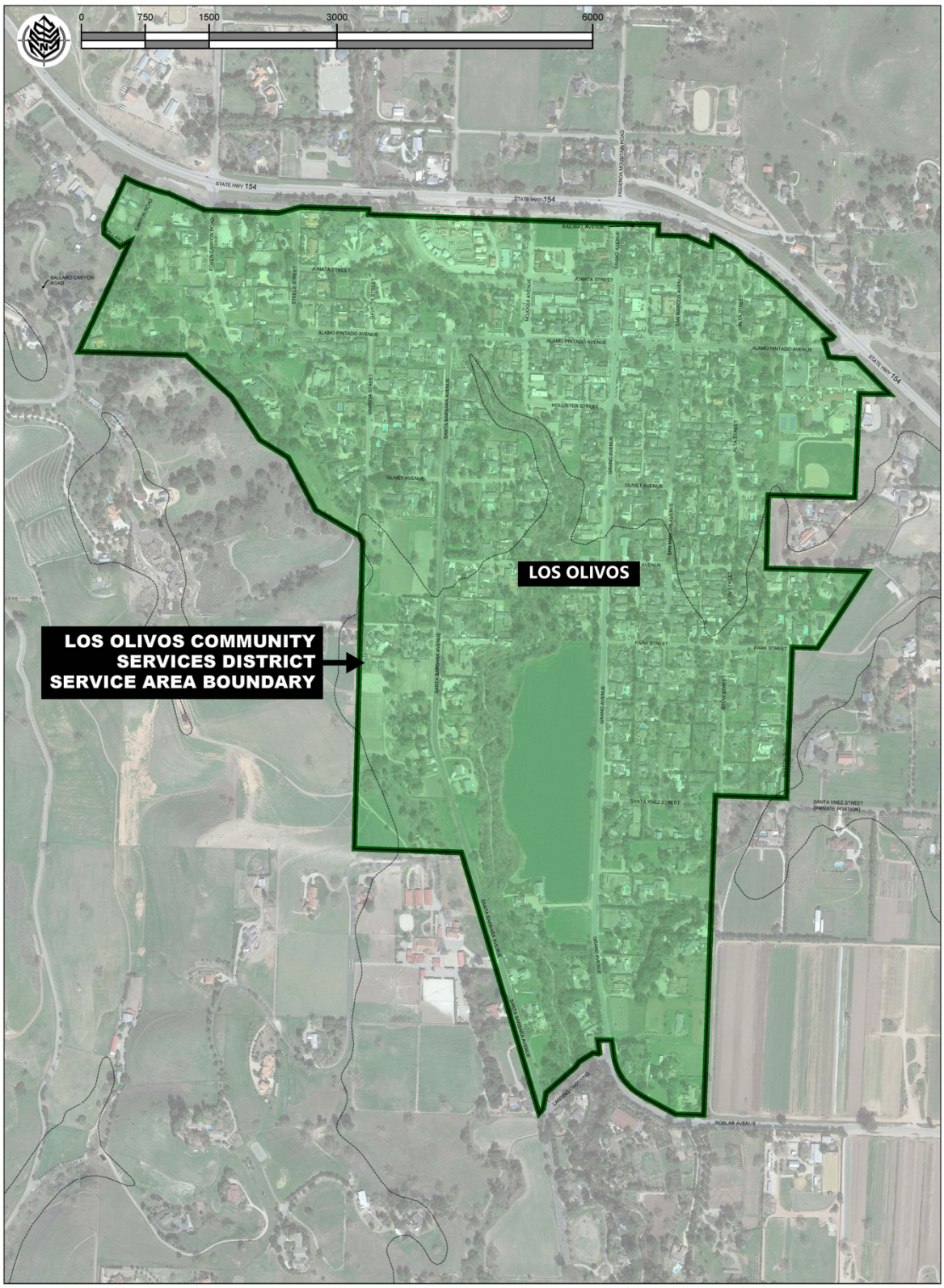


Figure 2 – Community Service District Area Boundary

PREVIOUS STUDIES

The community of Los Olivos has had several studies conducted over the past two decades to evaluate wastewater alternatives to address groundwater quality concerns. Key previous studies include:

1. Santa Ynez Valley Community Plan Environmental Impact Report (EIR 2009)
2. Los Olivos Wastewater Management Plan (LOWWMP 2010)
3. Los Olivos Wastewater System Preliminary Engineering Report (AECOM 2013)
4. Los Olivos Special Problems Area Sewer Calculations (Stantec 2015)
5. Final Draft Plan for Services and Feasibility Study (Berkson 2016)
6. Update to Los Olivos Wastewater System Preliminary Engineering Report (AECOM 2016)
7. Desktop Study- Proposed Wastewater Treatment Plant Siting Study (UPC 2021)
8. Septic to Sewer Task Order No. 1
9. Wastewater Collection and Treatment Basis of Design Report (Stantec 2022)

BASIS OF PLANNING

Zone Area Boundaries

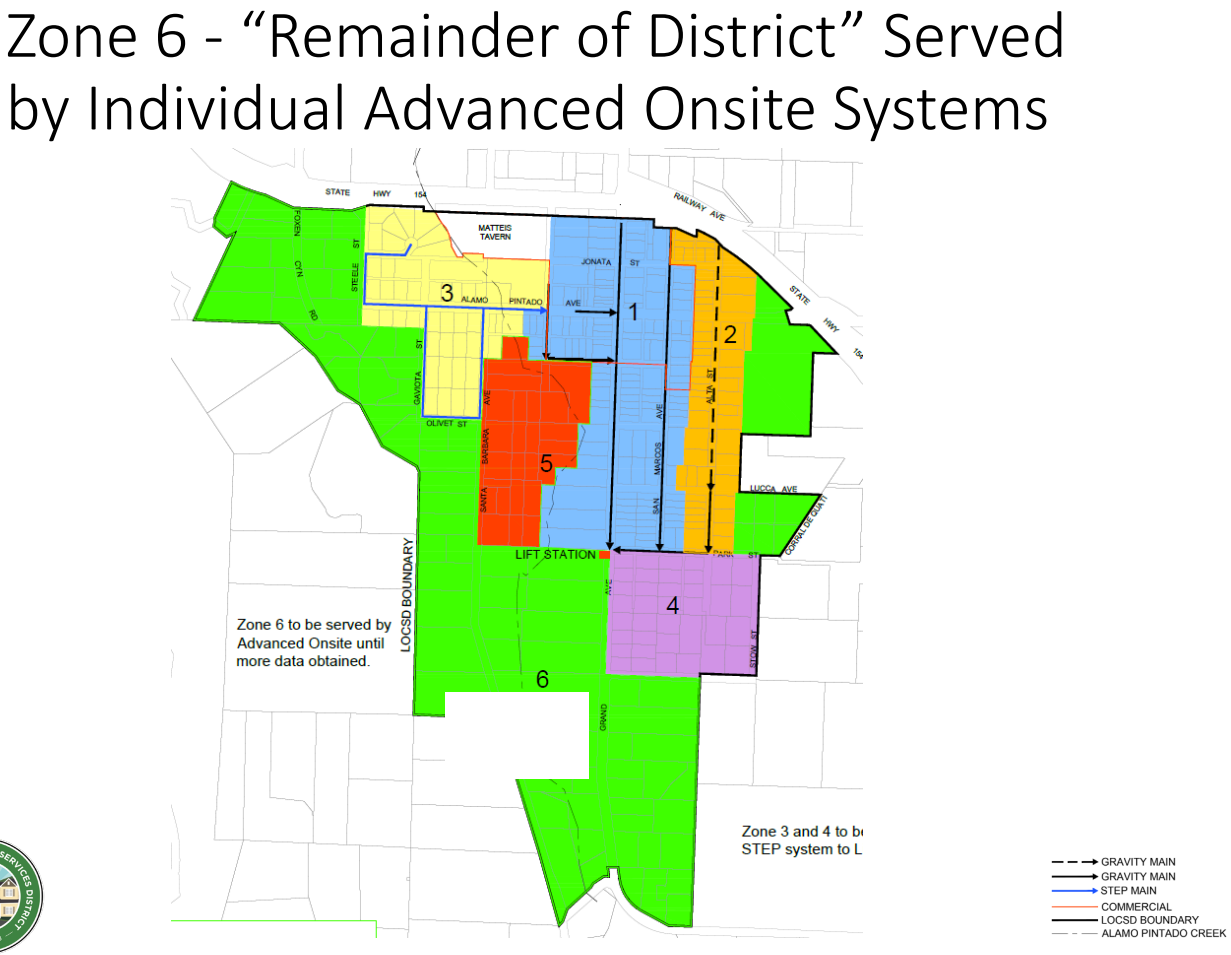


Figure 3 –Proposed Service District Zoning Map

Proposed Zone Collections System Alternatives

Collection system alternatives traditionally evaluated for residential development include gravity centralized lift stations, effluent collection systems (also known as step or liquid only sewers), and grinder systems.

Gravity sewers utilize large diameter lines, which gravity flow to a centralized location for further conveyance. in the step system, the effluent is pumped from the septic tank under pressure to a small-diameter, pressurized collector sewer. In the individual grinder lift stations, household sewage is collected in a small basin and macerated into the conveyance line with the grinder pumps. Residential step and grinder systems consist of an electrical panel, tank or basin, pump vault containing a single pump and level control.

Proposed Treatment Plant Locations

The wastewater treatment works are outside of the scope of Regen's collection system design work.

Treatment plant capacities are based on estimated flows from all residential and commercial properties. Estimated residential flows of 200 gpd average have been assumed, commercial property flows have been estimated based on water records and potential growth.

Hydraulic analysis will be based on the approved configuration when determined.

COLLECTION SYSTEM

Gravity Collection

Conventional gravity sewage collection systems are the oldest forms of sewage collection and sanitation dating back to the Roman Empire. These systems generally require no mechanical or electrical facilities and rely solely on gravity to transport sewage from the points of connection to a central receiving location, either a transfer lift station or a wastewater treatment plant (WWTP). Gravity collection systems are designed with network of pipes placed at slopes sufficient to maintain minimum velocities to transport solids and prevent deposition and accumulation of materials in the system. Typically, the network is subdivided into primary pipes (sewer mainlines along main roads), secondary pipes, and tertiary pipes collecting wastes from individual neighborhoods and properties.

Design Criteria

Gravity sewer wastewater contains human waste solids, grit, and other solids that down the drain. In considering the solid content in gravity sewers they must be designed to "self-clean" which requires specific velocities to be maintained to "flush" the solids to their destination. Velocities must be maintained at a minimum of 2 to 3 fps (feet per second) to ensure minimal build-up of material within collection lines. Velocities are maintained by designing gravity sewer collection lines to have slopes as is related of flow and pipe diameter.

Manholes are required for access at given straight distances along the gravity sewer lines, at pipe intersections, and at any change in pipe direction. Manholes allow for maintenance, inspection, and cleaning of the gravity collection system. Manholes are generally required at the end of each line, at all changes in grade, size, or alignment, at all intersections, and at distances not to exceed 400 ft for sewers 15" or less (Recommended Standards for Wastewater Facilities, 2004).

Minimum pipe diameters are required in gravity sewers to minimize blockages and allow for adequate space for cleaning equipment and cameras. Although the District does not currently have standard design criteria established for gravity sewer collection systems there are standards set forth in the industry and by local agencies that will be the basis for design. Based on agency and industry standards (and previous studies), a 6-inch minimum gravity sewer main line will be utilized. Gravity sewer pipe materials are assumed to be either PVC SDR3-35 or HDPE PE3408.

Manning's equation for open channel flow will be utilized with a minimum allowable pipe slope and coefficient "n" equal to 0.013, where "n" is the roughness coefficient of the pipe material.

Table 1 – Gravity Sewer Main Slopes and Design Depths

Pipe Size (inches)	Minimum Slope[1] (%)	Maximum Liquid Depth to Diameter Ratio (d/D)	Maximum Percent Full (%)
8	0.4	0.5	50
10	0.28	0.5	50
12	0.22	0.5	50
15	0.16	0.75	75

[1] Table 5.1 2013 AECOM Report

Estimated minimum cover over gravity sewer pipes should be maintained at 5 feet with an additional 1-foot vertical separation from existing or future utilities.

Lateral Connection Requirements

Each individual property will be required to connect to the gravity sewer collection system (where appropriate) with private laterals. Laterals are typically owned and maintained by the individual property owners. Each property owner is expected to be responsible for the construction of the lateral connection. Laterals are typically a minimum of 4-inch diameter at a minimum of 2 percent slope per the California Plumbing Code.

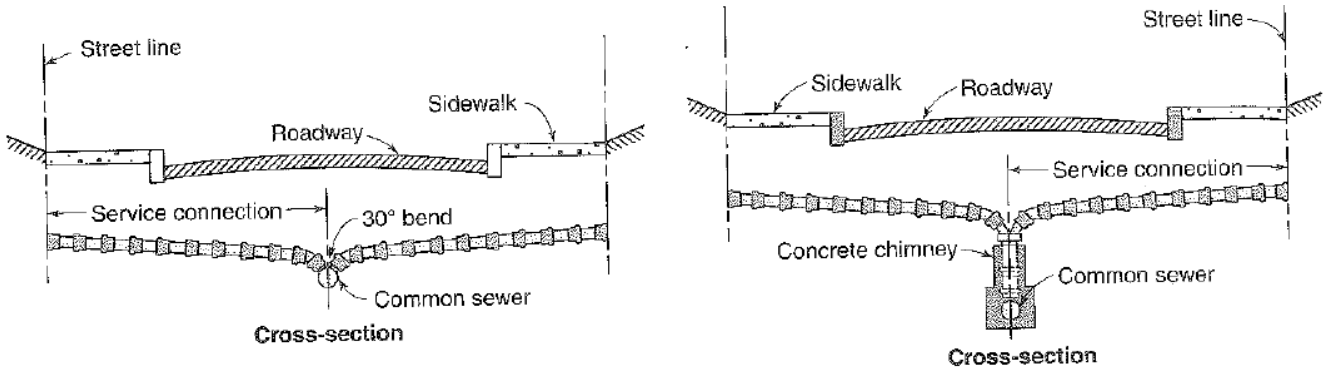


Figure 4 - Typical gravity sewer service lateral (Water Supply and Wastewater Removal, 2011).

Constructed costs for gravity sewers service laterals vary based upon main line depth, geological conditions, groundwater elevation, pipe material, and service lateral length.

Lateral size serving commercial multiple family dwellings must maintain pipe slope uniform from the sewer main to the property line. Minimum depths for laterals shall be maintained at 4 feet. Wye branches are used for lateral connections to mainline connections. Cleanouts shall be required with all lateral connections.

Right-of-way Requirements

ROW equipment for gravity sewers consists of large diameter mainline laid at a constant slope, manholes, lift stations (if required), and air release valves (if required). Costs fluctuate based upon bedding material, location (rural versus urban), clearing costs, topography, geological conditions, depth, and surface restoration costs. Table 2 excludes manholes, lift-stations, service wye's, and terminal cleanouts. It also assumes ideal soil conditions, no dewatering, and an 8-ft mean burial depth.

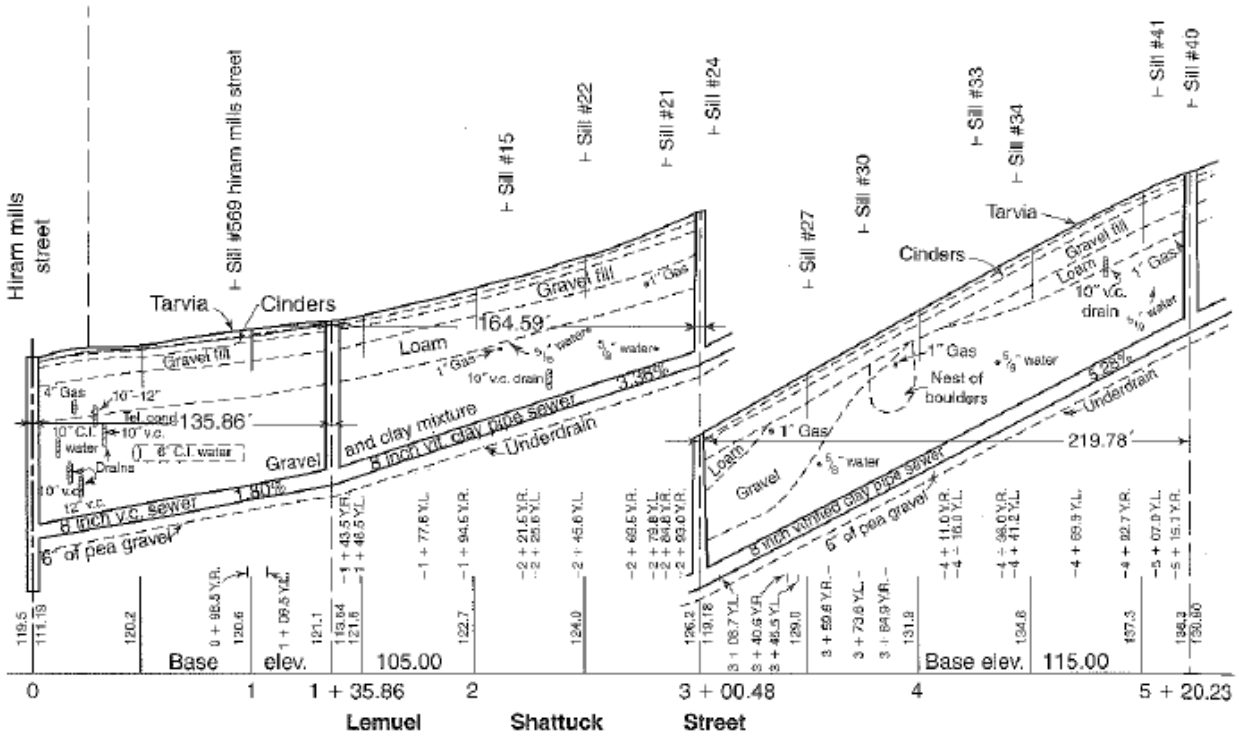


Figure 5 - Profile of gravity sewer (Water Supply and Wastewater Removal, 2011).

Table 2 - Installed Unit Costs: Gravity Sewer Pipe USD/Linear Ft (PVC).[2]

Item	Cost (2022 Stantec)
6" dia Mainline (USD/linear ft)	$180
8" dia Mainline (USD/linear ft)	$240

[2] Fair, Geyer, and Okun, Water Supply and Wastewater Removal, 3rd ed. (Wiley, 2011), Table 16.3.

Sewage Lift Station

When gravity sewers are installed in trenches deeper than 10 ft, the cost of sewer line installation increases significantly because of the more complex and costly excavation equipment and trench shoring techniques required. Lift stations are used to reduce mainline installation depth and, in some cases,

reduce the capital cost of sewer system construction. Lift station construction has a significant economy of scale and is generally expensive and difficult to apply to small communities. For example, if the capacity of a lift station is increased by 100%, the construction cost would increase only by 50 to 55%.

A sewage lift station will be required to convey wastewater from the District gravity sewer collection system to a wastewater treatment plant regardless of the plant location. For estimating purposes, it is assumed the lift station will include a round manhole wet well, duplex submersible pumps, and telemetry controls. The lift station should include odor control systems.

The force main from the pump station to the WWTP shall be a dual force main to provide redundancy and reliability. It shall be two 6-inch diameter force mains, to be confirmed during design (Stantec 2022).

Effluent Sewer Collection

Effluent sewers utilize small settling tanks with pumping filters and effluent filtration units, small diameter transport lines (typically 2”-4”) buried with the contours of the land just below frost depth, and small simple cleaning and air release ports throughout the pressurized line network. Since solids in an effluent sewer system are collected and digested in the on-lot tank, only liquid effluent is conveyed to the collection system. Line cleanings are eliminated as a result, so effluent sewer owners and users should be exempt from the charges typically associated with cleaning activities. In addition, effluent sewer collection systems are watertight, reducing infiltration costs in both conveyance and at the treatment facility.

Design Criteria

Transporting wastewater from the primary tanks to the centralized treatment facility will be accomplished with a 2”-4” force main lines. Assumptions include Hazen-Williams C-Factor of 150 and Battelle Institute Flows of DU_3 (250 gpd, 3.5 people/dwelling unit).

The force mains in the conveyance system are typically only a few feet deep; therefore, there is potential of breakage due to future excavation events. Location wire and route markers will be used and strict enforcement controlling excavations in proximity of pipe should be exercised. Still, damage can occur and the used of isolation valves can be critical. Odor issues are a potential if primary tanks are not properly installed. All equipment should be installed to ensure proper seal of lids.

Because effluent sewers provide primary treatment on-lot and convey primary-treated and clarified effluent through a watertight, pressurized collection system that’s largely immune to infiltration and inflow, they allow bioreactor volume reductions compared to other collection systems (gravity or grinder).

On Lot Processing Tank

A primary septic, or interceptor, tank will collect and retain raw sewage from each dwelling. In the interceptor tank, heavy solids (known as sludge) settle to the bottom while the lighter material (known as scum) floats to the top of the liquid contents. The organic material at the bottom of the tank (sludge) undergoes facultative and anaerobic digestion converting the organic matter to gases. Facultative microbes solubilize the complex organic material to volatile organic acids while strict anaerobes ferment the volatile organic acids to gases (methane, carbon dioxide, etc.). The rate at which both scum and sludge accumulates decreases as the biological process in the tank matures. It allows sufficient storage

capacity for sludge and scum, resulting in long intervals between septage pump-outs. With long solids retention times, the tanks provide natural digestion, greatly reducing the impact of solids on a treatment facility. An effluent filter prevents any solids larger than 1/8-inch from reaching the pump. Typically, 40% to 60% of the BOD will be removed in the interceptor tank. It provides enough reserve space for 24 to 48 hours of normal operation before an emergency condition must be corrected, which minimizes the need for immediate maintenance. It provides an operating zone sufficient for modulating peak inflows without causing nuisance alarms or excessive hydraulic gradients.

The tanks in effluent sewers provide passive, long-term anaerobic digestion of primary sludge, flow equalization internal to the collection system, resistance to infiltration and inflow (I/I), and fine-screened effluent to the wastewater treatment facility. They facilitate the downsizing or complete elimination of influent fine-screen processes directly upstream of any wastewater secondary treatment process. The lower organic load of effluent sewers and their near elimination of I/I also permit smaller bioreactors (up to ~ 57% smaller), reduce bioreactor aeration requirements (lowering bioprocess aeration by ~ 57%), and reduce biosolids management demands (by up to 75%).
For smaller clustered units such as the cottages and villas, and for commercial buildings such as retail shops and offices, one interceptor tank may serve more than one building. Tanks will be furnished appropriately sized for the expected waste flows, typically at a minimum of 2.2 times design flow. For larger users, such as the restaurant and clubhouse, two tanks in series may be used. Grease traps will be required for all commercial kitchen facilities.

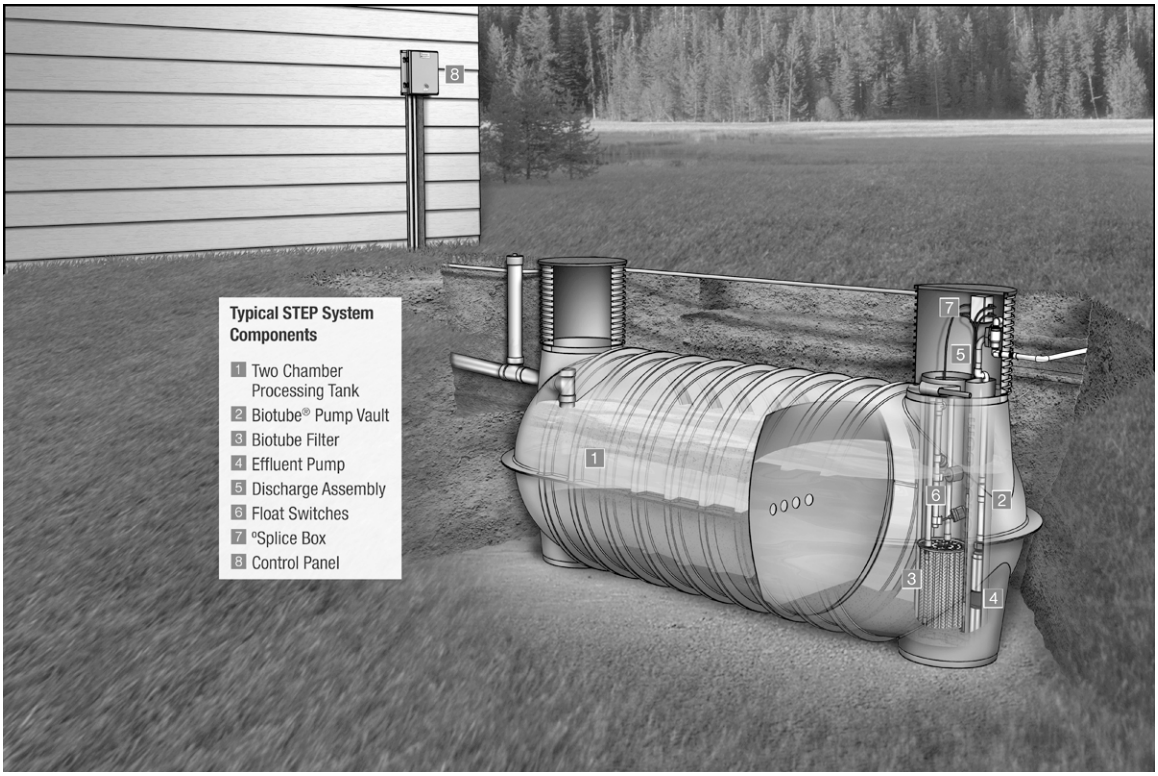


Figure 6 - Typical STEP system components. *courtesy of Orenco Systems Inc.*

Lateral Connection Requirements

Effluent sewers use watertight tanks and low-pressure sewer mains. The mains are also watertight and do not include manholes; therefore, they are largely resistant to I/I. Per capita average flows are typically 50 gpcd.

Right-of-way Requirements

Mainline and appurtenances for pressure sewers typically consist of small diameter mainlines (2” to 6” typical) that follow the contour of the land, service saddles, air release valves, clean-outs, pigging ports, and mainline isolation valves. Mainline material is generally polyvinyl chloride (PVC), polyethylene (PE or HDPE), with pipe buried at shallow depths and with fewer joints compared to gravity sewer due to their increased individual pipe lengths.

Water Lateral Separation Requirements

Individual lot water lateral separation will be required at a minimum of 5 horizontal feet. Primary tank separation from main water lines shall be maintained at a minimum of 25 horizontal feet.

WASTEWATER TREATMENT FACILITY SITING

Based on the Stantec Basis of Design Report the preliminary WWTP site will need a minimum of 1.6 acres to accommodate the treatment process, influent/effluent storage, truck access, equipment, buildings/screening, and other onsite needs at buildout of the facility. In addition to the two top recommendations from the Stantec report there is an additional option to utilize land at the school for treatment and dispersal of effluents. This cooperative with the school district would have to be met before moving forward with additional analysis.

Alternatively, distributed treatment facilities could be an alternative option for future evaluation. Distributed treatment and dispersal alternatives would be appropriate if high demands of water usage at specific locations could utilize the benefit of treated reuse for irrigation or other industrial water reuse applications. Variations in collection costs from this report would be minimal if distributed treatment facilities are deemed to be the appropriate solution for treating the districts wastewater.

WASTEWATER COLLECTION SYSTEM OPTIONAL LAYOUTS

Option A - *Gravity Sewer in central town (zones 1 & 2), Effluent Sewer in area surrounding downtown (zones 3-6)*

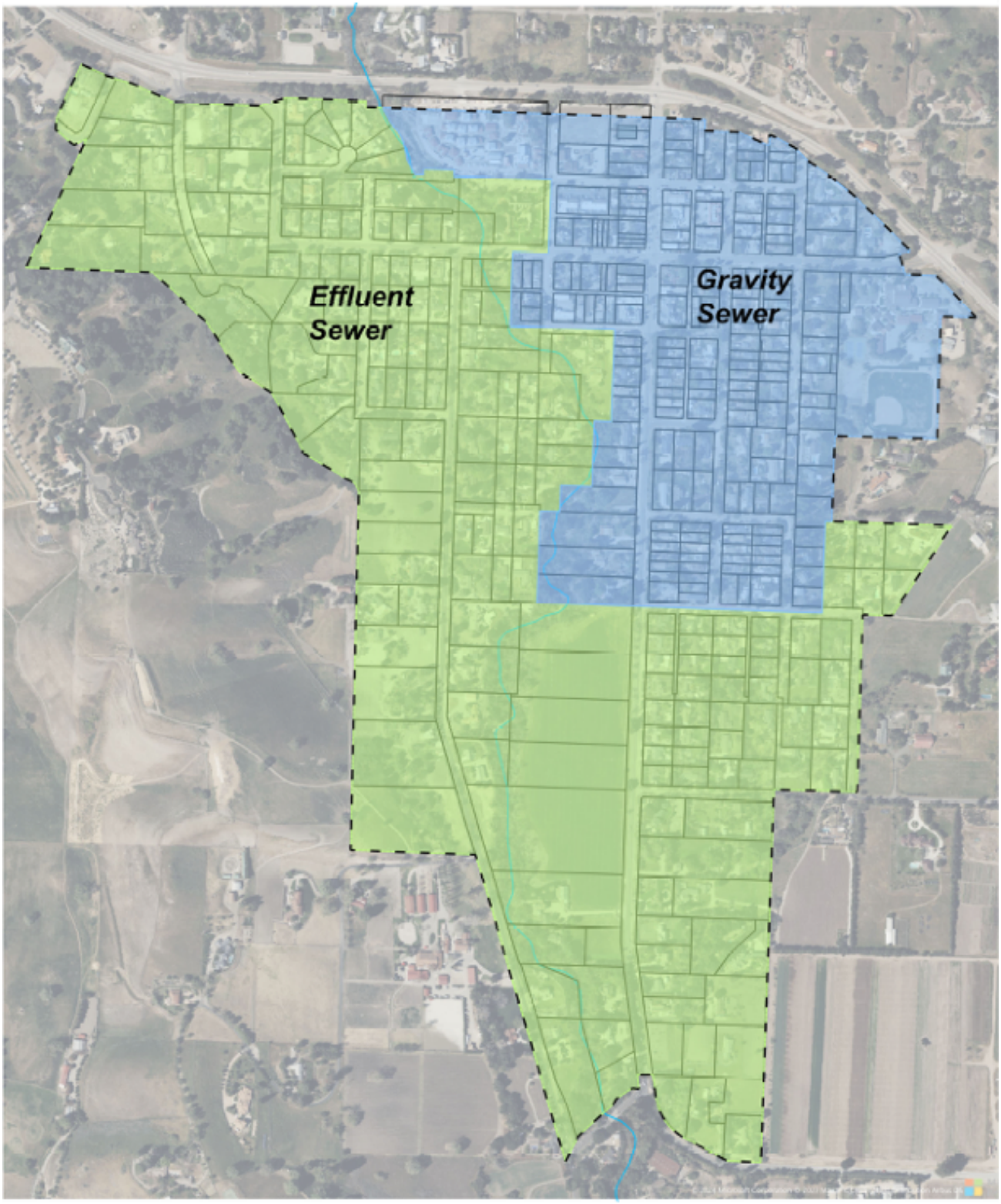


Figure 7 – Proposed Hybrid Sewer Collection System Alternative A

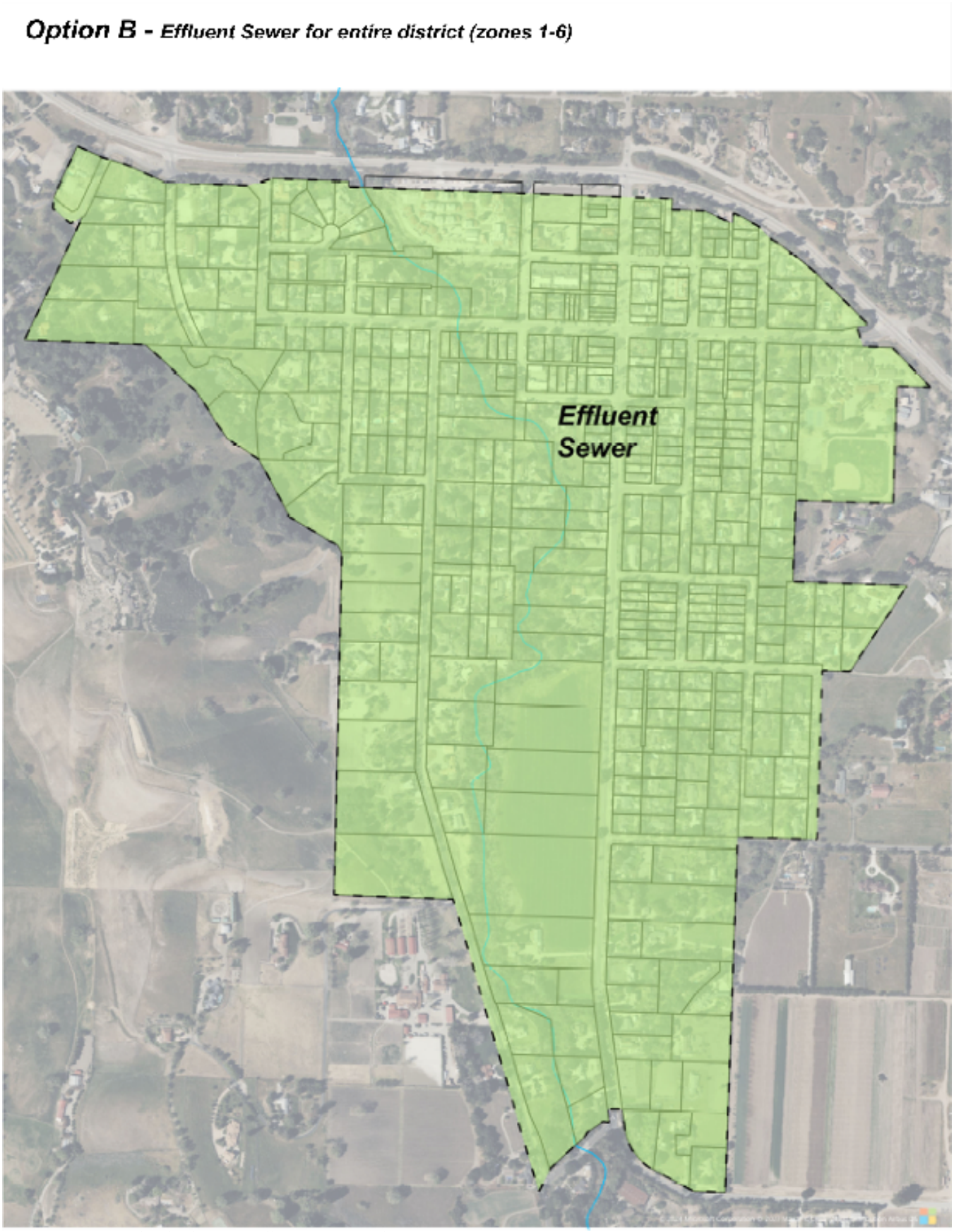


Figure 8 – Proposed Hybrid Sewer Collection System Alternative B

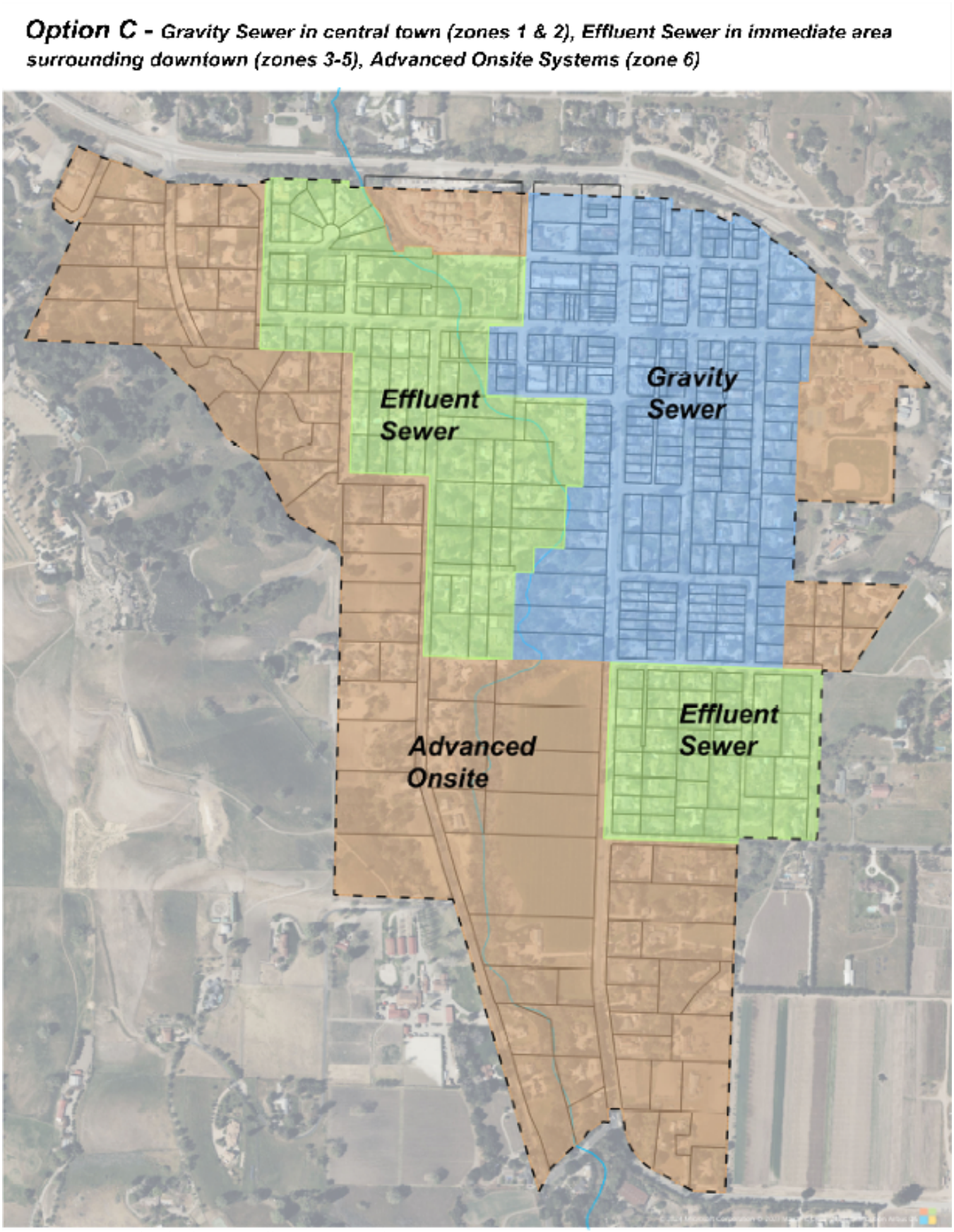


Figure 9 – Proposed Hybrid Sewer Collection System Alternative C

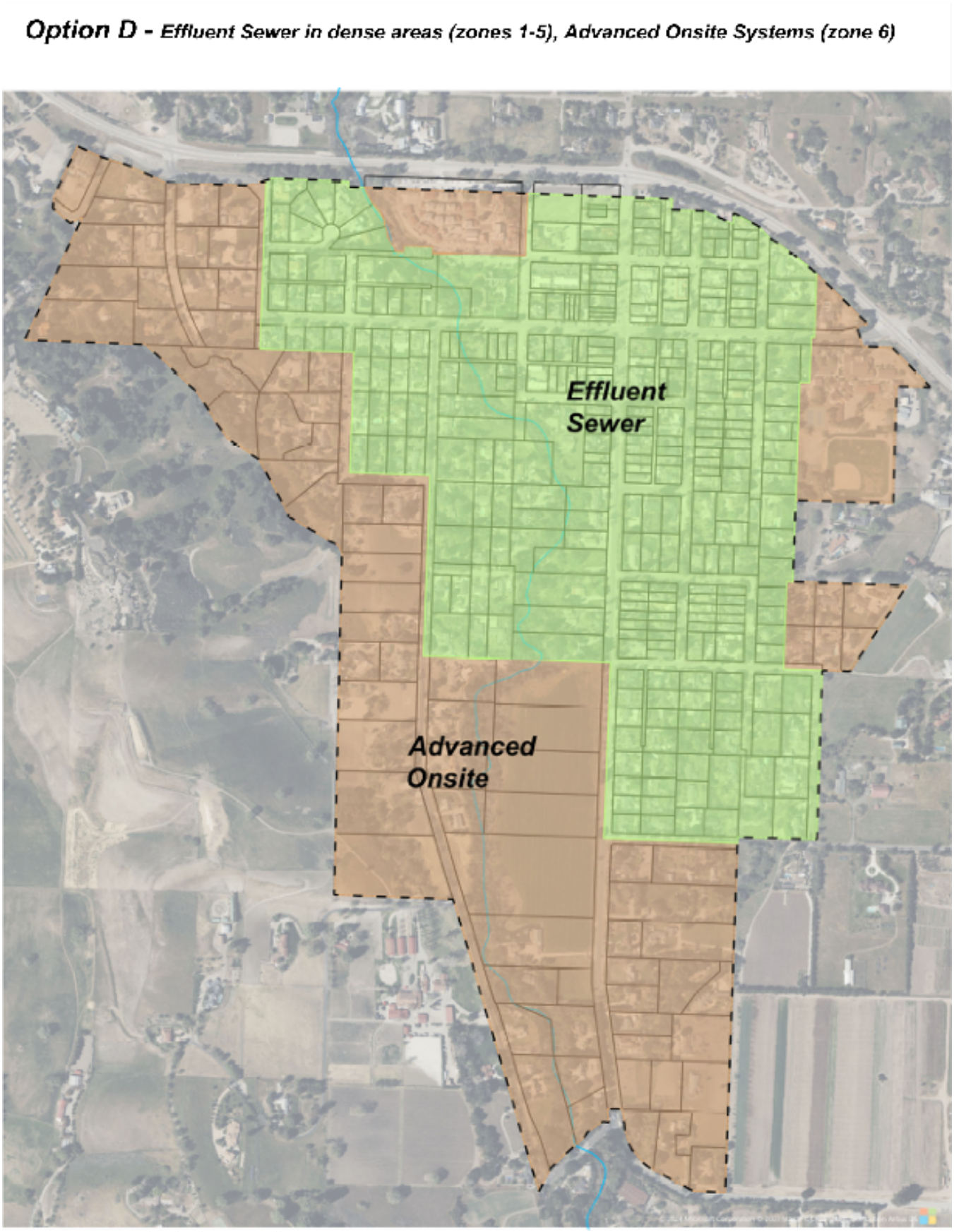


Figure 10 – Proposed Hybrid Sewer Collection System Alternative D

WASTEWATER FLOW AND COMPOSITION ANALYSIS

Wastewater collection options such as Gravity, grinder, and effluent sewers each deliver unique hydraulics and wastewater characteristics to downstream wastewater treatment facilities that greatly affect the design, capital costs, performance, and operational costs of treatment facilities.

Zone Populations

Table 3 – Zone Populations

Zone	Parcels	Equivalent Dwelling Unit (EDU)	Population Equivalent (2.5/EDU)
#1	149	249	623
#2	58	58	145
#3	46	46	115
#4	43	43	108
#5	26	26	65
#6	74	74	185

Various Systems Loading Estimates

Table 4 - Typical wastewater loading rates from effluent sewer, grinder sewer and gravity sewer

Constituent Loading Assumptions	Effluent Sewer	Grinder Sewer	Gravity Sewer
Design Average Flow	50 gpcd	50 gpcd	120 gpcd
Biochemical Oxygen Demand (BOD_5)	150 mg/L	450 mg/L	200 mg/L
Chemical Oxygen Demand (COD)	381 mg/L	1143 mg/L	508 mg/L
Total Suspended Solids (TSS)	40 mg/L	500 mg/L	210 mg/L
Total Kjeldahl Nitrogen (TKN)	65 mg/L	70 mg/L	35 mg/L
Ammonia (NH_3-N)	40 mg/L	55 mg/L	21 mg/L
Total Phosphorus	16 mg/L	17 mg/L	7 mg/L
Fats, Oils, Greases (FOG)	15 mg/L	164 mg/L	80 mg/L

[1]Adapted from Metcalf & Eddy 2003; Crites and Tchobanoglous 1998; USEPA 2002; Winneberger 1984.

Gravity Wastewater Hydraulic and Constituents Estimates

Table 5 – Gravity Collection Hydraulic Estimates

Zone	Avg Day (gpd)	Max Month (gpd)	Max Day (gpd)	Peak Hour (gpm)	Peak Hour Factor
#1	46,781	53,798	65,493	130	4
#2	11,600	13,340	16,240	32	4

Table 6 – Gravity Collection Wastewater Constituent Estimates

Contaminant	Typical Composition	Design Values
Total Suspended Solids (TSS)	300 to 400 mg/L	350 mg/L
BODs at 20°C	200 to 350 mg/L	275 mg/L
Nitrogen (total as N)	60 to 120 mg/L	75 mg/L
Phosphorous (total as P)	8 to 18 mg/L	12 mg/L

Effluent Sewer Wastewater Hydraulic and Constituent Estimates

Table 7 – Effluent Sewer Hydraulic Estimates

Zone	Avg Day (gpd)	Max Month (gpd)	Max Day (gpd)	Peak Hour (gpm)	Peak Hour Factor
#1	46,781	53,798	65,493		
#2	11,600	13,340	16,240		
#3	9,200	10,580	12,880		
#4	8,600	9,890	12,040		
#5	5,200	5,980	7,280		
#6	14,800	17,020	20,720		

Table 8 – Effluent Sewer Collection Wastewater Constituent Estimates

Contaminant	Typical Composition	Design Values
Total Suspended Solids (TSS)	40 to 50 mg/L	40 mg/L
BODs at 20°C	110 to 220 mg/L	150 mg/L
Nitrogen (total as N)	40 to 70 mg/L	65 mg/L
Phosphorous (total as P)	8 to 12 mg/L	8 mg/L

Wastewater Treatment Facility Hydraulic Load Estimates

The design flows for the collection system within the identified zones will be based on population estimates and commercial establishment water records. Flow estimates are based on 180 gpd per equivalent dwelling unit (EDU).

Table 9 – Collection Hydraulic Load Estimates

Option	Avg Day (gpd)	Max Month (gpd)	Max Day (gpd)
A	96,181	110,608	134,653
B	96,181	110,608	134,653
C	81,381	93,588	113,933
D	81,381	93,588	113,933

Table 10 – Alternative Option Constituent Estimates

Option	Avg BOD (mg/L)	Avg TSS (mg/L)	Avg TKN (mg/L)
A	183	271	71
B	150	40	65
C	209	293	72
D	150	40	65

The type of wastewater collection system also influences primary and biosolid accumulation and management requirements at treatment facilities. Effluent sewers, when paired with MBRs, reduce the overall volume of primary solids and waste-activated sludge generated by up to 75%. With the trend for more stringent regulations governing the disposal of solids, design options that reduce the overall amount of solids warrant close attention. The reduction of solids management requirements at the treatment facility also correlates to additional overall project savings, estimated to be roughly 2.5% of the centralized treatment facility capital cost (potentially around $500,000).

Additionally, there may be hydraulic and organic loading benefits in sizing and capital cost for treatment capacity. Solids within the effluent sewer collection system will be removed on an estimated frequency of 5-10 years and will need to be handled by an appropriate solids handling facility.

SUMMARY

Based on the analysis above and attached estimated construction cost for each option, the lowest capital options include the differed costs with the use of advanced onsite alternatives in zone 6. The reduced impact from the organic load is utilizing and Effluent Sewer 82%, and the reduced impact from the suspended solids load is 85%. Effluent sewers also allow for a reduction in biosolids handling costs and eliminate sewer line cleaning, however they do require annual onsite visits for maintenance and infrequent solids pumping and hauling.

Preliminary Cost Summary

Small communities face enormous challenges when constructing and maintaining wastewater infrastructure. Conventional collection system technologies — when applied to small, rural communities — typically result in costs that exceed affordability thresholds and ultimately require grant subsidies to attain reasonable user rates.

Table 11 – Estimated Options Costs

Option	Overhead and Construction ($US)	Gravity Sewer Construction ($US)	Effluent Sewer Construction ($US)	Collection Contingency Costs	Advanced Onsite Construction ($US)	Engineering Costs ($US)	Costs Provided by District ($US)
A	$2,830,000	$6,777,000	$3,969,000	$4,072,800	$0	$5,294,640	$2,760,000
B	$2,830,000	$0	$8,756,800	$3,422,040	$0	$4,488,652	$2,360,000
C	$2,830,000	$6,777,000	$2,553,000	$3,648,000	$6,734,000	$4,742,400	$2,760,000
D	$2,830,000	$0	$7,160,800	$2,997,240	$6,734,000	$3,896,412	$2,360,000

Table 12 – Estimated Total Cost

Option	Collection System Subtotal ($US)	Advanced Onsite Subtotal ($US)
A	$25,703,440	$0
B	$21,637,492	$0
C	$23,310,400	$6,734,000
D	$19,244,452	$6,734,000

Alternative collection systems were developed and designed to avoid the shortcomings associated with applying gravity sewers to small communities. Effluent sewer systems are largely immune to extraneous flows, resulting in a major cost savings, both capital and electrical, at the WWTP. Effluent sewer systems, by design, also enable simpler operations, less expensive operational equipment, and less reactive maintenance with respect to immediate response time relative to individual onsite problems versus gravity or lift station problems.

Los Olivos Wastewater Collection Option A - Gravity Collection Zone 1 & 2, Effluent Sewer Zones 3-6

Item	Description	Unit	Quantity	Unit Price	Total Cost	Responsible Lead	Notes
Overhead and Construction Support							
1	Mobilization, Demobilization, Road Permits, Bonds, & Insurance	LS	1	$ 2,000,000	$ 2,000,000	Unknown	Stantec Report
2	Construction Survey	LS	1	$ 250,000	$ 250,000	Unknown	Stantec Report
3	Pothole Existing Utilities	LS	1	$ 250,000	$ 250,000	Unknown	Stantec Report
4	Traffic Control	LS	1	$ 330,000	$ 330,000	Unknown	Should be unnecessasary for Effluent zones with boring
	Overhead and Construction Support Services Subtotal:				**$ 2,830,000**		
Gravity Collection System Construction							
Zone 1							
5	6-inch PVC Sewer Main (<15 ft cover)	LF	8000	$ 180	$ 1,440,000	Unknown	Stantec Report
6	8-inch PVC Sewer Main (<15 ft cover)	LF	4000	$ 240	$ 960,000	Unknown	Stantec Report
7	48-inch Standard Manhole	EA	30	$ 17,500	$ 525,000	Unknown	Stantec Report
8	Service Connection	EA	149	$ 12,000	$ 1,788,000	Unknown	4 in service connection (<14 ft) @ 50', landscape repair
	Zone 1 Construction Subtotal:				$ 4,713,000		
Zone 2							
9	6-inch PVC Sewer Main (<15 ft cover)	LF	900	$ 180	$ 162,000	Unknown	Stantec Report
10	8-inch PVC Sewer Main (<15 ft cover)	LF	400	$ 240	$ 96,000	Unknown	Stantec Report
11	48-inch Standard Manhole	EA	8	$ 17,500	$ 140,000	Unknown	Stantec Report
12	48-inch Drop Manhole	EA	2	$ 20,000	$ 40,000	Unknown	Stantec Report
13	Service Connection	EA	58	$ 12,000	$ 696,000	Unknown	4 in service connection (<14 ft) @ 50', landscape repair
14	Lift Station (duplex pumps, 350 gpm each, 25 HP each, 25 ft deep, 8 ft diameter, site gate, fence, electrical, SCE meter, backup power)	LS	1	$ 600,000	$ 600,000	Unknown	Stantec Report
15	4-inch PVC Sewer Forcemain (5 ft cover, separate trench)	LF	3,000	$ 110	$ 330,000	Unknown	Stantec Report
	Zone 2 Construction Subtotal:				$ 2,064,000		
	Gravity Collection Subtotal:				**$ 6,777,000**		
Effluent Sewer Collection System Construction							
Zone 3							
16	2-inch PVC Sewer Main (<4 ft cover)	LF	2400	$ 51	$ 122,400	Unknown	Direct boring estimate (Ventura Drilling)
17	3-inch PVC Sewer Main (<4 ft cover)	LF	2000	$ 54	$ 108,000	Unknown	Direct boring estimate (Ventura Drilling)
18	4-inch VC Sewer Main (<4 ft cover)	LF	0	$ 63	$ -	Unknown	Direct boring estimate (Ventura Drilling)
19	Primary Treatment Tanks	EA	46	$ 15,000	$ 690,000	Unknown	Primary tank, service connection, repair (Biosolutions)
	Zone 3 Construction Subtotal:				$ 920,400		
Zone 4							
20	2-inch PVC Sewer Main (<4 ft cover)	LF	2800	$ 51	$ 142,800	Unknown	Direct boring estimate (Ventura Drilling)
21	3-inch PVC Sewer Main (<4 ft cover)	LF	1250	$ 54	$ 67,500	Unknown	Direct boring estimate (Ventura Drilling)
22	4-inch VC Sewer Main (<4 ft cover)	LF	1500	$ 63	$ 94,500	Unknown	Direct boring estimate (Ventura Drilling)
23	Primary Treatment Tanks	EA	43	$ 15,000	$ 645,000	Unknown	Primary tank, service connection, repair (Biosolutions)
	Zone 4 Construction Subtotal:				$ 949,800		
Zone 5							
24	2-inch PVC Sewer Main (<4 ft cover)	LF	1400	$ 51	$ 71,400	Unknown	Direct boring estimate (Ventura Drilling)
25	3-inch PVC Sewer Main (<4 ft cover)	LF	600	$ 54	$ 32,400	Unknown	Direct boring estimate (Ventura Drilling)
26	4-inch VC Sewer Main (<4 ft cover)	LF	3000	$ 63	$ 189,000	Unknown	Direct boring estimate (Ventura Drilling)
27	Primary Treatment Tanks	Each	26	$ 15,000	$ 390,000	Unknown	Primary tank, service connection, repair (Biosolutions)
	Zone 5 Construction Subtotal:				$ 682,800		
Zone 6							
28	2-inch PVC Sewer Main (<4 ft cover)	LF	6000	$ 51	$ 306,000	Unknown	Direct boring estimate (Ventura Drilling)
29	3-inch PVC Sewer Main (<4 ft cover)	LF	0	$ 54	$ -	Unknown	Direct boring estimate (Ventura Drilling)
30	4-inch VC Sewer Main (<4 ft cover)	LF	0	$ 63	$ -	Unknown	Direct boring estimate (Ventura Drilling)
31	Primary Treatment Tanks	Each	74	$ 15,000	$ 1,110,000	Unknown	Primary tank, service connection, repair (Biosolutions)
	Zone 6 Construction Subtotal:				$ 1,416,000		
	Effluent Collection Subtotal:				**$ 3,969,000**		
	Collection Construction Subtotal:				**$ 13,576,000**		
32	Construction Contingency (30%)				$ 4,072,800		
	Collection Construction & Contingency Total				**$ 17,648,800**		
Engineering & Construction Management							
33	Final Design Engineering & Support	LS	1	$ 2,647,320	$ 2,647,320	Unknown	Assume 15% of construction
34	Construction Management and Inspections	LS	1	$ 2,647,320	$ 2,647,320	Unknown	Assume 15% of construction
	Engineering & Construction Management Subtotal:				**$ 5,294,640**		
	Option #1 Collection System Total:				**$ 22,943,440**		
Costs to be Provided by District							
35	Legal and Administration	LS	1	$ 250,000	$ 250,000	District	Assumed
36	Property Acquisition for Lift Station	AC	0.4	$ 1,000,000	$ 400,000	District	Assume $1M/Acre, 0.4 acres assumed
37	Property Acquisition for Easements	AC	2.11	$ 1,000,000	$ 2,110,000	District	Assume $1M/Acre, placeholder to match Stantec Estimate
	District Costs Subtotal:				**$ 2,760,000**		
Option #1 Collection System Total Costs:					**$ 25,703,440**		

Los Olivos Wastewater Collection Option B - Effluent Sewer Zones 1-6

Item	Description	Unit	Quantity	Unit Price	Total Cost	Responsible Lead	Notes
Overhead and Construction Support							
1	Mobilization, Demobilization, Road Permits, Bonds, & Insurance	LS	1	$ 2,000,000	$ 2,000,000	Unknown	Stantec Report
2	Construction Survey	LS	1	$ 250,000	$ 250,000	Unknown	Stantec Report
3	Pothole Existing Utilities	LS	1	$ 250,000	$ 250,000	Unknown	Stantec Report
4	Traffic Control	LS	1	$ 330,000	$ 330,000	Unknown	Should be unnecessasary for Effluent zones with boring
	Overhead and Construction Support Services Subtotal:				**$ 2,830,000**		
Effluent Sewer Collection System Construction							
Zone 1							
5	2-inch PVC Sewer Main (<4 ft cover)	LF	0	$ 51	$ -	Unknown	Direct boring estimate
6	3-inch PVC Sewer Main (<4 ft cover)	LF	8000	$ 54	$ 432,000	Unknown	Direct boring estimate
7	4-inch PVC Sewer Main (<4 ft cover)	LF	4000	$ 63	$ 252,000	Unknown	Direct boring estimate
8	Primary Treatment Tanks	Each	149	$ 20,000	$ 2,980,000	Unknown	Primary tank, service connection, landscape repair
	Zone 1 Construction Subtotal:				$ 3,664,000		
Zone 2							
9	2-inch PVC Sewer Main (<4 ft cover)	LF	0	$ 51	$ -	Unknown	Direct boring estimate
10	3-inch PVC Sewer Main (<4 ft cover)	LF	900	$ 54	$ 48,600	Unknown	Direct boring estimate
11	4-inch PVC Sewer Main (<4 ft cover)	LF	400	$ 63	$ 25,200	Unknown	Direct boring estimate
12	Primary Treatment Tanks	Each	58	$ 15,000	$ 870,000	Unknown	Primary tank, service connection, landscape repair
	Zone 2 Construction Subtotal:				$ 943,800		
Zone 3							
13	2-inch PVC Sewer Main (<4 ft cover)	LF	2400	$ 51	$ 122,400	Unknown	Direct boring estimate
14	3-inch PVC Sewer Main (<4 ft cover)	LF	2000	$ 54	$ 108,000	Unknown	Direct boring estimate
15	4-inch PVC Sewer Main (<4 ft cover)	LF	0	$ 63	$ -	Unknown	Direct boring estimate
16	Primary Treatment Tanks	Each	46	$ 15,000	$ 690,000	Unknown	Primary tank, service connection, landscape repair
	Zone 3 Construction Subtotal:				$ 920,400		
Zone 4							
17	2-inch PVC Sewer Main (<4 ft cover)	LF	2800	$ 51	$ 142,800	Unknown	Direct boring estimate (Ventura Drilling)
18	3-inch PVC Sewer Main (<4 ft cover)	LF	1250	$ 54	$ 67,500	Unknown	Direct boring estimate (Ventura Drilling)
19	4-inch PVC Sewer Main (<4 ft cover)	LF	1500	$ 63	$ 94,500	Unknown	Direct boring estimate (Ventura Drilling)
20	Primary Treatment Tanks	Each	43	$ 15,000	$ 645,000	Unknown	Primary tank, service connection, repair (Biosolutions)
	Zone 4 Construction Subtotal:				$ 949,800		
Zone 5							
21	2-inch PVC Sewer Main (<4 ft cover)	LF	1400	$ 51	$ 71,400	Unknown	Direct boring estimate (Ventura Drilling)
22	3-inch PVC Sewer Main (<4 ft cover)	LF	600	$ 54	$ 32,400	Unknown	Direct boring estimate (Ventura Drilling)
23	4-inch PVC Sewer Main (<4 ft cover)	LF	3000	$ 63	$ 189,000	Unknown	Direct boring estimate (Ventura Drilling)
24	Primary Treatment Tanks	Each	26	$ 15,000	$ 390,000	Unknown	Primary tank, service connection, repair (Biosolutions)
	Zone 5 Construction Subtotal:				$ 682,800		
Zone 6							
25	2-inch PVC Sewer Main (<4 ft cover)	LF	6000	$ 51	$ 306,000	Unknown	Direct boring estimate (Ventura Drilling)
26	3-inch PVC Sewer Main (<4 ft cover)	LF	0	$ 54	$ -	Unknown	Direct boring estimate (Ventura Drilling)
27	4-inch PVC Sewer Main (<4 ft cover)	LF	0	$ 63	$ -	Unknown	Direct boring estimate (Ventura Drilling)
28	Primary Treatment Tanks	Each	74	$ 15,000	$ 1,110,000	Unknown	Primary tank, service connection, repair (Biosolutions)
	Zone 6 Construction Subtotal:				$ 1,416,000		
	Effluent Collection Subtotal:				**$ 8,576,800**		
	Collection Construction Subtotal:				**$ 11,406,800**		
29	Construction Contingency (30%)				$ 3,422,040		
	Collection Construction & Contingency Total				**$ 14,828,840**		
Engineering & Construction Management							
30	Final Design Engineering & Support	LS	1	$ 2,224,326	$ 2,224,326	Unknown	Assume 15% of construction
31	Construction Management and Inspections	LS	1	$ 2,224,326	$ 2,224,326	Unknown	Assume 15% of construction
	Engineering & Construction Management Subtotal:				**$ 4,448,652**		
	Option #2 Collection System Total:				**$ 19,277,492**		
Costs to be Provided by District							
32	Legal and Administration	LS	1	$ 250,000	$ 250,000	District	Assume
33	Property Acquisition for Lift Station	AC	0	$ -	$ -	District	Assume $1M/Acre, Not needed with option #2
34	Property Acquisition for Easements	AC	2.11	$ 1,000,000	$ 2,110,000	District	Assume $1M/Acre, placeholder to match Stantec Estimate
	District Costs Subtotal:				**$ 2,360,000**		
Option #2 Collection System Total Costs:					**$ 21,637,492**		

Los Olivos Wastewater Collection Option C - Gravity Collection Zone 1 & 2, Effluent Sewer Zones 3-5, Alt Onsite Zone 6

Item	Description	Unit	Quantity	Unit Price	Total Cost	Responsible Lead	Notes
Overhead and Construction Support							
1	Mobilization, Demobilization, Road Permits, Bonds, & Insurance	LS	1	$ 2,000,000	$ 2,000,000	Unknown	Stantec Report
2	Construction Survey	LS	1	$ 250,000	$ 250,000	Unknown	Stantec Report
3	Pothole Existing Utilities	LS	1	$ 250,000	$ 250,000	Unknown	Stantec Report
4	Traffic Control	LS	1	$ 330,000	$ 330,000	Unknown	Should be unnecessasary for Effluent zones with boring
	Overhead and Construction Support Services Subtotal:				**$ 2,830,000**		
Gravity Collection System Construction							
Zone 1							
5	6-inch PVC Sewer Main (<15 ft cover)	LF	8000	$ 180	$ 1,440,000	Unknown	Stantec Report
6	8-inch PVC Sewer Main (<15 ft cover)	LF	4000	$ 240	$ 960,000	Unknown	Stantec Report
7	48-inch Standard Manhole	EA	30	$ 17,500	$ 525,000	Unknown	Stantec Report
8	Service Connection	EA	149	$ 12,000	$ 1,788,000	Unknown	4 in service connection (<14 ft) @ 50', landscape repair
	Zone 1 Construction Subtotal:				$ 4,713,000		
Zone 2							
9	6-inch PVC Sewer Main (<15 ft cover)	LF	900	$ 180	$ 162,000	Unknown	Stantec Report
10	8-inch PVC Sewer Main (<15 ft cover)	LF	400	$ 240	$ 96,000	Unknown	Stantec Report
11	48-inch Standard Manhole	EA	8	$ 17,500	$ 140,000	Unknown	Stantec Report
12	48-inch Drop Manhole	EA	2	$ 20,000	$ 40,000	Unknown	Stantec Report
13	Service Connection	EA	58	$ 12,000	$ 696,000	Unknown	4 in service connection (<14 ft) @ 50', landscape repair
14	Lift Station (duplex pumps, 350 gpm each, 25 HP each, 25 ft deep, 8 ft diameter, site gate, fence, electrical, SCE meter, backup power)	LS	1	$ 600,000	$ 600,000	Unknown	Stantec Report
15	4-inch PVC Sewer Forcemain (5 ft cover, separate trench)	LF	3,000	$ 110	$ 330,000	Unknown	Stantec Report
	Zone 2 Construction Subtotal:				$ 2,064,000		
	Gravity Collection Subtotal:				**$ 6,777,000**		
Effluent Sewer Collection System Construction							
Zone 3							
16	2-inch PVC Sewer Main (<4 ft cover)	LF	2400	$ 51	$ 122,400	Unknown	Direct boring estimate (Ventura Drilling)
17	3-inch PVC Sewer Main (<4 ft cover)	LF	2000	$ 54	$ 108,000	Unknown	Direct boring estimate (Ventura Drilling)
18	4-inch VC Sewer Main (<4 ft cover)	LF	0	$ 63	$ -	Unknown	Direct boring estimate (Ventura Drilling)
19	Primary Treatment Tanks	Each	46	$ 15,000	$ 690,000	Unknown	Primary tank, service connection, repair (Biosolutions)
	Zone 3 Construction Subtotal:				$ 920,400		
Zone 4							
20	2-inch PVC Sewer Main (<4 ft cover)	LF	2800	$ 51	$ 142,800	Unknown	Direct boring estimate (Ventura Drilling)
21	3-inch PVC Sewer Main (<4 ft cover)	LF	1250	$ 54	$ 67,500	Unknown	Direct boring estimate (Ventura Drilling)
22	4-inch VC Sewer Main (<4 ft cover)	LF	1500	$ 63	$ 94,500	Unknown	Direct boring estimate (Ventura Drilling)
23	Primary Treatment Tanks	Each	43	$ 15,000	$ 645,000	Unknown	Primary tank, service connection, repair (Biosolutions)
	Zone 4 Construction Subtotal:				$ 949,800		
Zone 5							
24	2-inch PVC Sewer Main (<4 ft cover)	LF	1400	$ 51	$ 71,400	Unknown	Direct boring estimate (Ventura Drilling)
25	3-inch PVC Sewer Main (<4 ft cover)	LF	600	$ 54	$ 32,400	Unknown	Direct boring estimate (Ventura Drilling)
26	4-inch VC Sewer Main (<4 ft cover)	LF	3000	$ 63	$ 189,000	Unknown	Direct boring estimate (Ventura Drilling)
27	Primary Treatment Tanks	Each	26	$ 15,000	$ 390,000	Unknown	Primary tank, service connection, repair (Biosolutions)
	Zone 5 Construction Subtotal:				$ 682,800		
	Effluent Collection Subtotal:				**$ 2,553,000**		
	Collection Construction Subtotal:				**$ 12,160,000**		
28	Construction Contingency (30%)				$ 3,648,000		
	Collection Construction & Contingency Total				**$ 15,808,000**		
Zone 6							
29	Individual Advanced Onsite Systems	LF	74	$ 70,000	$ 5,180,000	Unknown	Assumed TN requirement of 20 mg/L
	Zone 6 Construction Subtotal:				$ 5,180,000		
	Advanced Onsite Systems Subtotal:				**$ 5,180,000**		
30	Construction Contingency (30%)				$ 1,554,000		
	Advanced Onsite Collection Construction Total				**$ 6,734,000**		
Engineering & Construction Management							
30	Final Design Engineering & Support	LS	1	$ 2,371,200	$ 2,371,200	Unknown	Assume 15% of construction (Advanced Onsite Not Included)
31	Construction Management and Inspections	LS	1	$ 2,371,200	$ 2,371,200	Unknown	Assume 15% of construction (Advanced Onsite Not Included)
	Engineering & Construction Management Subtotal:				**$ 4,742,400**		
	Option #3 Collection & Advanced Onsite System Total:				**$ 27,284,400**		
Costs to be Provided by District							
32	Legal and Administration	LS	1	$ 250,000	$ 250,000	District	Assumed
33	Property Acquisition for Lift Station	AC	0.4	$ 1,000,000	$ 400,000	District	Assume $1M/Acre, 0.4 acres assumed
34	Property Acquisition for Easements	AC	2.11	$ 1,000,000	$ 2,110,000	District	Assume $1M/Acre, placeholder to match Stantec Estimate
	District Costs Subtotal:				**$ 2,760,000**		
Option #3 Gravity & Effluent Collection Systems Total Costs:					**$ 23,310,400**		
Option #3 Collection & Advanced Onsite Systems Total Costs:					**$ 30,044,400**		

Los Olivos Wastewater Collection Option D - Effluent Sewer Zones 1-5, Alt Onsite Zone 6

Item	Description	Unit	Quantity	Unit Price	Total Cost	Responsible Lead	Notes
Overhead and Construction Support							
1	Mobilization, Demobilization, Road Permits, Bonds, & Insurance	LS	1	$ 2,000,000	$ 2,000,000	Unknown	Stantec Report
2	Construction Survey	LS	1	$ 250,000	$ 250,000	Unknown	Stantec Report
3	Pothole Existing Utilities	LS	1	$ 250,000	$ 250,000	Unknown	Stantec Report
4	Traffic Control	LS	1	$ 330,000	$ 330,000	Unknown	Should be unnecessasary for Effluent zones with boring
	Overhead and Construction Support Services Subtotal:				**$ 2,830,000**		
Effluent Sewer Collection System Construction							
Zone 1							
5	2-inch PVC Sewer Main (<4 ft cover)	LF	0	$ 51	$ -	Unknown	Direct boring estimate
6	3-inch PVC Sewer Main (<4 ft cover)	LF	8000	$ 54	$ 432,000	Unknown	Direct boring estimate
7	4-inch VC Sewer Main (<4 ft cover)	LF	4000	$ 63	$ 252,000	Unknown	Direct boring estimate
8	Primary Treatment Tanks	Each	149	$ 20,000	$ 2,980,000	Unknown	Primary tank, service connection, landscape repair
	Zone 1 Construction Subtotal:				$ 3,664,000		
Zone 2							
9	2-inch PVC Sewer Main (<4 ft cover)	LF	0	$ 51	$ -	Unknown	Direct boring estimate
10	3-inch PVC Sewer Main (<4 ft cover)	LF	900	$ 54	$ 48,600	Unknown	Direct boring estimate
11	4-inch VC Sewer Main (<4 ft cover)	LF	400	$ 63	$ 25,200	Unknown	Direct boring estimate
12	Primary Treatment Tanks	Each	58	$ 15,000	$ 870,000	Unknown	Primary tank, service connection, landscape repair
	Zone 2 Construction Subtotal:				$ 943,800		
Zone 3							
13	2-inch PVC Sewer Main (<4 ft cover)	LF	2400	$ 51	$ 122,400	Unknown	Direct boring estimate
14	3-inch PVC Sewer Main (<4 ft cover)	LF	2000	$ 54	$ 108,000	Unknown	Direct boring estimate
15	4-inch VC Sewer Main (<4 ft cover)	LF	0	$ 63	$ -	Unknown	Direct boring estimate
16	Primary Treatment Tanks	Each	46	$ 15,000	$ 690,000	Unknown	Primary tank, service connection, landscape repair
	Zone 3 Construction Subtotal:				$ 920,400		
Zone 4							
17	2-inch PVC Sewer Main (<4 ft cover)	LF	2800	$ 51	$ 142,800	Unknown	Direct boring estimate
18	3-inch PVC Sewer Main (<4 ft cover)	LF	1250	$ 54	$ 67,500	Unknown	Direct boring estimate
19	4-inch VC Sewer Main (<4 ft cover)	LF	1500	$ 63	$ 94,500	Unknown	Direct boring estimate
20	Primary Treatment Tanks	Each	43	$ 15,000	$ 645,000	Unknown	Primary tank, service connection, landscape repair
	Zone 4 Construction Subtotal:				$ 949,800		
Zone 5							
21	2-inch PVC Sewer Main (<4 ft cover)	LF	1400	$ 51	$ 71,400	Unknown	Direct boring estimate
22	3-inch PVC Sewer Main (<4 ft cover)	LF	600	$ 54	$ 32,400	Unknown	Direct boring estimate
23	4-inch VC Sewer Main (<4 ft cover)	LF	3000	$ 63	$ 189,000	Unknown	Direct boring estimate
24	Primary Treatment Tanks	Each	26	$ 15,000	$ 390,000	Unknown	Primary tank, service connection, landscape repair
	Zone 5 Construction Subtotal:				$ 682,800		
	Effluent Collection Subtotal:				**$ 7,160,800**		
	Collection Construction Subtotal:				**$ 9,990,800**		
25	Construction Contingency (30%)				$ 2,997,240		
	Collection Construction & Contingency Total				**$ 12,988,040**		
Zone 6							
26	Individual Advanced Onsite Systems	LF	74	$ 70,000	$ 5,180,000	Unknown	Assumed TN requirement of 20 mg/L
	Zone 6 Construction Subtotal:				$ 5,180,000		
	Advanced Onsite Systems Subtotal:				**$ 5,180,000**		
27	Construction Contingency (30%)				$ 1,554,000		
	Advanced Onsite Construction Total				**$ 6,734,000**		
Engineering & Construction Management							
28	Final Design Engineering & Support	LS	1	$ 1,948,206	$ 1,948,206	Unknown	Assume 15% of construction (Advanced Onsite Not Included)
29	Construction Management and Inspections	LS	1	$ 1,948,206	$ 1,948,206	Unknown	Assume 15% of construction (Advanced Onsite Not Included)
	Engineering & Construction Management Subtotal:				**$ 3,896,412**		
	Option #4 Collection & Advanced Onsite System Total:				**$ 23,618,452**		
Costs to be Provided by District							
30	Legal and Administration	LS	1	$ 250,000	$ 250,000	District	Assumed
31	Property Acquisition for Lift Station	AC	0.4	$ -	$ -	District	Assume $1M/Acre, Not needed option #4
32	Property Acquisition for Easements	AC	2.11	$ 1,000,000	$ 2,110,000	District	Assume $1M/Acre, placeholder to match Stantec Estimate
	District Costs Subtotal:				**$ 2,360,000**		
Option #4 Effluent Sewer Collection Total Costs:					**$ 19,244,452**		
Option #4 Effluent Sewer Collection & Advanced Onsite Total Costs:					**$ 25,978,452**		