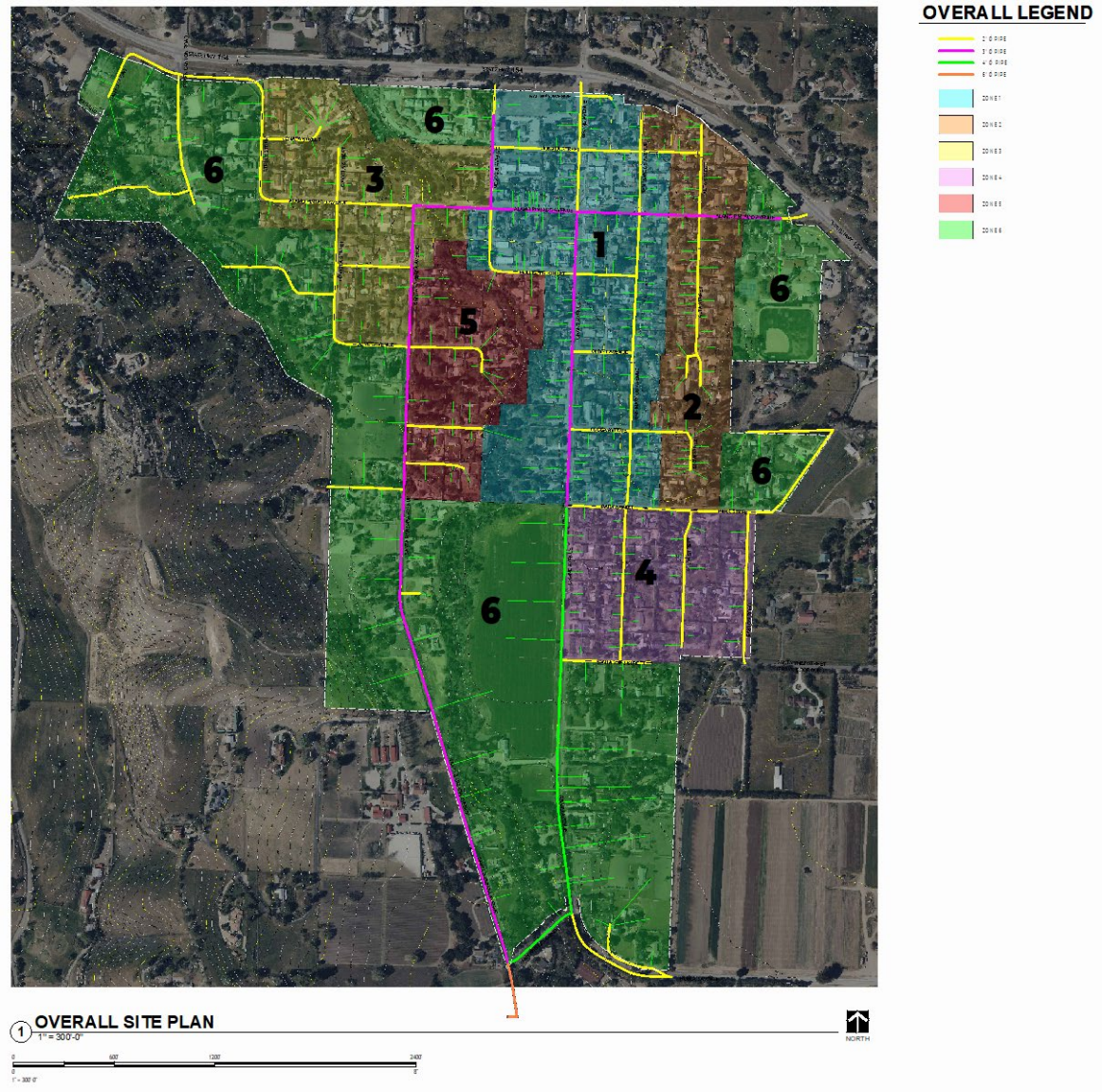
LOS OLIVOS WASTEWATER COLLECTION ANALYSIS
30% DESIGN

May 15, 2024

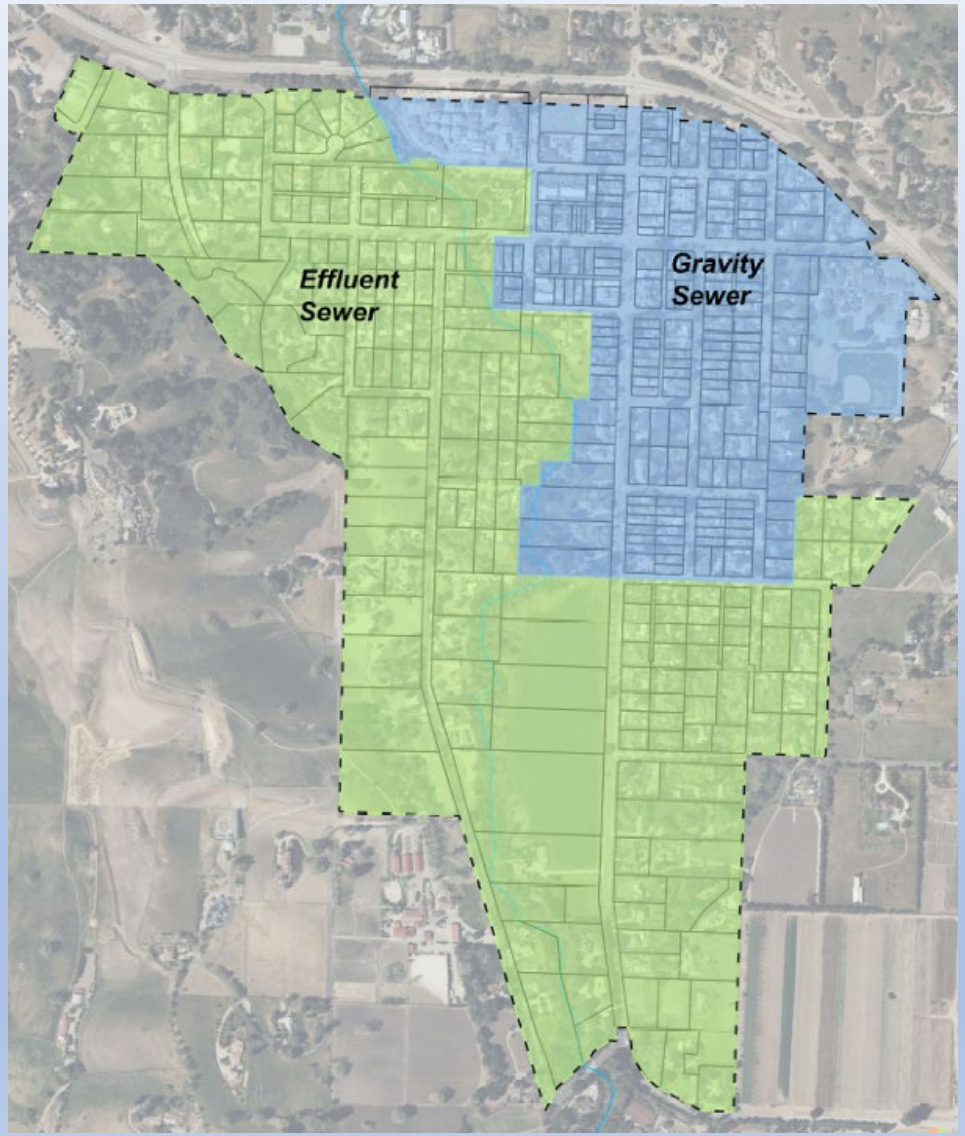
LOCSD & Regen Project Objectives

- Evaluate collection system alternative configurations based on approved zone map
- Consider the use of gravity sewers in downtown core, effluent sewers (STEP sewers), and advanced onsite alternatives for larger lots
- Consider capital costs for various alternative configurations
- Consider impacts to treatment works with various alternative configurations
- Consider viability of various alternatives
- Develop 30% design documents to accompany evaluation

LOCSD Zone Map

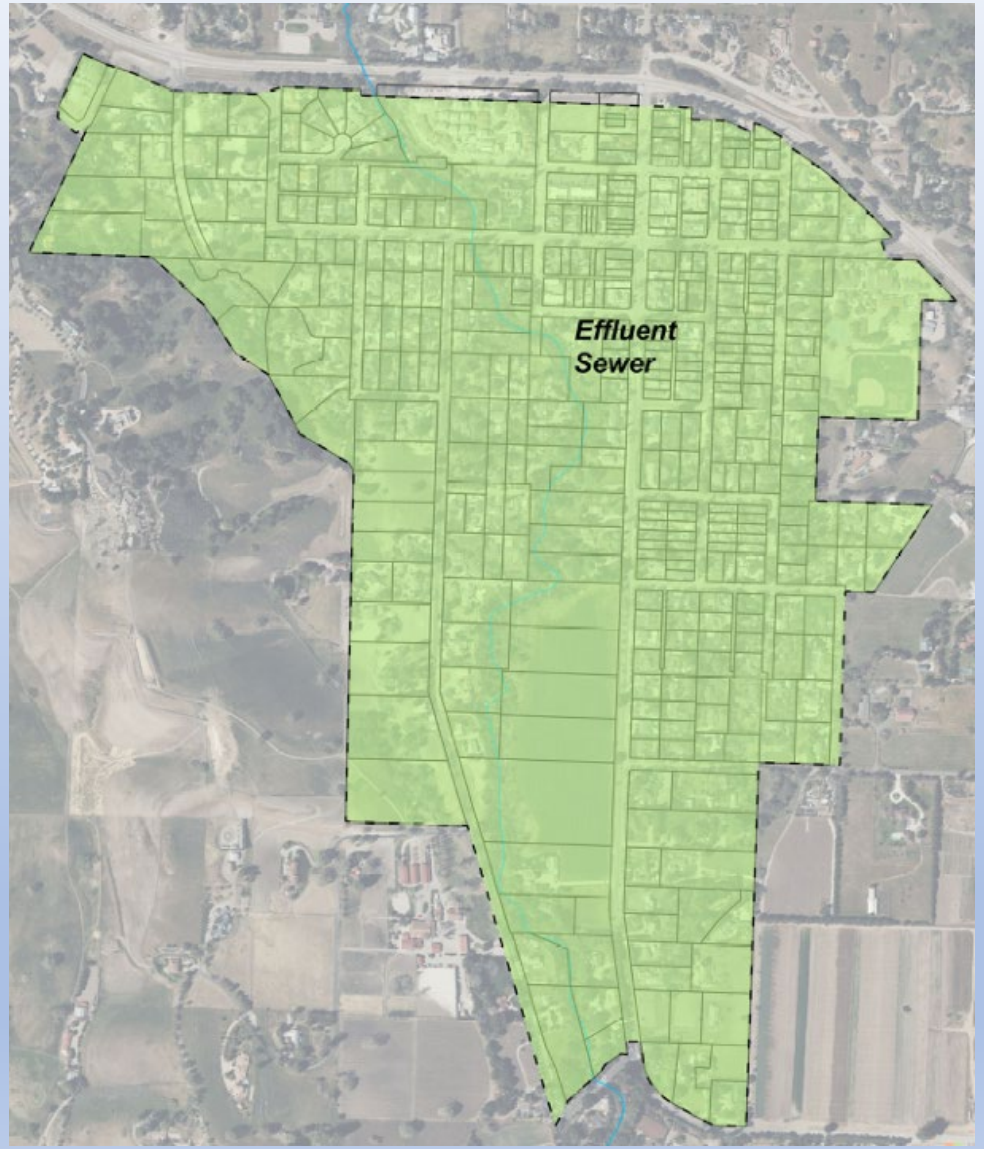


LOCSD Wastewater Collection Option A

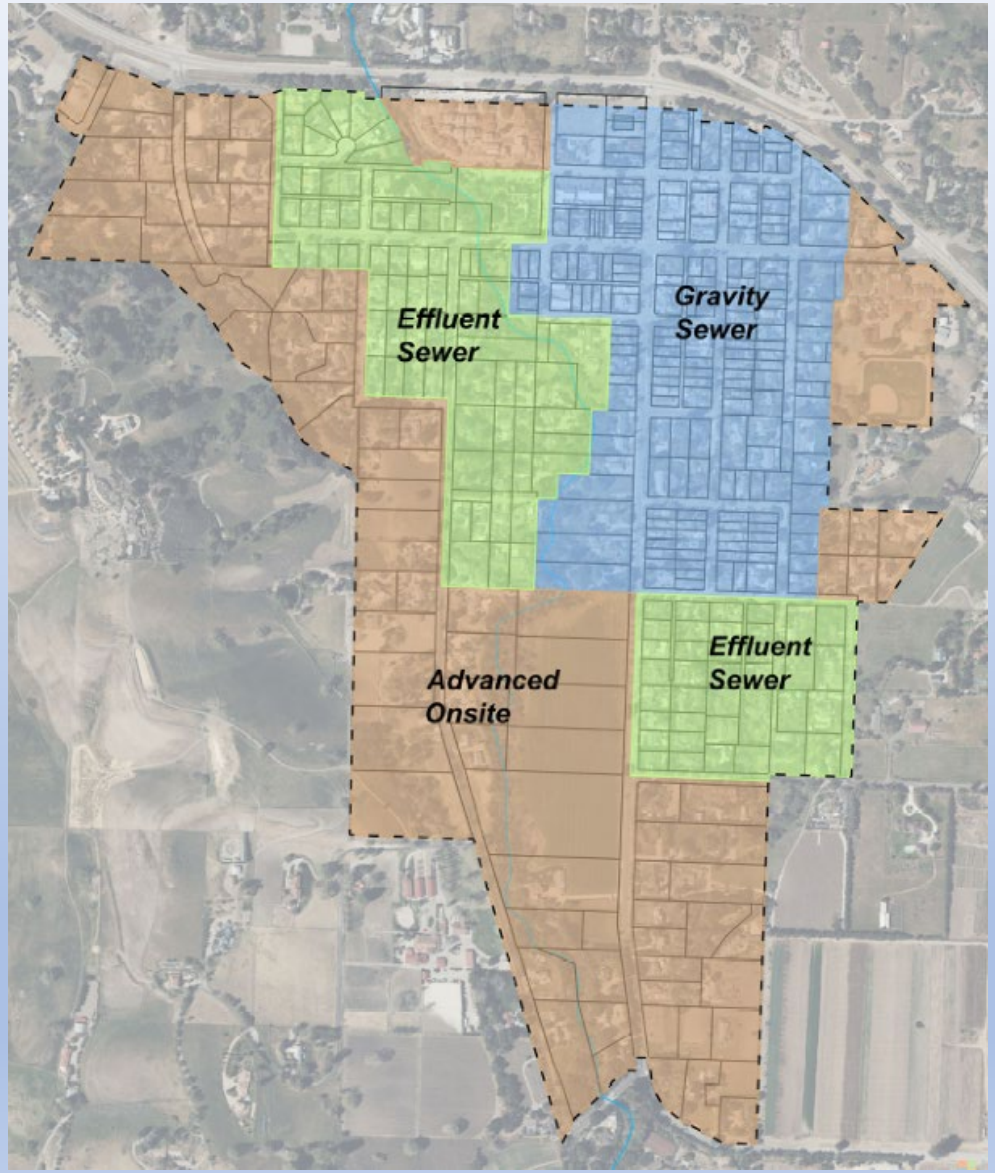


LOCSD Wastewater Collection Analysis

LOCSD Wastewater Collection Option B

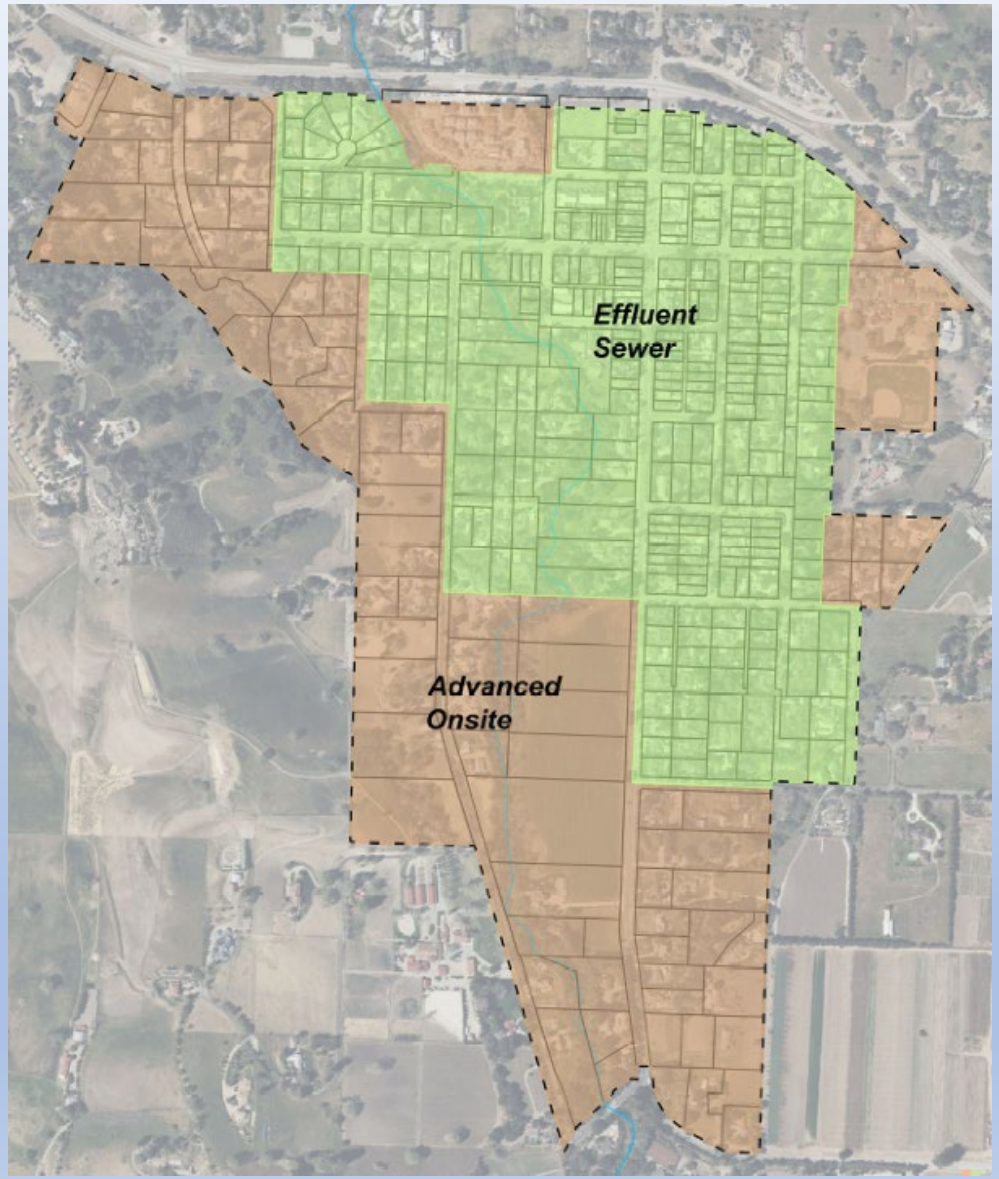


LOCSD Wastewater Collection Option C



LOCSD Wastewater Collection Analysis

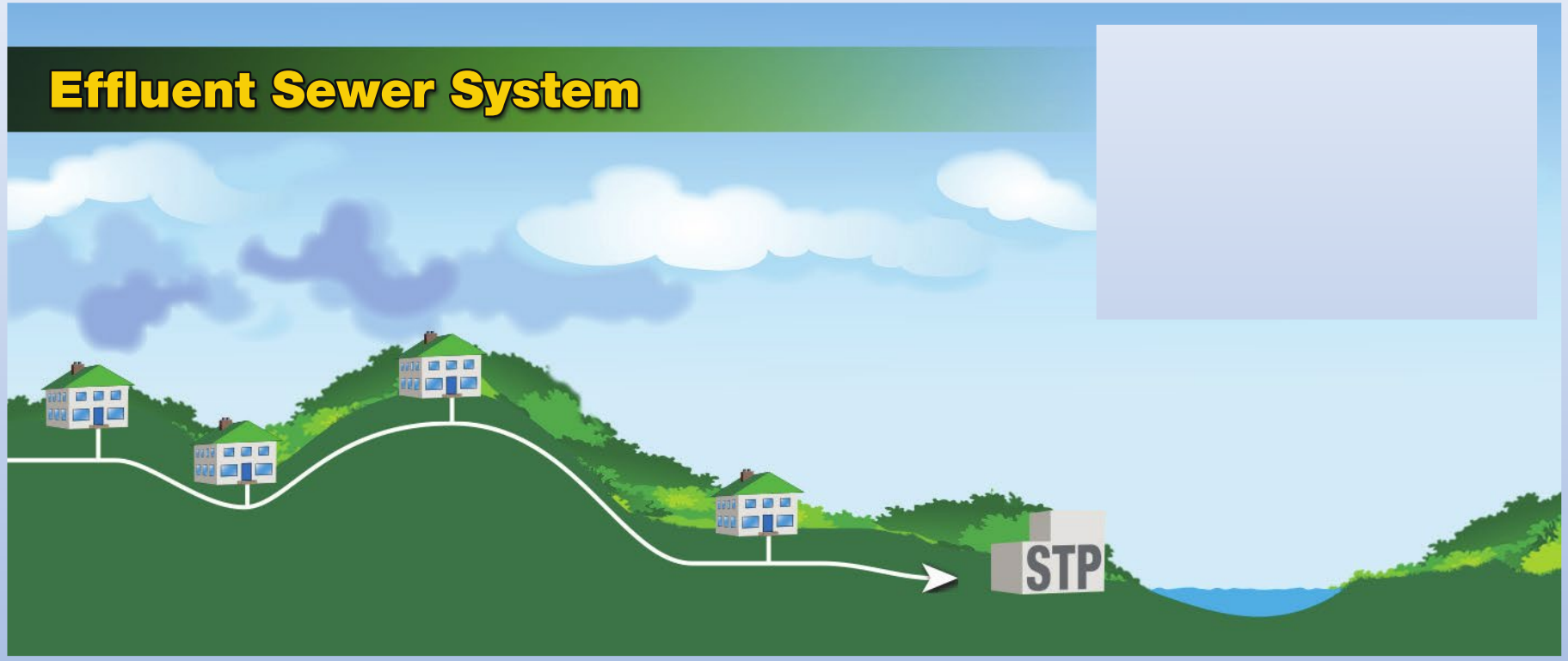
LOCSD Wastewater Collection Option D



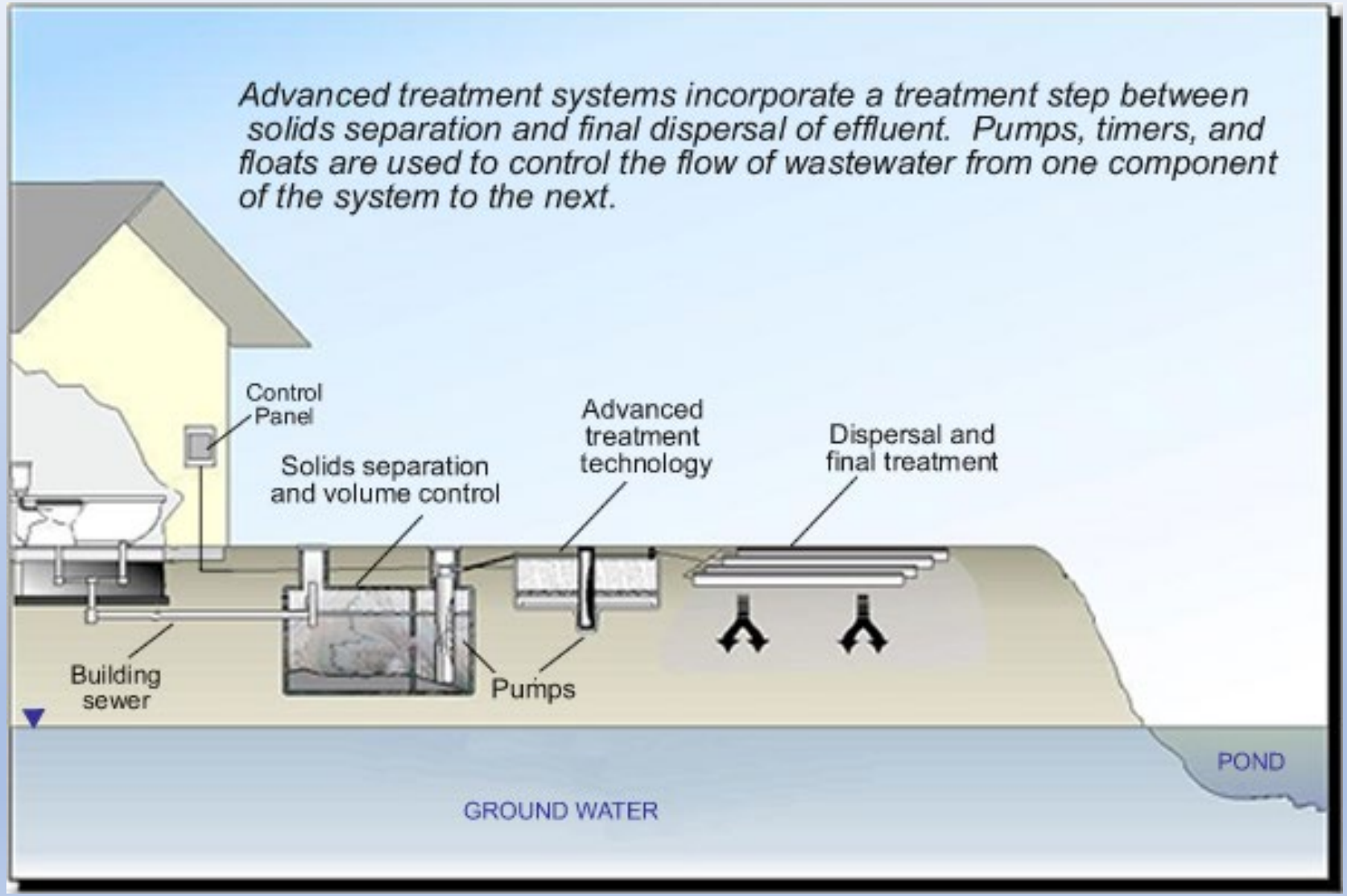
LOCSD Wastewater Collection Analysis

Wastewater Collection Alternatives – Gravity Sewer

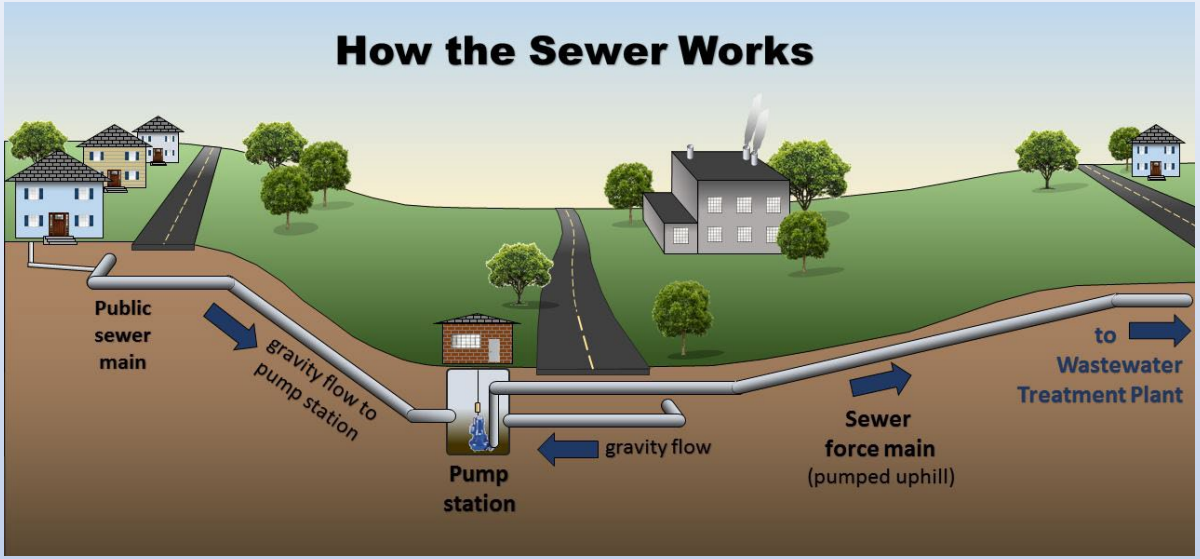
Wastewater Collection Alternatives – Effluent Sewer (STEP)



Wastewater Onsite (on-lot) Alternatives – Advanced Onsite Treatment and Dispersal - Example

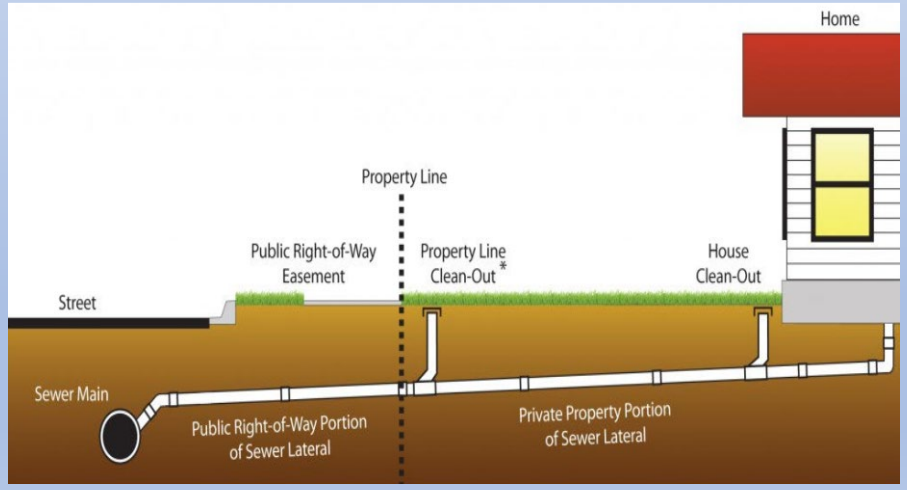


Wastewater Collection Alternatives – Gravity Sewer Components



Mainline Components

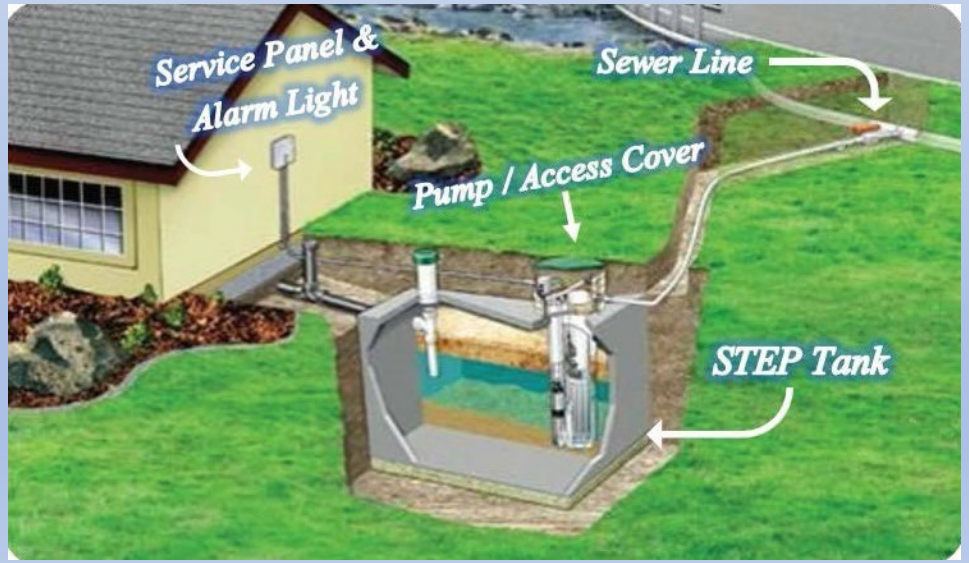
Typical Central Sewer System Layout



Onlot Components

Wastewater Collection Alternatives – Effluent Sewer (STEP) Components

Mainline Components



Onlot Components

Hybrid Wastewater Collection Flow Evaluation

Hydraulic Estimates (water records[1])

Option	Avg Day (gpd)	Max Month (gpd)	Max Day (gpd)	Peak Hour (gpm)
A	96,181	110,608	134,653	215
B	96,181	110,608	134,653	134
C	81,381	93,588	113,933	194
D	81,381	93,588	113,933	113

A – Gravity Sewer & Effluent Sewer

B – Effluent Sewer all Zones

C – Gravity Sewer, Effluent Sewer & Advanced

D – Effluent Sewer & Advanced

Note: Hydraulic capacity of collection options could impact the size and capital cost of treatment and dispersal / reuse system

[1] Based on LOCSD water records

Gravity Collection Flow Evaluation

Typical Estimated Hydraulic Variation

Zone	Effluent Sewer Avg Day[1]	Gravity Sewer Avg Day[1]
	(gpd)	(gpd)*
1	31,150	74,760
2	7,200	17,400
Total	62,050	148,920

* 120 gpcd for Gravity Sewers

Hydraulic Estimates (water records)

Zone	Avg Day*	Max Month	Max Day	Peak Hour	Peak Hour Factor
	(gpd)	(gpd)	(gpd)	(gpm)	
1	46,781	53,798	65,493	130	4
2	11,600	13,340	16,240	32	4
Total	58,381	67,138	81,733	162	4

*Further evaluation on the flows for gravity sewer option are necessary
- This could greatly impact the capital cost of the treatment and dispersal/reuse systems for options A & C

[1] Adapted from Metcalf & Eddy 2003; Crites and Tchobanoglous 1998; USEPA 2002; Winneberger 1984
[2] Based on LOCSD water records

Hybrid Collection Wastewater Strength Evaluation

Constituent Load Estimates (at wastewater treatment facility)

Option	Avg BOD[1] (mg/L)	Avg TSS[1] (mg/L)	Avg TKN[1] (mg/L)
A*	180	143	53
B	150	40	65
C*	186	162	51
D	150	40	65

A – Gravity Sewer & Effluent Sewer

B – Effluent Sewer all Zones

C – Gravity Sewer, Effluent Sewer & Advanced

D – Effluent Sewer & Advanced

*Biological loads are based on typical values for gravity sewers, which consider average daily flow from gravity sewers of 120 gpcd
- If water records are used for hydraulic analysis the biological load impacts from gravity sewer connections should be increased

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

Treatment Site Selection

A Southern treatment site was selected for this 30% design analysis to allow for comparison with previous work. Notes associated with this selection included:

1. Location of treatment site is not expected to dramatically impact the price of the effluent sewer options.
2. Location of the treatment site is note expected to dramatically impact the gravity sewer price for zones 1 &2.
3. If options C or D are selected and the use of Advanced Onsite is determined to be a viable long-term solutions it may be more economic to select a site to the North of the District or consider the School site as an ideal location.

Hybrid Wastewater Collection Capital Cost Evaluation

Capital Expenditure Estimates

Option	Collection System Subtotal	Advanced Onsite Subtotal
	($US)	($US)
A	$25,503,016	$0
B	$21,637,492	$0
C	$23,064,728	$6,734,00
D	$18,669,808	$6,734,00

A – Gravity Sewer & Effluent Sewer

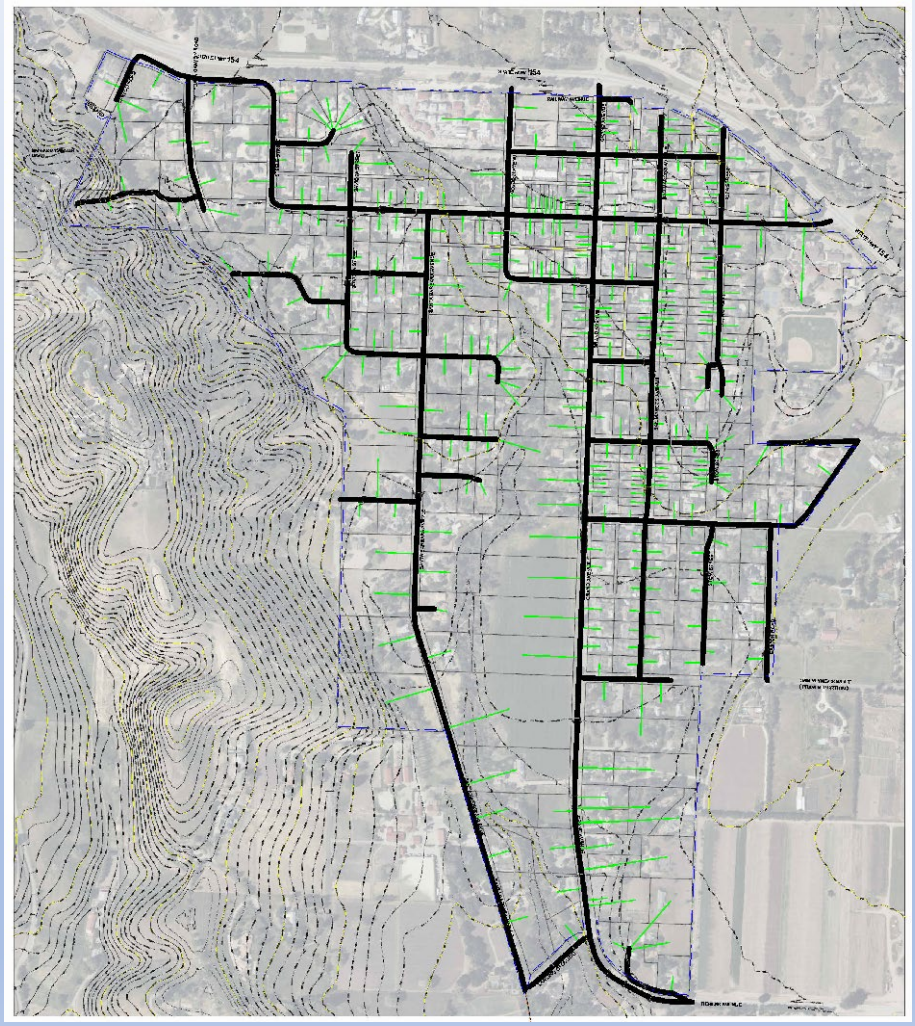
B – Effluent Sewer all Zones

C – Gravity Sewer, Effluent Sewer & Advanced

D – Effluent Sewer & Advanced

Effluent Sewer Wastewater Collection System 30% Design

- South Treatment Site
- Complete rough hydraulic analysis
- Line Sizing 2”-6”
- Directional boring
- Individual on-lot primary units
- Commercial primary sizing estimated
- Water main setback analyzed



Effluent Sewer Collection Benefits

Benefits of Effluent Sewer Options:

- Reduced capital expenditure for collection system
- Reduced capital expenditure on treatment system
- Reduced capital expenditure on dispersal / reuse system
- Reduced construction time and disturbance in roadways
- Greater potential control of growth due to space requirements and tank sizing
- Potential for reduced construction cost through district construction management
- Reduced capital expenditure if used to connect to Solvang
- Potential reduced capital expenditure through testing and use of existing tanks
- Simple design and construction process could reduce engineering costs
- Simplifies treatment facility design and operation

Gravity Sewer Collection Benefits

- Minimal annual on-lot operational requirements
- Maximizes on-lot potential space for parking or building
- Reduced landscape disturbance during construction

Advanced Onsite Benefits

- Potential differed capital expenditure
- Existing sites may already comply with regulatory requirements and not need additional capital expenditure

Next Steps

- Finalize the groundwater monitoring evaluation and determine if Advanced Onsite systems are an acceptable alternatives on less dense properties
- Continue the refinement of site selection and consider how site selection impacts the treatment, dispersal, and reuse aspects of system selection
- If Option A or C is chosen to continue pursuing, further evaluation of collection system alternatives hydraulics as gravity sewer selection may dramatically impact the size and cost of treatment and dispersal / reuse Biological load of gravity sewer should be adjusted based on hydraulic analysis
- Identify funding sources and the impacts of obtaining various funds in relation to treatment technology and dispersal or reuse alternatives, this will require selection of collection alternative and completion of 30% treatment and dispersal / reuse design

Effluent Sewer Collection Design – Next Steps

- Develop program to evaluate condition of existing tanks. Evaluate tanks for watertightness and update economic analysis based on findings
- Evaluate mobilization and construction management fees and adjust economic analysis accordingly
- Evaluate final engineering fees and adjust economic analysis accordingly
- Finalize site evaluation and complete hydraulic analysis and line sizing based on final treatment site location
- Conduct individual lot analysis for tank placement and adjust lateral connection location and distance based on tank siting
- Evaluate individual landscape repair needs and adjust economic analysis accordingly

Thank You!

REGEN