

Appendix H

Abalone Cove Sewer Capacity Report

Abalone Cove Sewer Capacity Report

The Abalone Cove Sewer System is defined as the area included in the City's Redevelopment Agency sewer system improvements constructed in 2000/2001, within the Abalone Cove HOA, as shown in **Exhibit 1**. Parcels adjacent to that sewer system collection area have not been included in this capacity evaluation.

The overall Abalone Cove sewer system includes 114 existing connections, and 66 future connections from currently vacant lots, for a total of 180 parcels. Sewer connections consist of conventional gravity laterals tributary to gravity mains, as well as individual grinder pumps with low pressure/small diameter force mains tributary to gravity mains.

As summarized in the Abalone Cove Sewer Needs Assessment, equivalent residential units (ERU) have an average dry weather flow (ADWF) generation of 260 gallons per day (gpd). To analyze peak wet weather flows (PWWF) for the parcels connected with gravity laterals, a peaking factor of 4.0 has been applied, for a PWWF of 1,040 gpd per ERU. This peaking factor accounts for the diurnal variation in flow, as well as inflow and infiltration into the gravity pipes.

The flows from parcels connected by grinder pumps do not have the same peaking factor; however, they are instead regulated by the pumping rate of the unit, which is 11 gallons per minute (gpm), or 15,840 gpd. The grinder pump vendor, E-One, has evaluated the simultaneous operations of individual grinder pumps within developments, and developed a statistical model to predict the expected number of pumps operating at the same time. This number of simultaneous pumps, each at 11 gpm, constitutes the PWWF from this type of subarea.

The Abalone Cove sewer system includes three lift stations to serve various low areas within the development. All flows are eventually conveyed by gravity to the Abalone Cove Lift Station located on Palos Verdes Drive, which pumps to a regional City lift station. The service areas are summarized in **Table 1**, and shown in **Exhibit 2**.

Table 1. Existing and Future Flow Estimates

SUBAREA	Grinder Pump [*]		Gravity		TOTALS	
	Parcels	PWWF (gpd)	Parcels	PWWF (gpd)	Parcels	PWWF (gpd)
UPPER SWEETBAY						
Existing	2	31,680	6	6,240	8	37,920
Future	2	15,840	2	2,080	4	17,920
SUBTOTAL	4	47,520	8	8,320	12	55,840
LOWER SWEETBAY						
Existing	-	-	9	9,360	9	9,360
Future	-	-	4	4,160	4	4,160
SUBTOTAL	-	-	13	13,520	13	13,520
THYME						
Existing	2	31,680	10	10,400	12	42,080
Future	2	31,680	1	1,040	3	32,720
SUBTOTAL	4	63,360	11	11,440	15	74,800
ABALONE COVE						
Existing	47	260	38	39,520	85	39,780
Future	2	260	53	55,120	55	55,380
SUBTOTAL	49	520	91	94,640	140	95,160
TOTAL EXISTING	51	63,620	63	65,520	114	129,140
TOTAL FUTURE	6	47,780	60	62,400	66	110,180
TOTAL ABALONE COVE	57	111,400	123	127,920	180	239,320

Gravity Main PWWF Per Parcel: 260 ADWF x 4.0 PF = 1,040 PWWF (gpd)

Grinder Pump PWWF Per Parcel: 11 gpm per pump = 15,840 PWWF (gpd)

* Simultaneous pumps per E-One Analysis

The capacities of the four lift stations have been estimated using the total dynamic head (TDH) reported at each, the shaft horsepower of the motors, and an assumed 65% pump efficiency, as summarized in **Table 2**.

Table 2. Abalone Cove Lift Station Capacities

LIFT STATION	HP	TDH (ft)	CAPACITY (One Pump, GPD)
Upper Sweetbay LS	7 ½	29	864,000
Lower Sweetbay LS	10	74	504,000
Thyme LS	7 ½	60	432,000
Abalone Cove LS	10	68	540,000

The capacities of the sewer system components relative to the projected flows are summarized in **Table 3**.

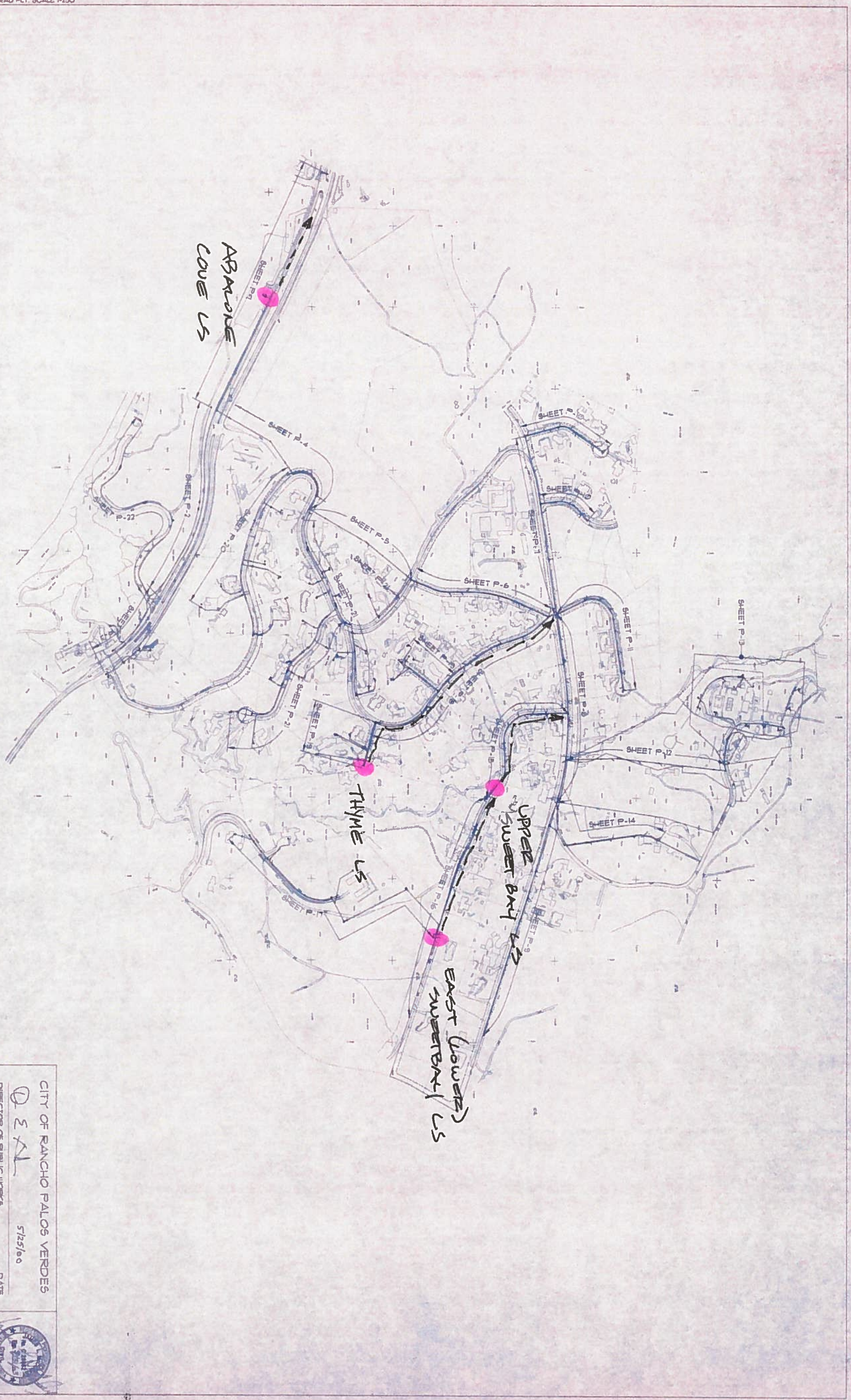
Table 3. Abalone Cove Sewer System Component Capacities

COMPONENT	CAPACITY (GPD)	PEAK FLOW (GPD)	ADEQUACY
Low Pressure FM: 1.5 to 3-in	31,680 to 158,400	31,680 to 158,400	Yes
Upper Sweetbay LS	864,000	55,840	Yes
Lower Sweetbay LS	504,000	13,520	Yes
Thyme LS	432,000	74,800	Yes
Abalone Cove LS	540,000	239,320	Yes
Gravity Sewers: 8-in	480,000 (at 0.5% slope)	239,320	Yes

The grinder pump/low pressure force main systems are evaluated on the capacity of the force mains, with 5.0 feet per second (fps) used as the maximum allowable velocity. The various numbers of grinder pumps potentially connected to the 1.5-in to 3.0-in force mains result in projected flows within the 5 fps range.

The four lift stations as configured have adequate capacity for potential future flows, as do the gravity collector sewers.

EXHIBIT 1. ABALONE COVE SEWER SYSTEM



6/09/99 G-2DWG IM42 RAD P.L.T. SCALE 1"=250'

NO.	DATE	REVISIONS

DESIGNED	BY	DATE
DRAWN	BY	DATE
CHECKED	BY	DATE
APPROVED		

SCALE

0

250

500

1" = 250'

CITY OF RANCHO PALOS VERDES

REDEVELOPMENT AGENCY

CTE ENGINEERS

CONSULTING ENGINEERS, INC.

INDEX MAP

CITY OF RANCHO PALOS VERDES

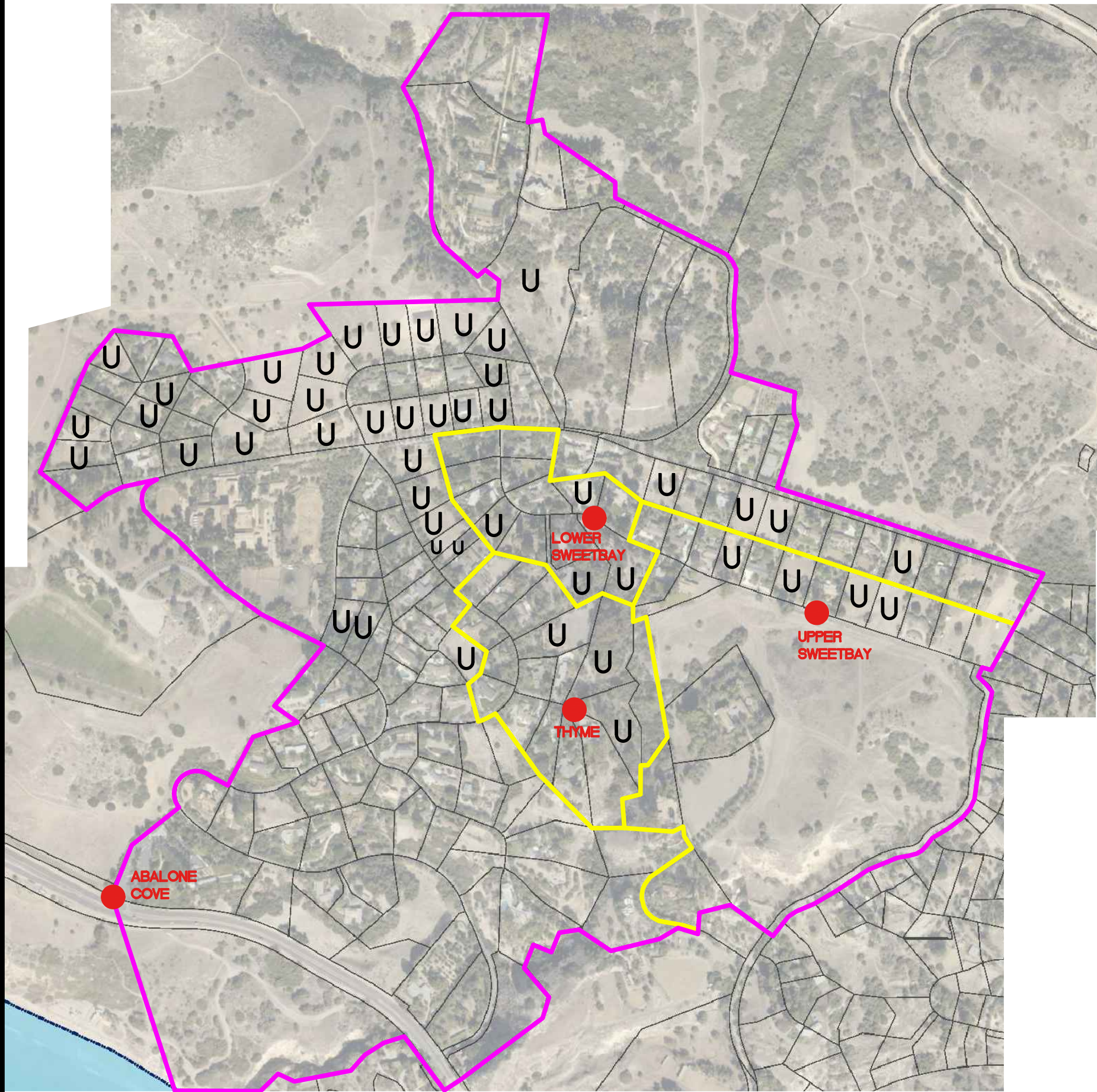
5/25/00

DATE

SHEET 07 OF 31

G-2

CTE PROJECT NO. 1001



LEGEND

- LIFT STATION 
- UNDEVELOPED LAND 
- SERVICE AREA 
- SUB AREA 

	EXISTING PARCELS	FUTURE PARCELS	TOTAL PARCELS
TOTAL ABALONE COVE	114	66	180



Environment One Corporation

**Pressure Sewer Preliminary
Cost and Design Analysis
For
Rancho Palos Verdes
Abalone Cove Sewer System**

Prepared For:

NV5

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Irvine

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USA

Tel: 949-585-0477

Fax:

Prepared By: NV5

March 1, 2019

Rancho Palos Verdes Abalone Cove Sewer System

Prepared by : NV5

On: March 1, 2019

Notes :

Pumps for

Zone 1 - Vanderlip Estates

Zone 2- Pomegranate To Sweetbay

Zone 3 - Narcissa

Zone 4 - Figtree and Narcissa

<<<< END OF NOTES >>>>

PRELIMINARY PRESSURE SEWER - PIPE SIZING AND BRANCH ANALYSIS

Prepared By:

NV5

Rancho Palos Verdes
Abalone Cove Sewer System

March 1, 2019

Zone Number	Connects to Zone	Number of Pumps in Zone	Accum Pumps in Zone	Gals/day per Pump	Max Flow Per Pump (gpm)	Max Sim Ops	Max Flow (GPM)	Pipe Size (inches)	Max Velocity (FPS)	Length of Main this Zone	Friction Loss Factor (ft/100 ft)	Friction Loss This Zone	Accum Friction Loss (feet)	Max Main Elevation	Minimum Pump Elevation	Static Head (feet)	Total Dynamic Head (ft)
This spreadsheet was calculated using pipe diameters for: SDR21PVC										Friction loss calculations were based on a Constant for inside roughness "C" of: 150							
1.00	1.00	10	10	260	11.00	4	44.00	2.50	2.66	600.00	1.04	6.23	6.23	10.00	0.00	10.00	16.23
2.00	2.00	3	3	260	11.00	2	22.00	1.50	3.04	1,500.00	2.15	32.27	32.27	30.00	0.00	30.00	62.27
3.00	3.00	6	6	260	11.00	3	33.00	2.00	2.92	1,000.00	1.54	15.43	15.43	30.00	0.00	30.00	45.43
4.00	4.00	20	20	260	11.00	5	55.00	3.00	2.24	1,800.00	0.60	10.86	10.86	78.00	0.00	78.00	88.86

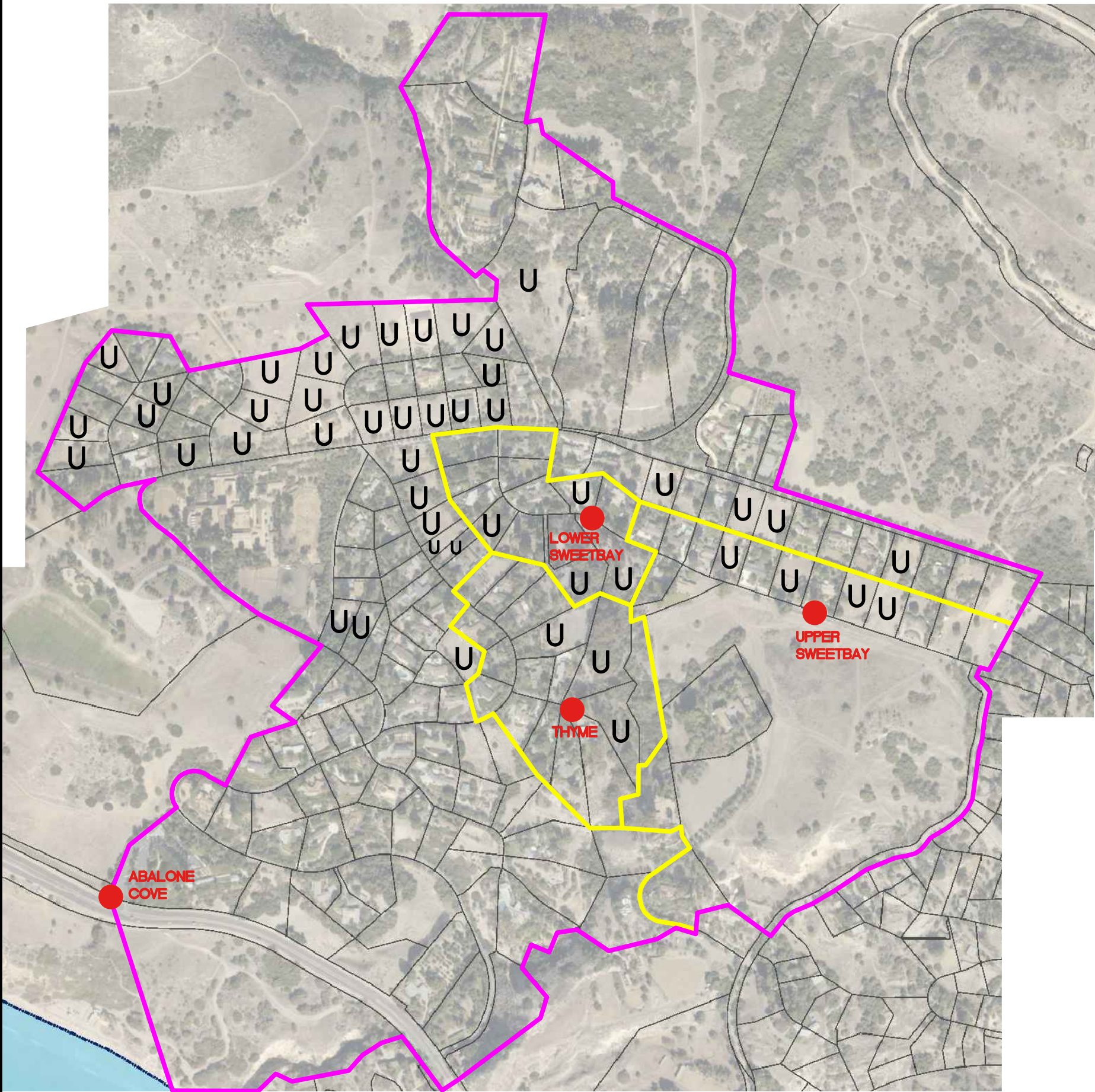
PRELIMINARY PRESSURE SEWER - ACCUMULATED RETENTION TIME(HR)

Prepared By:
NV5

Rancho Palos Verdes
Abalone Cove Sewer System

March 1, 2019

Zone Number	Connects to Zone	Accumulated Total of Pumps this Zone	Pipe Size (inches)	Gallons per 100 lineal feet	Length of Zone	Capacity of Zone	Average Daily Flow	Average Fluid Changes per Day	Average Retention Time (Hr)	Accumulated Retention Time (Hr)
This spreadsheet was calculated using pipe diameters for: SDR21PVC							Gals per Day per Dwelling		200	
1.00	1.00	10	2.50	27.60	600.00	165.61	2,600	15.70	1.53	1.53
2.00	2.00	3	1.50	12.07	1,500.00	181.05	780	4.31	5.57	5.57
3.00	3.00	6	2.00	18.84	1,000.00	188.42	1,560	8.28	2.90	2.90
4.00	4.00	20	3.00	40.90	1,800.00	736.12	5,200	7.06	3.40	3.40



LEGEND

- LIFT STATION 
- UNDEVELOPED LAND 
- SERVICE AREA 
- SUB AREA 

	EXISTING PARCELS	FUTURE PARCELS	TOTAL PARCELS
TOTAL ABALONE COVE	114	66	180