

# PRELIMINARY SEWER STUDY

## Brightwater Ranch

County of San Diego, CA

February 6, 2015

Tract No 5306RPL2

Prepared For:

**Pulte Group/Centex Homes**

27101 Puerta Real, Suite 300

Mission Viejo, CA 92691

Prepared By:



### PROJECT DESIGN CONSULTANTS

Planning | Landscape Architecture | Environmental | Engineering | Survey

701 B Street, Suite 800  
San Diego, CA 92101  
619.235.6471 Tel  
619.234.0349 Fax

PDC Job No. 2862.02

Prepared by: R. Rodriguez

*Under the supervision of*

Gregory Shields, P.E. RCE 42951  
Registration Expires 03/31/16



# TABLE OF CONTENTS

I.	Introduction .....	1
II.	Project Description.....	1
III.	Design Criteria .....	3
IV.	Flow Calculations and Equations.....	3
V.	Conclusion .....	4

## FIGURES

Figure 1:	Vicinity Map .....	2
-----------	--------------------	---

## APPENDIX

A.	Appendix A - County of San Diego Sewer Design Guide.....	6
B.	Appendix B - Proposed Condition Sewer Flow.....	12
C.	Appendix C - Proposed Condition Sewer Map.....	15
D.	Appendix D – Reference Material .....	17

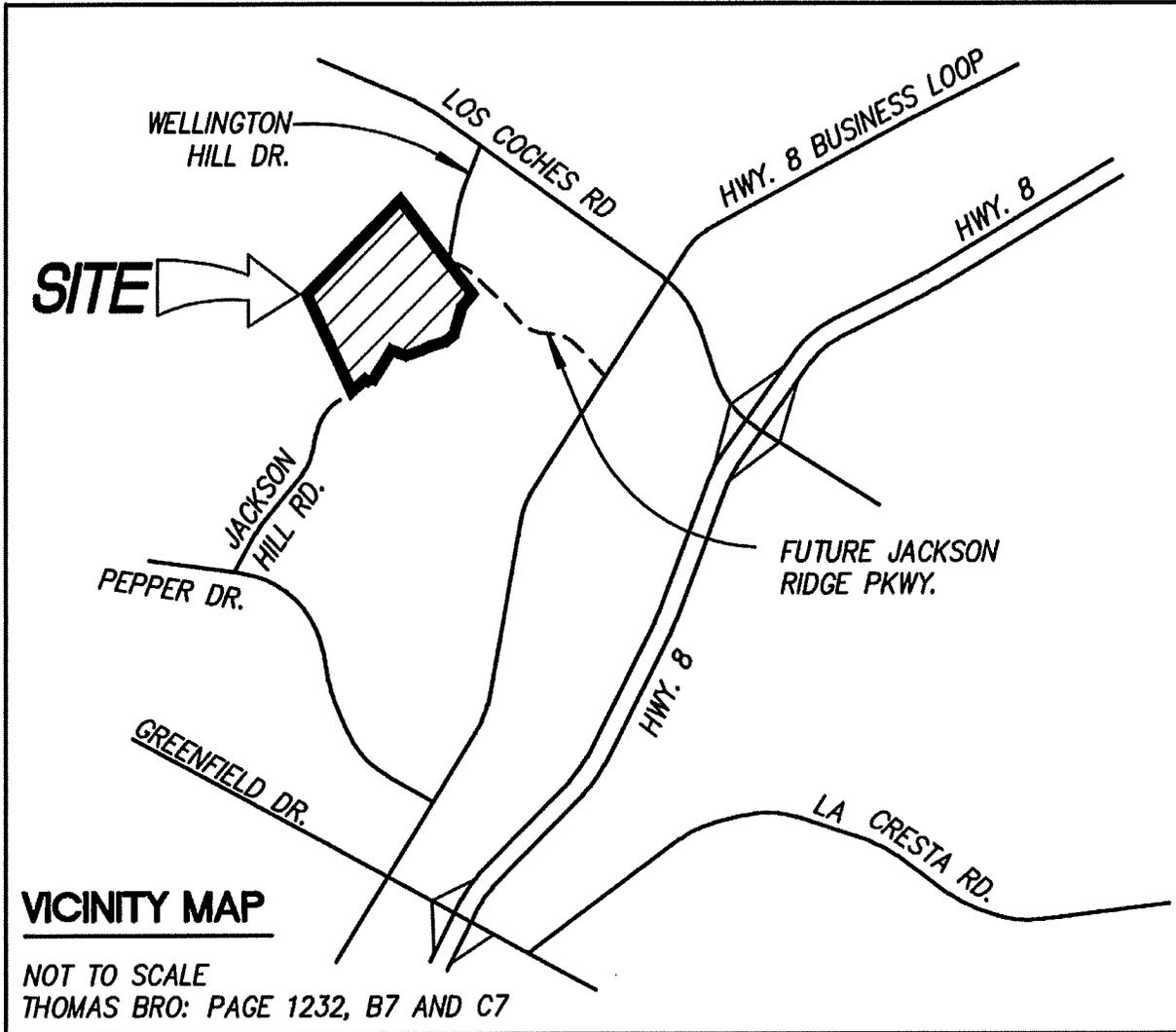
## **I. INTRODUCTION**

The purpose of this report is to present the design of the onsite sanitary sewer facilities associated with Brightwater Ranch and demonstrate that the sewer discharge from this proposed single-family (detached) residential subdivision does not exceed the hydraulic capacity of the existing downstream facilities.

## **II. PROJECT DESCRIPTION**

Brightwater Ranch is approximately 76.23 acres and located in the County of San Diego, consisting of 34.44 acres of residential development and 41.79 acres of open space. The proposed project is north of Interstate 8 and west of Los Coches Road as shown in Figure 1 on page 2.

The proposed development consists of 66 single-family units. Sewage from within the subdivision will be collected through a series of 8-inch collector lines, which will connect to an existing 8-inch main at the intersection of Wellington Hill Drive and Wellington Hill Court and ultimately will connect to an existing sewer main at the intersection of Wellington Hill Drive and Los Coches Road. The point of connection to the existing system is at an existing clean out at Station 18+85.00 per the Improvement plans for Tract NO. 3747 (TM 3747-1). See Appendix D.



**FIGURE 1**  
**VICINITY MAP**

### III. DESIGN CRITERIA

All sewer facilities have been designed in accordance with the *San Diego County Standard for Sewer Construction* by the Department of Public works, County of San Diego. The Sewer Flow Calculations Table summarizes peak flows, minimum pipe slopes, flow velocities, and normal depths. Minimum pipe slopes of 0.4 percent were maintained in all areas or tried to achieve a flow velocity of 2 feet per second, per section 2.5 of the *San Diego County Standard for Sewer Construction*.

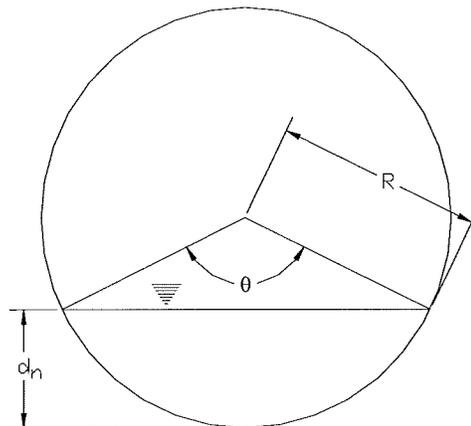
The project site is within zone RS and RR for the 66 residential lots. Based on SANDAG Demographic and Social Economic Estimates, (see Appendix A) there is an average of 2.81 persons per household which leads to a total population of 185 household population within the development. Per Table “A” of the *San Diego County Standard for Sewer Construction*, we will be using a peak average ratio of 4.0 with a population per DU of 3.

$$\text{Average dry weather flow (ADWF)} = \text{No. EDU's} \times 240 \text{ gal/day/EDU}$$

$$\text{Peak dry weather flow (PDWF)} = (\text{DF avg}) * \text{ADWF}$$

### IV. FLOW CALCULATIONS AND EQUATIONS

Flow Velocities ( $V$ ) and Normal Depths ( $d_n$ ) are calculated using iterative solutions of the following equations:



**Typical Cross Section**

$$Q \text{ (ft}^3\text{/s)} = \text{Volumetric Flow} = V \times A$$

where:

$A$  = Cross-Sectional Area of Flow ( $\text{ft}^2$ )

$V$  = Flow Velocity (ft/s)

$$A = (R)^2 \times [\theta/2 - \sin(\theta/2) \times \cos(\theta/2)]$$

where:

$\theta$  =  $2 \times \text{ARCCOS}[(R - d_n)/(R)]$

$d_n$  = Normal Depth (ft)

$$V = (1.486/n)R_h^{2/3}S^{1/2} \text{ (Manning Equation)}$$

where:

$V$  = Cross-sectional average Velocity (ft/s)

$n$  = Manning Roughness Coefficient = 0.013

$R_h$  = Hydraulic Radius =  $A/P_w$  (ft)

$P_w$  = Wetted Perimeter =  $\theta \times R$  (ft)

$S$  = Slope of Pipe (ft/ft)

## V. CONCLUSION

This report analyzed the proposed design of the sanitary sewer facilities associated with Brightwater Ranch and shows that the sewer discharge from this single-family residential subdivision does not exceed the hydraulic capacity of the existing downstream pipe. Per the proposed design, the overall flow for the 66 units within Brightwater Ranch is 0.098 cfs per Appendix B (sewer flow calculation table, peak design) and the segment of the 8" sewer main that is connecting to the existing 8" sewer main is designed at a slope of 1.2% due to the site constraints of grading into the existing development, grading constraints with the open space, existing storm drain within Wellington Hill Drive and the high invert elevation of the existing CO within Wellington Hill Drive. The connecting sewer main (MH 8- to MH 15) has a velocity of 2.0 feet per second, which is consistent with the required velocity of 2 feet-per-second per *San Diego County Standard for Sewer Construction*. Please note that the existing sewer main downstream of MH 15 has a slope of 6.4% according to the existing improvement plans (TM3747-1).

Per Appendix D section 2.5 of the San Diego County standard for sewer construction, the County of San Diego allows slopes with slightly less than those required for the 2 feet per second velocity and may be permitted when the average flow will be 0.3 of the diameter or greater, as well as a table within section 2.5 allowing a 0.40 minimum slope in feet per 100 feet for an 8" sewer pipe. Because of the design constraints within the project (as mentioned above), there are four segments of sewer main (from MH 4 to MH 7) that are less than the required 2% slope, less than the d/D of 0.3 and under the 2 feet-per-second velocity required. This segment of proposed 8" sewer main has a slope of 1% and a velocity with a range of 1.35fsp – 1.66 fps for an average dry weather flow of 16,560 gallons per day. Please note that the peak velocity ranges from 1.41 fps – 1.76fps (See appendix B). We are requesting a deviation of standard for this segment of 8" sewer main due to the fact that there is a limited amount of dwelling units upstream of these manholes (23 dwelling units), because these units do not generated enough flow to meet the 2 feet-per-second velocity.

The results from our sewer analysis were compared to the Sewer Master Plan by Atkins, dated December 2011, to see if it would have any adverse effect on any future designs/improvements. Based on the Atkins Report, the current flow at manhole 1698 (which is where the Brightwater Project would tie into the main sewer line on Los Coches Road) is 0.63 MGD with a d/D of 0.44. The Brightwater project would increase the flow by 0.063 MGD for a total of 0.693 MGP or 1.072 CFG. The existing 8" pipe along Los Coches Road would increase to 44.75% full or d/D of .45 with a velocity of 7.07ft/s. Therefore the Brightwater project will not have any major effect on the main sewer line.

In conclusion, the sewer main segments (MH4 to MH7) do not meet the required slope, d/D and velocity due to the limited number of proposed units and site constraints (i.e. existing grading conditions, existing sewer main and storm drain crossings), see appendix C for crossing constraints. The Brightwater project is requesting the County grant a design deviation and approval of this sewer report. Please note that the project is proposing 4 manholes along the stretch of sewer main where 2 fps is not achieved, allowing for additional access for maintenance purposes.

# **APPENDIX A**

## **County of San Diego Sewer Design Guide**

(Per *San Diego County standards for sewer construction*, Department of Public Works,  
County of San Diego)

DEMOGRAPHIC & SOCIO ECONOMIC ESTIMATES  
Lakeside



Jan 1, 2013	
Total Population	74,471
Household Population	73,986
Group Quarters Population	485
Persons Per Household	2.81

HOUSING AND OCCUPANCY

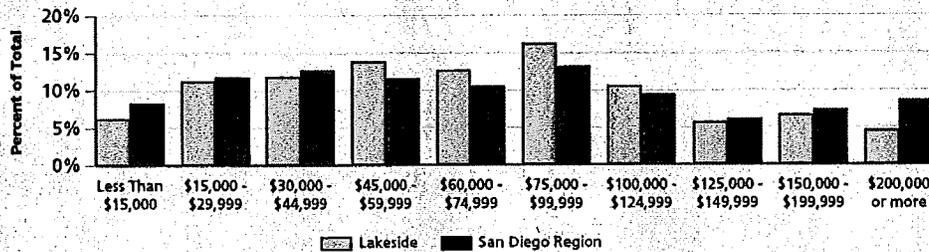
	Total Housing Units	Households	Vacancy Rate
Total Housing Units	27,586	26,332	4.5%
Single Family - Detached	13,150	12,697	3.4%
Single Family - Multiple-Unit	2,726	2,562	6.0%
Multi-Family	6,356	5,989	5.8%
Mobile Home and Other	5,354	5,084	5.0%

HOUSEHOLD INCOME

Households by Income Category (2010 \$, adjusted for inflation)

	Less than \$15,000	\$15,000-\$29,999	\$30,000-\$44,999	\$45,000-\$59,999	\$60,000-\$74,999	\$75,000-\$99,999	\$100,000-\$124,999	\$125,000-\$149,999	\$150,000-\$199,999	\$200,000 or more
% of Total	6%	11%	12%	14%	13%	16%	11%	6%	7%	5%

Median Household Income	2013
Adjusted for Inflation (2010 \$)	\$67,867
Not adjusted for Inflation (current 2012\$)	\$71,046



IMPORTANT ADVISORY:

Caution should be taken when using data for small population groups, particularly at small levels of geography. Minor adjustments were made (such as correcting the location of housing units that were erroneously allocated by the Census Bureau to roads and open space) to more accurately reflect the region's true population and housing distribution.

In addition, Census 2010 does not include information about structure type or household income. Those details and other demographic estimates shown here are developed from other sources, including the California Department of Finance E-5 estimates for cities and the County of San Diego; San Diego County Assessor Records, vital events records from the California Department of Health, and income data from the U.S. Census Bureau American Community Survey.

Caution should always be taken when using data for small population groups, particularly at small levels of geography.

Source: SANDAG, Current Estimates  
SANDAG  
www.sandag.org

January 24, 2014  
Lakeside  
Page 1 of 3

*San Diego County Standards for Sewer Construction*

- 2.2 Size of Lateral:** A sewer service lateral of a minimum size of four inches shall be provided in the street or easement for each lot.
- 2.3 Depth:** In general, sewers must be designed deep enough to serve the adjacent properties by gravity flow from the connected structure to the sewer main. Abutting properties not served or requiring the use of individual pump systems for service shall be noted on the plans. Where, for specific reasons, it is necessary to install a sewer with cover of less than 4 feet from top of pipe, the sewer shall be encased in concrete as shown on the standard detail (SDRSD S-7).
- 2.4 Pipe Bedding:** All sewers shall be designed to prevent failure due to superimposed loads and the weight of backfill material. Standard bedding for various pipe material shall be shown on the standard sewer notes. Special bedding for extra-depth Vitrified Clay Pipe shall be as shown on the following table:

DEPTHS SHOWN FROM INVERT

PIPE SIZE	TYPE B (S-5) CRUSHED ROCK	TYPE A CRADLE	TYPE B CRADLE	MAXIMUM TRENCH WIDTH
8"	16-34'	34'+		2'-2"
10"	15-31'	31'+		2'-4"
12"	13-22'	22'+		2'-6"
15"	11-16'	16-22'	22-28'	3'-1"
18"	11.5-15.5'	15.5-20.5'	20.5-24.5'	3'-6"
21"	12.25-16.75'	16.75-21.25'	21.25'+	3'-10"
24"	13.5-19'	19-23'	23'+	4'-1"

- 2.5 Velocity of Flow:** All sewers shall be designed and constructed with hydraulic slopes sufficient to give mean velocities, when flowing full, of not less than 2.0 feet per second, based on Kutter's or Manning's formula using an "n" value of 0.013. Use of other practical "n" values will be permitted by the County Engineer for the longer pipe sections if deemed justifiable on the basis of research or field data presented.

Under special conditions, if full and justifiable reasons are given, slopes slightly less than those required for the 2 feet per second velocity when full may be permitted. Such decreased slopes will only be considered when the average flow will be 0.3 of the diameter or greater for design average flow.

Whenever such decreased slopes are selected, the engineer must furnish with his report, his computations of the depths of flow in such pipes at minimum, average and peak rates of flow. It is recognized that such flatter grades may cause additional sewer maintenance expense.

The following are the minimum slopes which shall be provided:

SEWER SIZE	MINIMUM SLOPE IN FEET PER 100 FEET	SEWER SIZE	MINIMUM SLOPE IN FEET PER 100 FEET
6"	0.68	15"	0.15
8"	0.40	16"	0.14
10"	0.28	18"	0.12
12"	0.22	21"	0.10
14"	0.17	24"	0.08

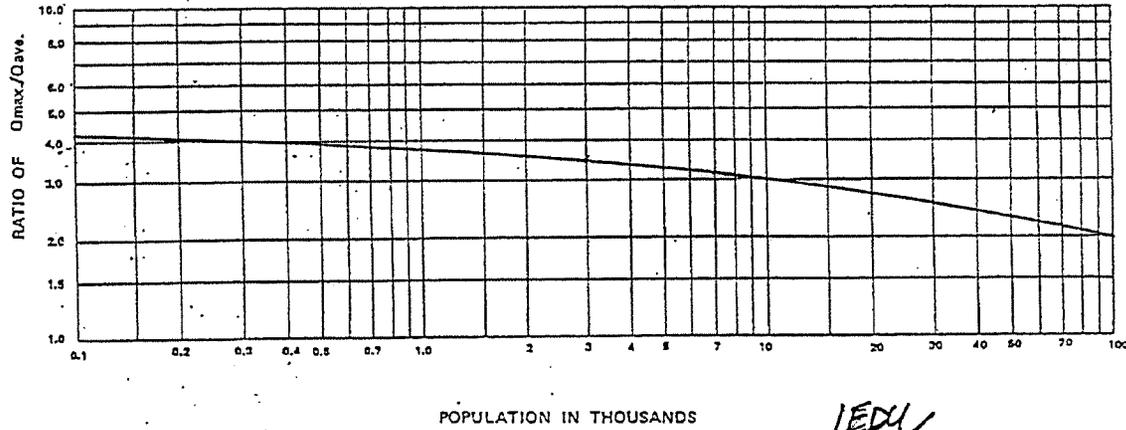
Dead end lines shall be designed with a velocity of 2 to 2.5 feet per second at 1/4 full: 6" line - minimum slope of 1.0 feet per 100 feet and 8" line - minimum slope of 0.7' per 100 feet.

- 2.6 Sewer Energy Gradient:** When sewers are increased in size along the main sewer alignment, the invert of the larger sewer shall be lowered sufficiently to maintain the same energy gradient. An approximate method for securing these results is to place the 0.8 depth point of both sewers at the same elevation.

When a branch sewer line intersects a main line sewer, the invert of the branch line shall intersect at the 0.8 depth point of the main line regardless of sewer pipe size.

- 2.7 Protection from Sulfides:** All sewer lines and manholes downstream from a force main connection, for a minimum distance of 1,000 feet or 3 manholes, whichever is the greater distance, shall be protected from sulfides. Additionally, the County Engineer may require sulfide protection in other parts of a system due to anticipated problems.

RATIO OF EXTREME FLOW TO DAILY AVERAGE FLOW



1 EDU / SFD UNIT

Qmax: Maximum Rate of Sewage Flow (Peak Hourly Flow)

Qave: Average Daily Sewage Flow

Source: 
$$Q_{max}/Q_{ave} = \frac{18 + \sqrt{P}}{4 + \sqrt{P}} \quad \text{--- (P = population in thousands)}$$

Fair, G.M. and Geyer, J.C. "Water Supply and Waste-Water Disposal"  
1st Ed., John Wiley & Sons, Inc., New York (1954), p. 136

TABLE A

**PUBLIC UTILITIES DEPARTMENT**  
**PEAKING FACTOR FOR SEWER FLOWS**  
(Dry Weather)

**Ratio of Peak to Average Flow\***  
**Versus Tributary Population**

<u>Population</u>	<u>Ratio of Peak to Average Flow</u>	<u>Population</u>	<u>Ratio of Peak to Average Flow</u>
200	4.00	4,800	2.01
500	3.00	5,000	2.00
800	2.75	5,200	1.99
900	2.60	5,500	1.97
1,000	2.50	6,000	1.95
1,100	2.47	6,200	1.94
1,200	2.45	6,400	1.93
1,300	2.43	6,900	1.91
1,400	2.40	7,300	1.90
1,500	2.38	7,500	1.89
1,600	2.36	8,100	1.87
1,700	2.34	8,400	1.86
1,750	2.33	9,100	1.84
1,800	2.32	9,600	1.83
1,850	2.31	10,000	1.82
1,900	2.30	11,500	1.80
2,000	2.29	13,000	1.78
2,150	2.27	14,500	1.76
2,225	2.25	15,000	1.75
2,300	2.24	16,000	1.74
2,375	2.23	16,700	1.73
2,425	2.22	17,400	1.72
2,500	2.21	18,000	1.71
2,600	2.20	18,900	1.70
2,625	2.19	19,800	1.69
2,675	2.18	21,500	1.68
2,775	2.17	22,600	1.67
2,850	2.16	25,000	1.65
3,000	2.14	26,500	1.64
3,100	2.13	28,000	1.63
3,200	2.12	32,000	1.61
3,500	2.10	36,000	1.59
3,600	2.09	38,000	1.58
3,700	2.08	42,000	1.57
3,800	2.07	49,000	1.55
3,900	2.06	54,000	1.54
4,000	2.05	60,000	1.53
4,200	2.04	70,000	1.52
4,400	2.03	90,000	1.51
4,600	2.02	100,000+	1.50

\*Based on formula: Peak Factor =  $6.2945 \times (\text{pop})^{-0.1542}$   
(Holmes & Narver, 1960)

**FIGURE 1-1**

## **APPENDIX B**

### **Proposed Condition Sewer Flows**

PROJECT DESIGN CONSULTANTS  
 701 'B' STREET, SUITE 800  
 SAN DIEGO, CALIFORNIA 92101

PDC JOB # 2862.02  
 County No. Tract No 5306RPL2  
 DATE: 02/03/15

SEWER FLOW CALCULATIONS  
 BRIGHTWATER RANCH  
 MH-1 THROUGH MH-15  
 Peak Design

MH / CO		POP PER D.U.	EQUIVALENT DWELLING UNITS		POPULATION PER D.U.		AVE DRY WEATHER FLOW (GAL/DAY)	PEAK AVERAGE RATIO	PEAK DESIGN GAL/DAY	FLOW C.F.S.	LINE SIZE(D) (INCH.)	DESIGN SLOPE %	dn (ft)	dn/D	VEL. F.P.S.
FROM	TO		IN LINE	TOTAL	IN LINE	TOTAL									
MH-1	MH-2	3.0	8	8	24	24	5,760	4.00	7,680	0.012	8	11.80%	0.026	0.04	2.61
MH-2	MH-3	3.0	5	13	15	39	9,360	4.00	12,480	0.019	8	14.40%	0.0311	0.05	3.22
MH-3	MH-4	3.0	4	17	12	51	12,240	4.00	16,320	0.025	8	2.00%	0.056	0.08	1.76
MH-4	MH-5	3.0	4	21	12	63	15,120	4.00	20,160	0.031	8	1.00%	0.073	0.11	1.41
MH-5	MH-6	3.0	2	23	6	69	16,560	4.00	22,080	0.034	8	1.00%	0.076	0.11	1.51
MH-6	MH-7	3.0	0	23	0	69	16,560	4.00	22,080	0.034	8	1.00%	0.076	0.11	1.51
MH-7	MH-8	3.0	0	23	0	69	16,560	4.00	22,080	0.034	8	1.00%	0.076	0.11	1.51
MH-12	MH-11	3.0	10	10	30	30	7,200	4.00	9,600	0.015	8	5.00%	0.035	0.05	2.07
MH-11	MH-10	3.0	6	16	18	48	11,520	4.00	15,360	0.024	8	10.00%	0.037	0.06	3.05
MH-10	MH-9	3.0	5	21	15	63	15,120	4.00	20,160	0.031	8	9.60%	0.043	0.06	3.25
MH-12	MH-13	3.0	5	5	15	15	3,600	4.00	4,800	0.007	8	4.60%	0.025	0.04	1.60
MH-13	MH-14	3.0	9	14	27	42	10,080	4.00	13,440	0.021	8	10.30%	0.035	0.05	2.96
MH-14	MH-9	3.0	5	19	15	57	13,680	4.00	18,240	0.028	8	5.50%	0.046	0.07	2.59
MH-9	MH-8	3.0	3	43	9	129	30,960	4.00	41,280	0.064	8	9.20%	0.061	0.09	3.99
MH-8	EX MH-15	3.0	0	66	0	198	47,520	4.00	63,360	0.098	8	1.20%	0.122	0.18	2.20

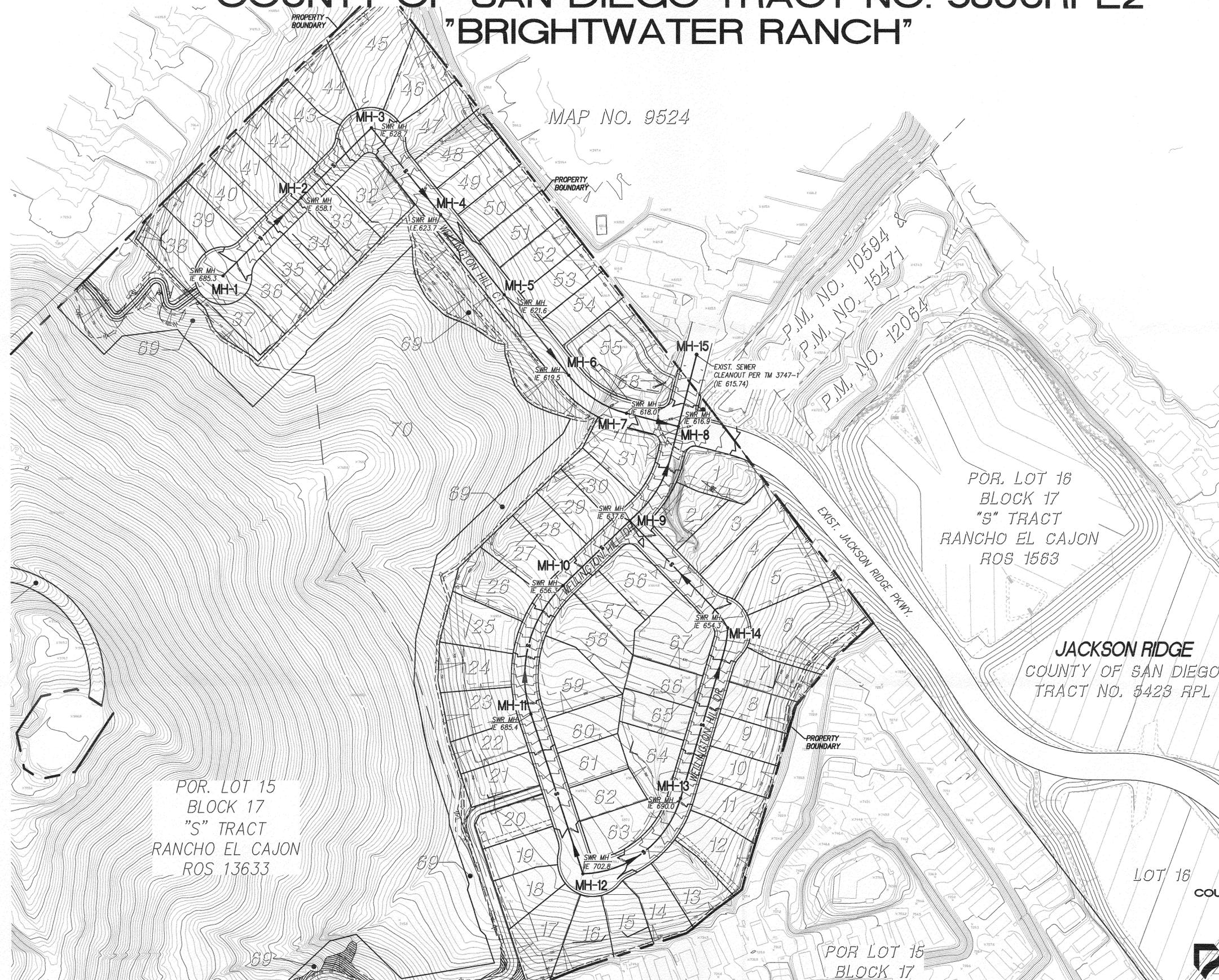
SEWER FLOW CALCULATIONS  
 BRIGHTWATER RANCH  
 MH-1 THROUGH MH-15  
 Ave Dry Weather Flow

MH / CO		POP PER D.U.	EQUIVALENT DWELLING UNITS		POPULATION PER D.U.		AVE DRY WEATHER FLOW (GAL/DAY)	PEAK AVERAGE RATIO	PEAK DESIGN GAL/DAY	FLOW C.F.S.	LINE SIZE(D) (INCH.)	DESIGN SLOPE %	dn (ft)	dn/D	VEL. F.P.S.
FROM	TO		IN LINE	TOTAL	IN LINE	TOTAL									
MH-1	MH-2	3.0	8	8	24	24	5,760	4.00	7,680	0.009	8	11.80%	0.023	0.03	2.39
MH-2	MH-3	3.0	5	13	15	39	9,360	4.00	12,480	0.014	8	14.40%	0.026	0.04	2.93
MH-3	MH-4	3.0	4	17	12	51	12,240	4.00	16,320	0.019	8	2.00%	0.49	0.74	1.66
MH-4	MH-5	3.0	4	21	12	63	15,120	4.00	20,160	0.023	8	1.00%	0.063	0.09	1.35
MH-5	MH-6	3.0	2	23	6	69	16,560	4.00	22,080	0.026	8	1.00%	0.067	0.10	1.40
MH-6	MH-7	3.0	0	23	0	69	16,560	4.00	22,080	0.026	8	1.00%	0.067	0.10	1.40
MH-7	MH-8	3.0	0	23	0	69	16,560	4.00	22,080	0.026	8	1.00%	0.067	0.10	1.40
MH-12	MH-11	3.0	10	10	30	30	7,200	4.00	9,600	0.011	8	5.00%	0.03	0.05	1.89
MH-11	MH-10	3.0	6	16	18	48	11,520	4.00	15,360	0.018	8	10.00%	0.033	0.05	2.78
MH-10	MH-9	3.0	5	21	15	63	15,120	4.00	20,160	0.023	8	9.60%	0.037	0.06	2.97
MH-12	MH-13	3.0	5	5	15	15	3,600	4.00	4,800	0.006	8	4.60%	0.023	0.03	1.52
MH-13	MH-14	3.0	9	14	27	42	10,080	4.00	13,440	0.016	8	10.30%	0.031	0.05	2.72
MH-14	MH-9	3.0	5	19	15	57	13,680	4.00	18,240	0.021	8	5.50%	0.04	0.06	2.38
MH-9	MH-8	3.0	3	43	9	129	30,960	4.00	41,280	0.048	8	9.20%	0.053	0.08	3.65
									0.000						
MH-8	EX MH-15	3.0	0	66	0	198	47,520	4.00	63,360	0.074	8	1.20%	0.106	0.16	2.04

**APPENDIX C**  
**Proposed Condition Sewer Map**

# SEWER REPORT EXHIBIT COUNTY OF SAN DIEGO TRACT NO. 5306RPL2 "BRIGHTWATER RANCH"

MAP NO. 9524



POR. LOT 15  
BLOCK 17  
"S" TRACT  
RANCHO EL CAJON  
ROS 13633

POR. LOT 16  
BLOCK 17  
"S" TRACT  
RANCHO EL CAJON  
ROS 15663

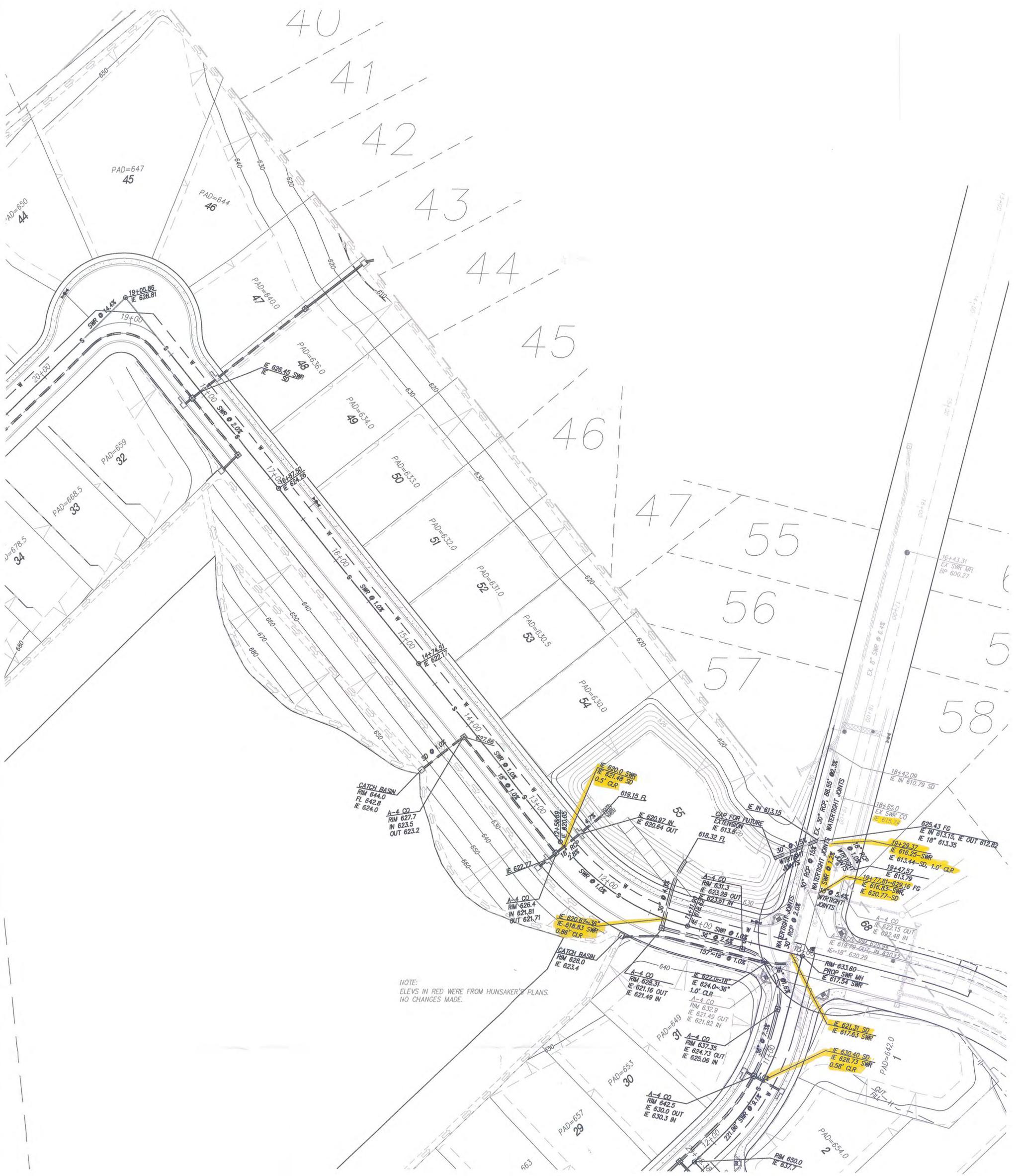
JACKSON RIDGE  
COUNTY OF SAN DIEGO  
TRACT NO. 5423 RPL

POR LOT 15  
BLOCK 17

SEWER REPORT EXHIBIT  
COUNTY OF SAN DIEGO TRACT NO. 5306RPL2  
LOG. NO. 03-14-007  
"BRIGHTWATER RANCH"

**PROJECT DESIGN CONSULTANTS**  
Planning | Landscape Architecture | Engineering | Survey

701 B Street, Suite 800  
San Diego, CA 92101  
619.236.6471 Tel  
619.236.0349 Fax



NOTE:  
 ELEVS IN RED WERE FROM HUNSAKER'S PLANS.  
 NO CHANGES MADE.

**APPENDIX D**  
**Reference Material**

**ATKINS**

# **Alpine and Lakeside Sewer Service Areas**

## **Sewer Master Plan** December 2011



Plan Design Enable

# **Alpine and Lakeside Sewer Service Areas Sewer Master Plan**

December 2011

## **CHAPTER 7**

# **PROPOSED CAPITAL IMPROVEMENT PROGRAM**

---

This chapter presents the proposed Capital Improvement Program (CIP) based on the findings of the Master Plan and includes:

- Development of Unit Costs;
- Capital Improvement Project Summary of Cost and Timing; and
- Proposed Condition Upgrades and estimated costs

### **7.1 Development of Unit Costs**

The unit cost estimates reflect full capitalization inclusive of planning, engineering design, environmental, legal, construction, construction management and contract administration. The values are presented in mid-2010 dollars based on an anticipated ENR Construction Cost Index (ENR-CCI) of 9969 for the Los Angeles/Orange County area. These estimates are based on representative available data at the time of this report; however, since prices of materials and labor fluctuate over time, new estimates should be obtained at or near the time of construction of proposed facilities. A scaling factor has been included to account for pipeline projects that are relatively short in distance or have more significant environmental or construction challenges. The CIP has been divided into four phases.

#### **7.1.1 Pipelines**

Base unit costs for pipeline material and installation including repaving and system appurtenances that, collectively, constitute principal elements of the wastewater collection system facilities, are presented in Table 7-1.

The unit costs provided above reflect an average cost for full capitalization inclusive of planning, engineering design, environmental, legal, construction (including all appurtenances), construction management and contract administration. Special circumstances (e.g., jacking, trenchless installations, tunnels, etc.) are considered separately on a case-by-case basis. A scaling factor was applied to each project to account for project specific issues such as difficult conditions, constrained access, congested areas, etc.

**Table 7-1 Pipeline Unit Costs**

Diameter (inches)	Sewer, Gravity (\$/LF)
4	200
6	300
8	350
10	425
12	500
15	600
18	650
21	700
24	750
30	850
36	900
39	950
42	1000

**7.1.2 Lift Stations**

Lift station upgrades are primarily condition related and only the Galloway Lift Station require upgrades to address projected wastewater flows. The Galloway Lift Station will likely require pump replacements and electrical/control upgrades as well as additional emergency storage in Phase 4 estimated at approximately \$500,000. The Moreno Lift Station will also require significant upgrades to the mechanical and electrical equipment estimated at approximately \$200,000 to get the station up and running.

**7.2 Recommended CIP Program**

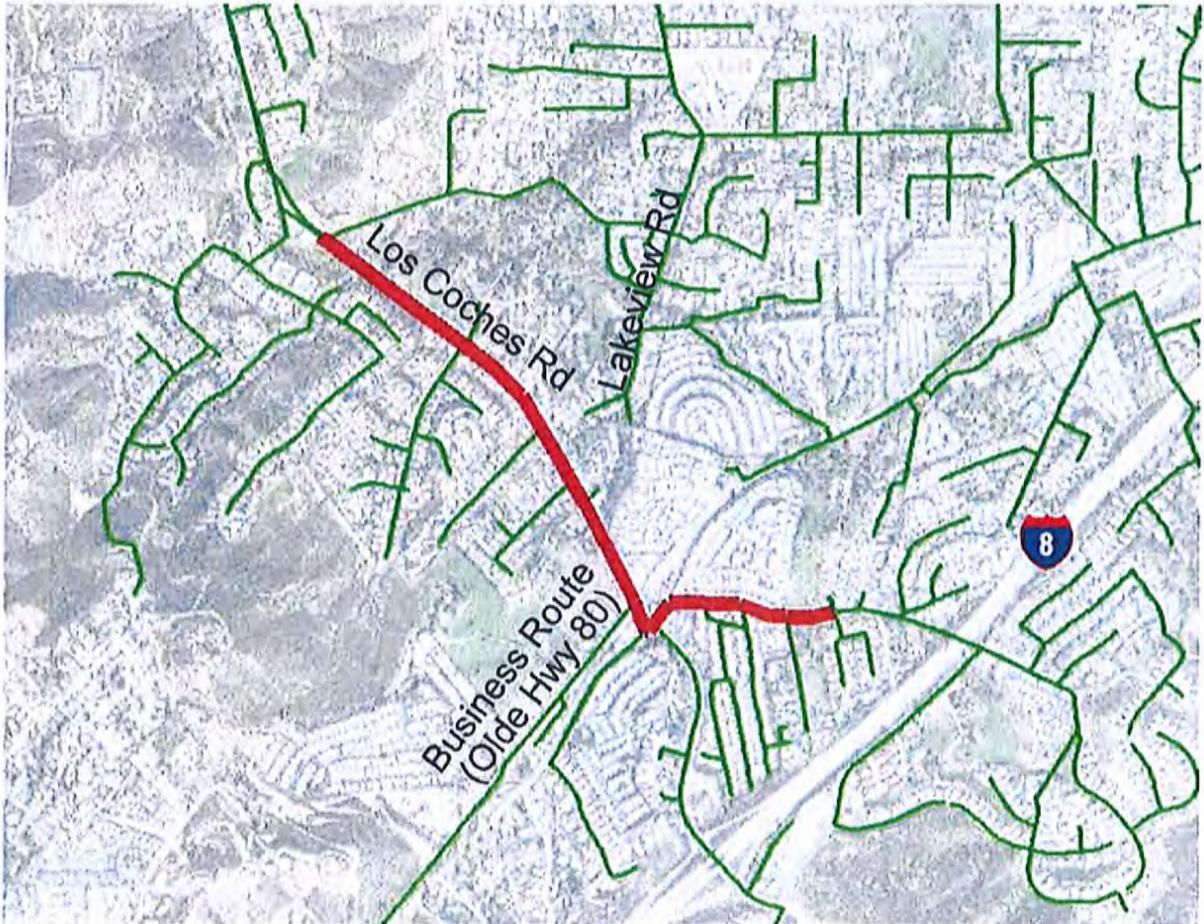
The CIP projects identify facilities needed to meet existing system needs based on the County's design criteria for the wastewater collection systems. As previously discussed, the CIP projects are presented in four major phases of work based on priority needs. The total CIP costs including Phase 1 through 4 are estimated to be \$4.8 million for Alpine SSA and \$41.4 million for the Lakeside SSAs. These costs are summarized by phase in Table 7-3. Proposed CIP projects recommended for the Alpine and Lakeside SSA's collection systems are listed in Table 7-2, and shown and described in further detail on the subsequent pages.

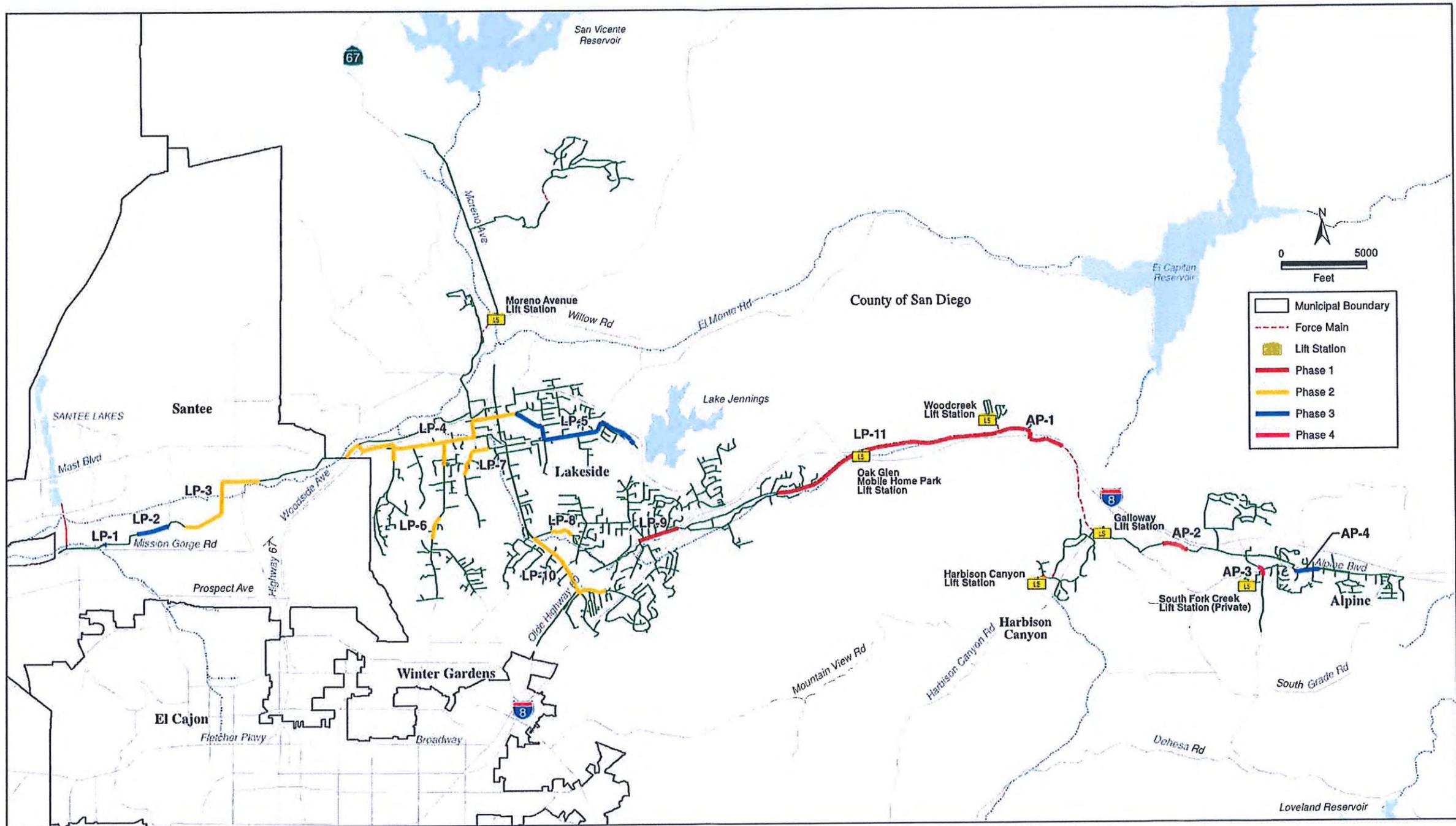
**Table 7-2 CIP Summary**

Description	Alpine	Lakeside	Total
Phase I	\$2,444,000	\$10,895,000	\$13,339,000
Phase II	\$0	\$23,140,000	\$23,140,000
Phase III	\$1,440,000	\$7,525,000	\$8,965,000
Phase IV	\$920,000	\$0	\$920,000
<b>Total</b>	<b>\$4,804,000</b>	<b>\$41,560,000</b>	<b>\$46,364,000</b>

## Proposed Capital Improvement Program

<b>CIP Project:</b>	LP-10 – Los Cochés Road Sewer Pipeline Replacement Project
<b>Description:</b>	Replace approximately 6,100 feet of existing 8 and 10 inch diameter pipeline with diameters ranging from 12 to 15 inch.
<b>Estimated Construction Cost:</b>	\$3,090,000
<b>Estimated Construction Schedule:</b>	Phase II





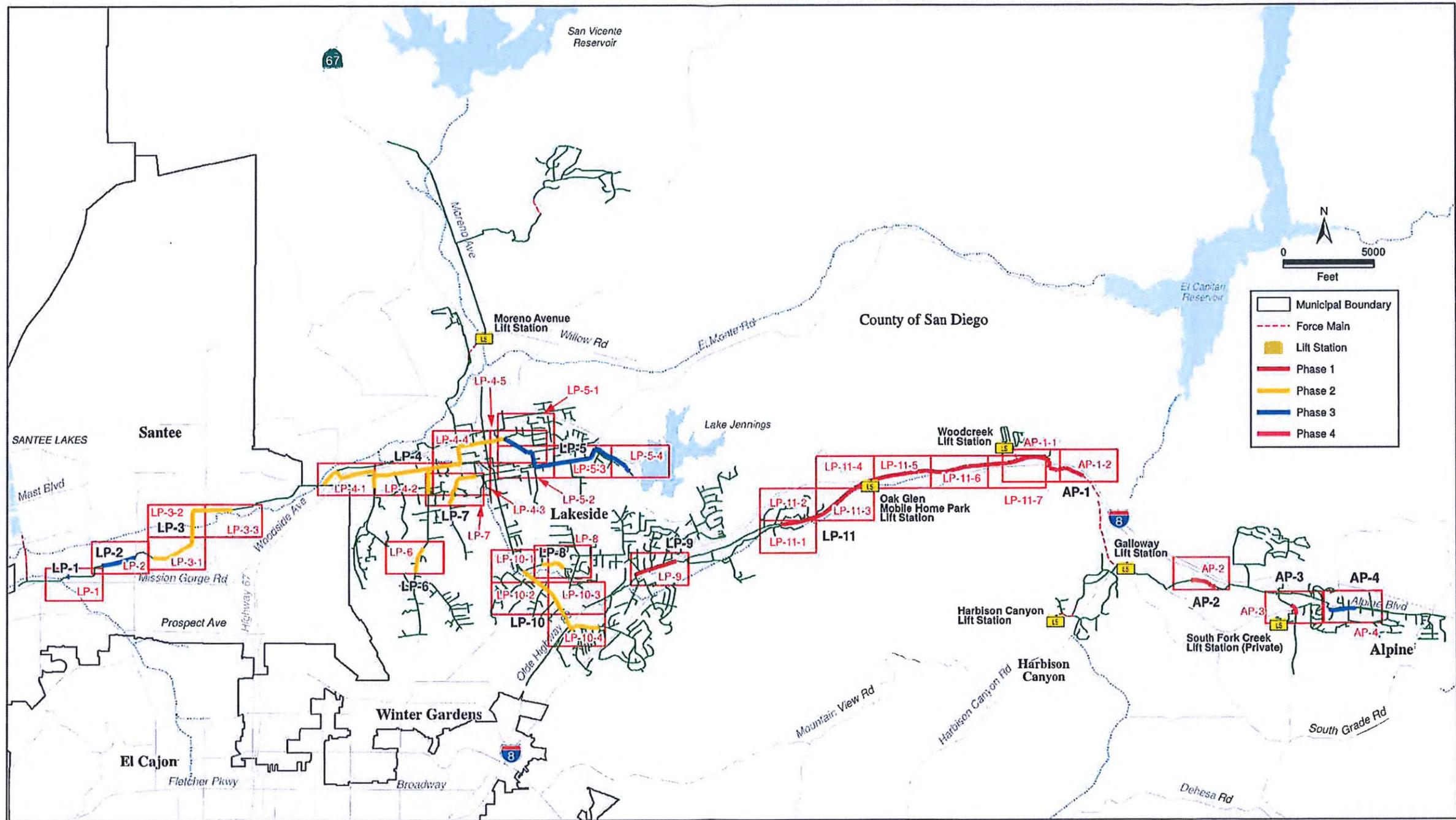
**CAPITAL  
IMPROVEMENT PROJECTS**

FIGURE 7-1

12/6/2011 KM SD Z:\Projects\SI\SanDiegoCounty\100001472\_AsNeeded\14\_AlpineLakeside\_MasterPlan\mxd\FICIP\_F7-1.mxd

Proposed Capital Improvement Program

CIP #	Type	Project	Description	Units	Base Unit Cost	Scaling Factor	Description	CIP Cost	Priority	Phase				Phased Cost			
										I	II	III	IV	I	II	III	IV
LP-10	Pipeline	Los Coches Road Sewer Pipeline Replacement Project	Replace approximately 6,100 feet of existing 8 and 10 inch diameter pipeline with diameters ranging from 12 to 15 inch.	6100 - LF	\$ 507 /LF	1.0	The base unit cost was taken as a weighted average between the proposed diameters.	\$3,090,000	2	0%	100%	0%	0%	\$0	\$3,090,000	\$0	\$0
LP-11	Pipeline	Flinn Springs Interceptor II/III Sewer Pipeline Replacement Project	Replace approximately 13,600 feet of existing pipeline ranging in diameter from 8 to 12 inch with 15 and 18 inch diameter.	13600 - LF	\$ 641 /LF	1.0	The base unit cost was taken as a weighted average between the proposed diameters. No Caltrans crossing.	\$8,717,000	1	100%	0%	0%	0%	\$8,717,000	\$0	\$0	\$0
L-LS	Lift Station	Moreno Lift Station	Upgrade Mechanical and Electrical equipment	1	\$200,000	-	N/A	\$200,000	1	100%	0%	0%	0%	\$200,000	\$0	\$0	\$0
AP-1	Pipeline	Flinn Springs Interceptor I Sewer Pipeline Replacement Project	Replace approximately 4,400 feet of existing 10 inch diameter with 15 inch diameter.	2800 - LF	\$ 600 /LF	1.1	Designed - Construction in 2012. Scaling factor includes accommodation for new Air-Vac assembly outside of road ROW	\$1,764,000	1	100%	0%	0%	0%	\$1,764,000	\$0	\$0	\$0
AP-2	Pipeline	Alpine Interceptor Sewer Pipeline Replacement Project (Midway Drive)	Parallel approximately 1,600 feet of existing 12 inch diameter with 10 inch diameter.	1600 - LF	\$ 425 /LF	1.0	No comment	\$680,000	1	100%	0%	0%	0%	\$680,000	\$0	\$0	\$0
AP-3	Pipeline	Tavern Road Sewer Pipeline Replacement Project	Replace approximately 700 feet of existing 8 inch diameter with 12 inch diameter.	700 -LF	\$ 500 /LF	1.2	The scaling factor was taken at 1.2 to account for mobilization	\$420,000	4	0%	0%	0%	100%	\$0	\$0	\$0	\$420,000
AP-4	Pipeline	Alpine Interceptor Sewer Pipeline Replacement	Replace approximately 1,600 feet of existing 8 inch diameter with 15-inch diameter.	1600 - LF	\$ 600 /LF	1.5	The new Alpine High School and road construction moratorium in Alpine Blvd will determine project timing. The scaling factor was taken at 1.5 to account for traffic control and mobilization	\$1,440,000	3	0%	0%	100%	0%	\$0	\$0	\$1,440,000	\$0
A-LS	Lift Station	Galloway Lift Station Pump and Storage Upgrades	New pumps (3) with capacity of 2,100 gpm & 125,000 gallons of additional storage	1	--	--	N/A	\$500,000	4	0%	0%	0%	100%	\$0	\$0	\$0	\$500,000



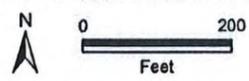
**CAPITAL IMPROVEMENT PROJECTS**

Map Book Index

Alpine and Lakeside Sewer Service Areas  
Sewer Master Plan  
December 2011

12/21/2011 TH SD Z:\Projects\San Diego County\100001472\_AsNeeded\14\_AlpineLakeside\_MasterPlan\mxd\FM\Mapbook\CIP\_F7-1\_Mapbook\_Index.mxd





- Force Main
- Gravity Main (Active)
- CIP Project Pipe
- LS Lift Station
- Dead End
- Clean Out
- Drop Manhole - ID (Drop, Depth)
- Manhole - ID (Depth)

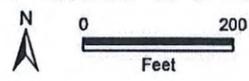
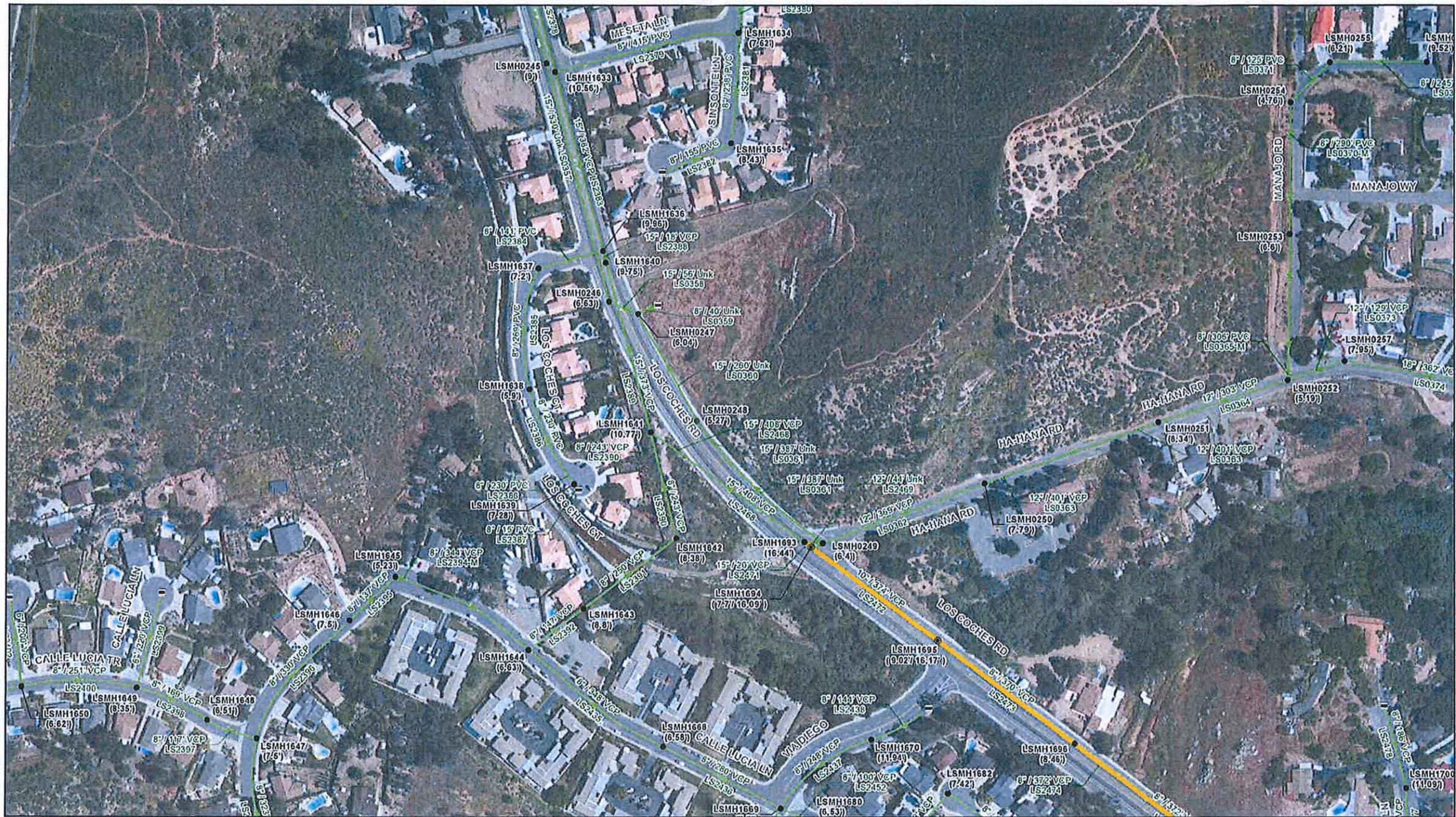
12/17/2011 TH SD Z:\Projects\SanDiegoCounty\100001472\_AsNeeded\14\_AlpineLakeside\_MasterPlan\mxd\F7-1\_Mapbook\_3.mxd

**ATKINS**

**CAPITAL IMPROVEMENT PROJECTS**

CIP LP-10 Map 2 of 4

Alpine and Lakeside Sewer Service Areas  
Sewer Master Plan  
December 2011



- Force Main
- Gravity Main (Active)
- CIP Project Pipe
- Lift Station
- Dead End
- Clean Out
- Drop Manhole - ID (Drop, Depth)
- Manhole - ID (Depth)

**CAPITAL IMPROVEMENT PROJECTS**

CIP LP-10 Map 1 of 4

12/17/2011 TH SD Z:\Projects\San Diego County\100001472\_AstNeed\14\_AlpineLakeside\_MasterPlan\mxd\FICIP\_F7-1\_Mapbook\_3.mxd



Alpine and Lakeside Sewer Service Areas  
Sewer Master Plan  
December 2011