2.0 Executive Summary

2.1 Overview of Collection Systems Activities

Most cities' sewer collection system are owned and operated by the City. Business activities associated with the collection system would be management and operations and maintenance activities. Operations and maintenance functions for the Rancho Palos Verdes sewer collection system are performed through an ongoing contract with the Los Angeles County Sewer Maintenance District (LACSMD or SMD). Routine maintenance activities include cleaning, closed circuit television (CCTV), repairs and replacements.

The city provides the bulk of the management of the system through the preparation of budgets and reporting of sanitary sewer overflows (SSOs). Typical management functions include the planning, budgeting and funding programs required to insure the health of the sewer collection system. To facilitate these activities the City has invested in the creation of the Sewer Geographic Information System (GIS) and periodic master planning activities. The master planning process (1) identifies areas of inadequate capacity or of poor physical conditions (2) develops candidate projects to address the deficiencies (3) estimates costs associated with the projects and proposes schedules for the projects. The use of GIS in the City's collection system has greatly facilitated the analysis of the collection system to determine the need and priority of system improvements. Maps are readily created and used to: discover the overall character of the system, map known overflow locations, cleaning schedules and to identify emerging trends discovered through the City or County televised inspection program (CCTV). The master plan update addresses the questions of (1) Where is the collection system? (2) What are the physical characteristics of the system? And (3) what needs to be done to bring the system into good conditions? The two primary aspects of concern are the physical condition and hydraulic capacity which are addressed through the system evaluation and hydraulic modeling respectively. The following section describes briefly the findings of the 2009 master plan update.

2.2 Condition Assessment

In the following sections, the system's physical condition is described through the findings of the CCTV results and the SSO database maintained by the State. The hydraulic capacity of the system is described through the modeling results.

2.2.1 CCTV Results

In 2004, Houston Harris and Associates, CCTV inspected 47,000 feet of pipeline or 6.1 % of the sewer collection system. The inspection results indicated that approximately 75% of the lines inspected were in fair or better condition. The remaining 25% was observed to have cracks and/or fats, roots, oil and grease accumulations. Based on these findings and

the recommendations of the Sewer Master Plan, the City staff began to work more closely with the LACSMD to escalate the maintenance of the system. The County also accelerated the CCTV inspection schedule to comply with the WDRs. This should result in the CCTV inspection of the complete system within 10 years.

In the first year of the County CCTV inspection program (2005-2006) 76,591 feet of sewer or just over 10% of the system was inspected. The results indicate that over 88.8% of the system is in fair or better condition structurally and 79.1 % of the system is in fair or better condition from a maintenance perspective. This indicates that approximately 12% of the system is structurally deficient (cracked pipe) and 20% of the system is subject to blockage from fats, roots, oil and grease accumulation. The County has stated that they plan to address problems found through cleaning and repair as appropriate.

The previous Sewer Master Plan indicated that the physical conditions observed in the CCTV inspection program show that in general the condition of the piping is fair. Root intrusion and cracked pipe dominate the defects observed in the field inspections. Pipeline capacity is not limited by their physical size. 20% of the pipe segments in the system are estimated to be in poor condition which could result in an increase in overflows. Table 5-6 confirms the above statement that 79.1% of the city's (county maintained) system that was CCTV inspected in 2006 is in fair or better maintenance condition.

Photos of the 2006 study by the county were unavailable and the following photos show the conditions observed in the 2004 CCTV study. It is important to realize that these types of defects are typical and occur in approximately 20% of the observed system. This means that most of the system (80%) is in fair or better condition

Figure 2-1 Typical TV Observation of Normal of Roots at Ungasketed Joint (2004)

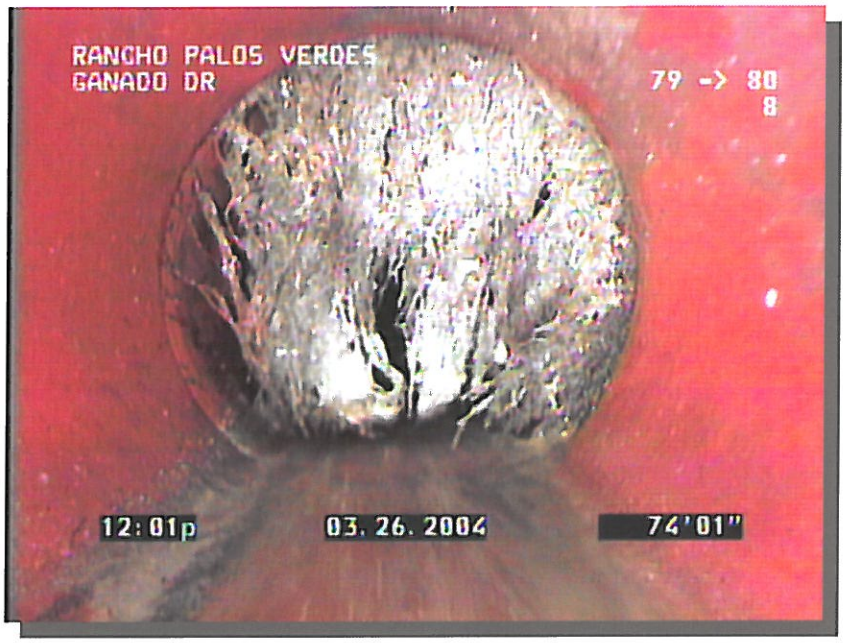


Figure 2-2 Fats, Oils and Grease (2004)

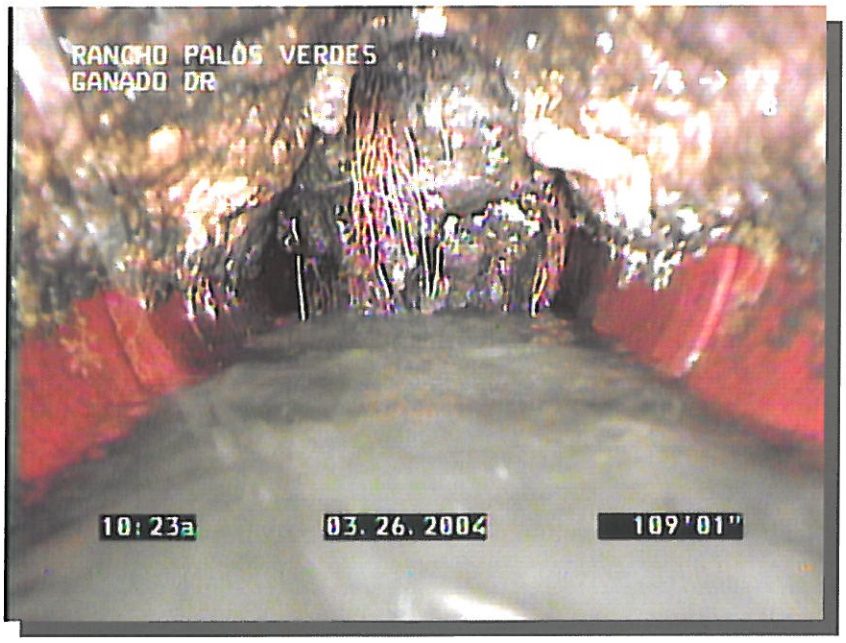
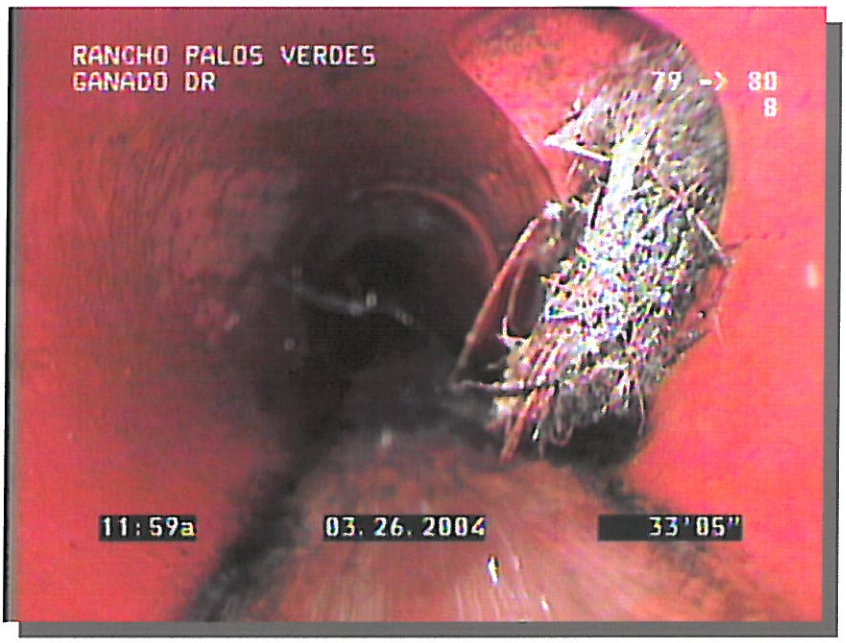


Figure 2-3 Roots from Service Connection (2004)



The previous photos are shown as a representative example of undesirable pipeline conditions. Note that these types of defects are found in 20% of the system inspected. The City should attain all inspection records including the photographs for inclusion in the City's GIS. This will enhance the overall management function and provide documentation of changing conditions in the system. For instance, the property owner of the lateral connection shown in Figure 2-3 should be contacted and advised of the extensive root intrusion in the lateral. Staff recognizes that this practice is not without risk as cleaning the private lateral may result in pushing roots into the city system and creating a downstream blockage.

2.2.2 California Integrated Water Quality System (CIWQS)

The CWIQS is a reporting system created during the WDR development that provides a clearing house for agency overflow reporting. To benchmark the performance of collection system the database stores information related to the number of overflows (SSOs), the number of SSOs per 100 miles of pipe and the SSO volume. Using this information, the following table of SSO characteristics for the five highest ranking systems was developed for the reporting period 2007-2009. The comparison only includes facilities that are maintained by the LACSMD. Three of the five top ranked facilities are located near Rancho Palos Verdes.

Table 2-1 SSO Characteristics SMD Clients

2007-2009	SSOs	SSO Vol.	Recover	To Surface	Length	Frequency	Volume to surface waters
Responsible Agency	(count)	(Gallons)	(Gallons)	(Gallons)	(Miles)	(SSO/100 mi.)	(gallons/100 mi.)
West Hollywood	20	8,800	3,210	4,650	39.4	50.7	11,802.00
Palos Verdes Estates	37	8,465	2,161	3,475	76.4	47.8	4,495.40
Rancho Palos Verdes	38	13,425	3,140	8,025	138.8	27.0	5,707.60
Rolling Hills Estates	7	1,285	245	50	32.4	21.4	152.9
Hawaiian Gardens	3	601	101	500	15.7	19.1	3,184.70

This table indicates that the City has more SSOs than any other agency maintained by the LACSMD. When normalized to consider the length of the system, the City ranks third of the highest five ranked systems. The SSO frequency is a further indicator of the physical condition of the system.

The following table shows the same comparisons for the highest frequency (SSO/100 mi.) for all agencies in Los Angeles County.

Table 2-2 Top 10 SSO Frequency LA County

2007-2009	SSOs	SSO Vol.	Recovered	To Surface	Length	Frequency	Volume to surface waters
Responsible Agency	(count)	(Gallons)	(Gallons)	(Gallons)	(Miles)	(SSO/100 mi.)	(gallons/100 mi.)
CSU Dominguez Hills	37	113,674	6,174	0	3.0	284.6	-
UC Los Angeles	4	17,340	1,300	15,940	2.0	133.3	**531,333**
Los Angeles Cnty DPW	2	400	250	0	2.9	51.2	-
West Hollywood	20	8,800	3,210	4,650	39.4	50.7	**11,802**
Palos Verdes Estates	37	8,465	2,161	3,475	76.4	47.8	**4,495**
Whittier City	75	15,352	985	445	214.0	35.0	**208**
Beverly Hills	31	6,032	2,960	1,409	98.0	31.6	**1,438**
LA County Sanitation Districts	5	3,750	0	1,700	14.6	28.9	**9,827**
Rancho Palos Verdes City	38	13,425	3,140	8,025	138.8	27.0	**5,708**
LA County Sanitation Districts	4	275	75	0	15.3	25.9	-

Note that in Table 2-1 three of the top five communities are located on "the hill." This seems to indicate that a shared physical characteristic contributes to the frequency and amount of overflows. Factors that are likely to create this situation are the dominant construction material and techniques and the steep slopes. The steep slopes would result in a downward stress on the pipe joints which could enlarge the gap at the joint. This pulling apart could result in more root intrusion and structural cracking. The following table shows the Pipeline Assessment and Certification Program (PACP) rating (1=Excellent – 5 = Worst), slope and length of pipe.

Table 2-3 Pipe Rating and Slope

	Slope										
PACP Rating	0-0.5%	0.5-1%	1-2%	2-3%	3-4%	4-5%	5-6%	6-7%	7-8%	8-9%	>9%
	Pipe Length (ft)										
1 - Excellent	8,075	2,076	5,142	2,165	2,569	1,810	2,577	2,021	2,204	2,631	9,366
2 - Good	414	254	199	857	639	718	1,529	254	0	0	1,150
3 - Fair	3,010	1,079	2,324	1,414	2,344	1,188	1,702	2,158	2,105	1,021	2,315
4 - Poor	1,081	0	1,090	0	0	0	468	182	647	216	986
5 – Immediate Attention	368	142	622	218	121	685	889	143	136	0	1,127

2.2.3 GIS Analysis of Age and Materials

A system evaluation was performed through further analysis of the age and materials used in the collection system. The GIS data captured included the installation date and the material for a majority of the pipes. This data was used to prepare the following summary tables of age and materials.

Table 2-4 Pipe Age Distribution

Decade Constructed	Length of Gravity Pipe (feet)	Percent Cumulative	Length of Forcemain (feet)	Percent Cumulative
1950-1959	145,449	19.54%	0	0.00%
1960-1969	400,868	73.38%	1,550	5.27%
1970-1979	119,735	89.47%	855	8.18%
1980-1989	29,059	93.37%	481	9.81%
1990-1999	23,616	96.54%	20,426	79.28%
2000-2009	16,478	98.76%	2,221	86.83%
Unknown	9,265	100.00%	3,872	100.00%
Total	744,470		29,405	

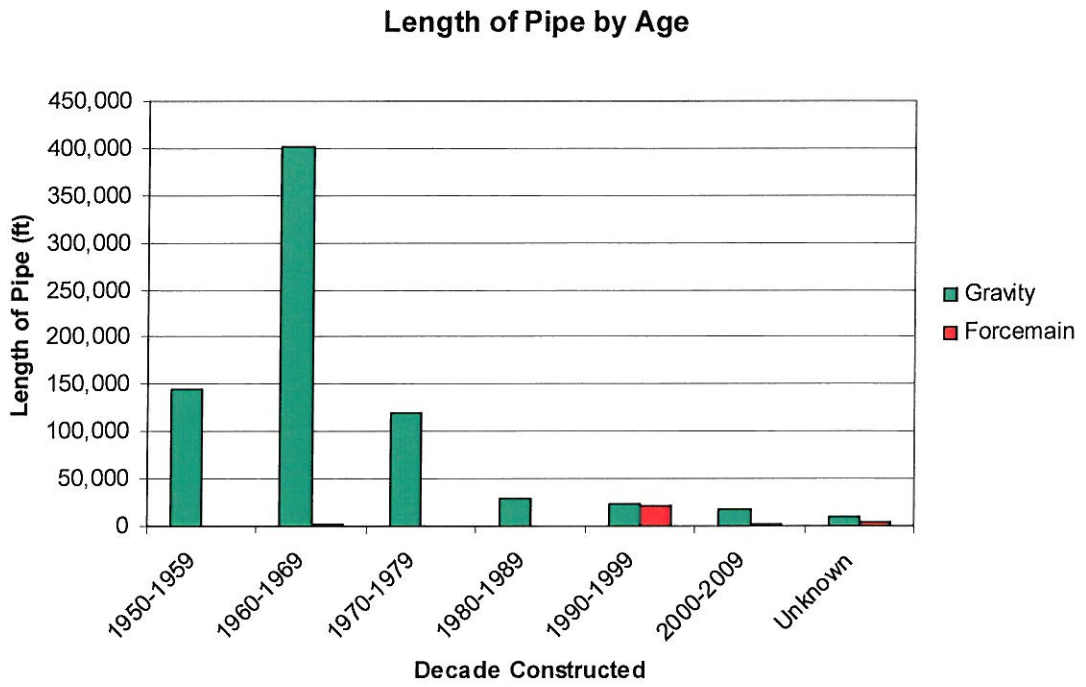
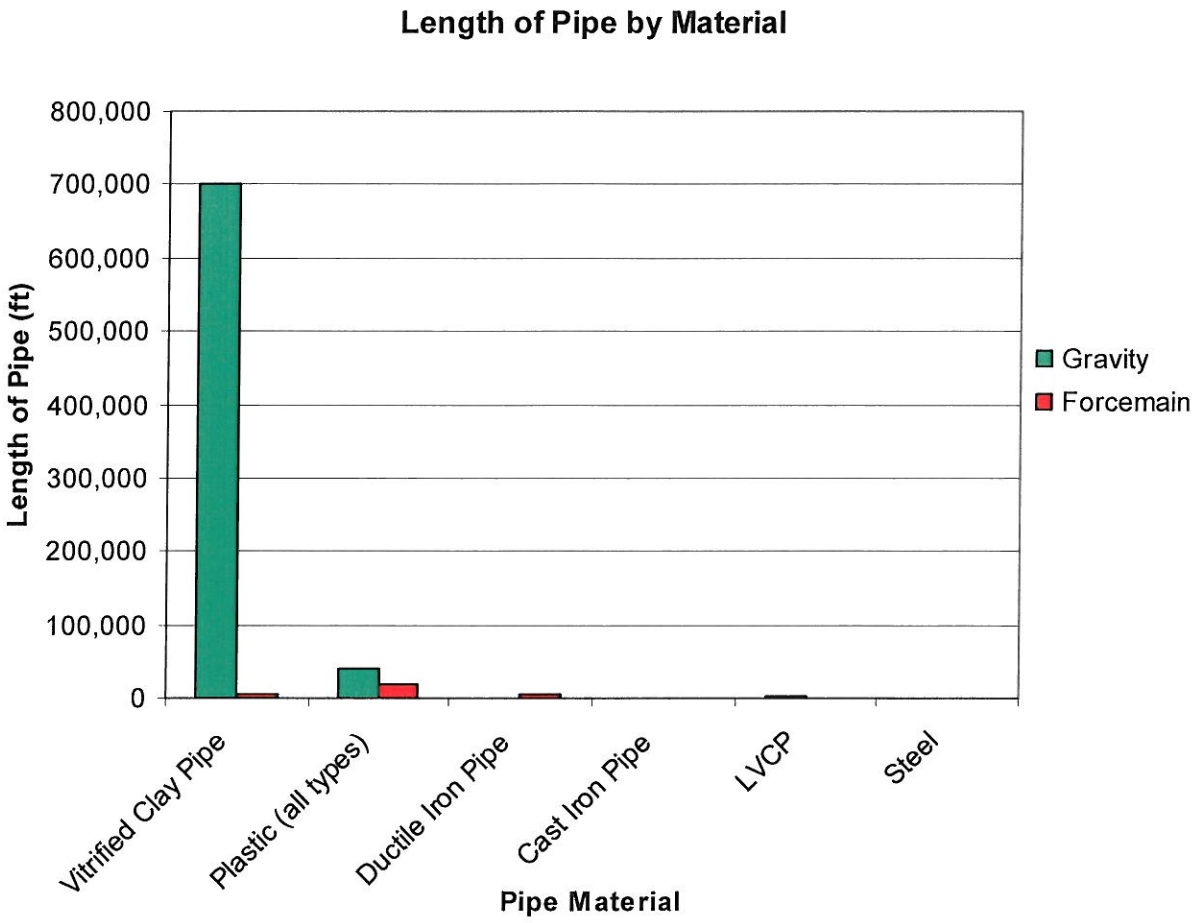


Table 2-5 Pipe Material Distribution

Material	Length of Gravity Pipe (feet)	Percent Cumulative	Length of Forcemain (feet)	Percent Cumulative
Vitrified Clay Pipe	700,270	94.06%	5,135	17.46%
Plastic (all types)	41,422	99.63%	18,931	81.84%
Ductile Iron Pipe	110	99.64%	4,817	98.22%
Cast Iron Pipe	521	99.71%	522	100.00%
LVCP	1,823	99.96%		
Steel	324	100.00%		
Total	744,470		29,405	



As shown in these tables the dominant material used in the system is Vitrified Clay Pipe (VCP) at just over 94%. Prior to the 1970s it was common practice to install VCP pipe sections without gaskets. This practice was based on the theory that additional groundwater flowing into the pipe was beneficial in cleaning and flushing the pipe. This practice resulted in easy entry of roots from surrounding trees and hedges into the pipes. In the mid 70's it became common practice to use mortar to "seal" the joints. This rigid seal would be easily cracked and would dissolve from hydrogen sulfide attack over time. Over 80% of the system was installed before gasketed joints became common.

The majority of the system (over 73%) is now more than 40 years old and made of VCP. The average service life for VCP pipe is generally accepted as 100 years with breakage beginning at approximately 20 years. As a result there will be an increasing trend in pipe structural failures with time.

2.2.4 Capacity Analysis

A hydraulic model was used to determine the systems theoretical capability to convey the flows under existing and future, dry and wet conditions. The capacity analysis uses the measurement of depth/diameter ratio to determine the capacity of the collection system. Gravity pipes flowing at less than d/D = 0.9 are considered adequate and not recommended for replacement. As shown, the steep slopes in the majority of the system provide excellent hydraulic capacity. The following table shows the number of capacity deficient segments for each of the hydraulic scenarios. As shown even with future population increases and a generous allowance for inflow and infiltration, approximately 98% of the system has adequate capacity.

Table 2-6 - Capacity Analysis Results

Flow Scenario	Total	0.5-0.75	0.75-0.90	>0.90	>0.90
Existing	3192	70	10	7	0.2%
Future	3192	71	12	11	0.3%
Future Wet (2.5X)	3192	195	23	81	2.1%

As a result of the Capacity Analysis, seven potential projects have been identified and prioritized. The details of the process are discussed in Chapter 7. The candidate projects and their approximate scheduling are shown below. The pipes included in the Miscellaneous category were single or double pipe segments that have capacity problems but do not necessarily fall into a project category. The Miscellaneous category is for a new pipe size of 12 inches, based on the hydraulic model recommendations.

The Abalone Cove area is served primarily by grinder pumps, lift stations and force mains. The criterion for capacity revolves around pump ratings and pipeline velocities where each individual home is served by a pump and a series of force mains. Since the system is predominately pressurized it is not subject to the wet weather effects seen in the gravity portions of the system. The number of homes in the Abalone Cove service area is expected to double as a result of recent litigation. This increase in homes Is NOT anticipated to create a capacity problem as the original plan anticipated. The increase in assessment district customers may provide an opportunity for the reassessment of all users and the elimination of the City subsidy for the area.

Table 2-7 Capacity Related Projects

Project Name	Planning Period	
	2010 to 2020	2020 to 2030
Ironwood Street	$202,275.00	
PV Drive South, Conqueror to Schooner	$516,997.50	
PVDrive S., Sea Cove to Abalone Cove Shoreline Pk.	$162,690.00	
Basswood Avenue		$98,136.00
Parallel to Basswood Avenue		$334,950.00
West General Street		$97,400.00
Ginger Root Lane		$165,648.00
Miscellaneous, 12 inch		$339,474.00
Total 10 Year Program	**$881,962.50**	**$1,035,608.00**
Average Annual Cost	**$88,196.25**	**$103,560.80**

Recommendations

The City has improved the management of the collection system through closer coordination and collaboration with the County Sewer Maintenance District. The preparation of the SSMP and the City's direction to the LACSMD will also facilitate improved management of the collection system. This document will be incorporated by reference in the SSMP which will become the business plan for the collection system. The sources of funding for the noted condition and capacity related projects needs to be identified through significant coordination with the County.

The LACSMD has proposed the following schedule for CCTV inspection of the system and system cleaning of segments with critical maintenance issues. As of June 2009, results for the 2006-2007 inspection program have not been provided. The City should coordinate with the County to attain this data for planning purposes.

Table 2-8 CCTV Project Schedule[1]

Fiscal Year	Project Name	Length (feet)
2005-2006	Y0TV0506F	76,591
2006-2007	Y0TV607D	131,329
2008-2009	4_18	31,410
2009-2010	4_19	266,674
2011-2012	4_16	100,727
2011-2012	4_17	124,667
2012-2013	1_5	850

The City should approach the management of the collection system to address three primary areas of concern. These are:

(1) Determine the actual physical condition of the system by augmenting the County's CCTV efforts
(2) Perform a detailed Advanced Asset Management Study of the Abalone Cove sewer system to determine the true costs of a sustainable system.
(3) Address the capacity problems identified and scheduled in the CIP.

The approximate costs and scheduling for the near term projects are shown in Table 2-9.

Recommendations - Determination of the System's Physical Condition

- To aid in augmenting the County's maintenance efforts, continue the public awareness campaign to educate citizens about the condition of the sewers and what they can do to help
- Work with LA County to insure that:
    - Increase routine maintenance is performed to improve the PACP Maintenance scores
    - Accelerate the CCTV Inspection program to insure complete inspection of the system is conducted within 5 years
    - Track lines identified by the County as structurally compromised through to replacement of the lines.
- Conduct a thorough assessment of the fiscal requirements for the operation of the Abalone Cove Special District
- Secure funding sources through establishment of rates that are based on the EPAs Enhanced Asset Management Strategy for Sustainability
- Incorporate suggested improvement to the Collection System CIP into the City's budget

[1] Consolidated Sewer Maintenance District Condition Assessment Program Report

Recommendations - Abalone Cove Sewer System

The current rates address a minimally compliant system. Longer term sustainability of the system has not been fully addressed in this report. A complete and thorough review of the fiscal requirements for the operations of the Abalone Cove Sewer System should be completed. Sustainability of this system requires detailed analysis of the life expectancy of all of the components of the system which is beyond the scope of this update to the Sewer System Management Plan. Additionally the risk analysis would include a rational assessment of the consequences of failure of these systems. The outcome of this detailed operational analysis would be the preparation of a proactive preventative maintenance and replacement schedule for the facilities.

The results of recent legal decisions are likely to provide an opportunity to revisit the ownership and operation of the Abalone Cove system. As discussed in the introduction, it is unusual for the City to own, operate and maintain facilities located on private property and serving only one single family residence. Individual ownership, operations and maintenance of these facilities is more consistent with the other properties in the City.

It is recommended that both the city and County continue to investigate and document the physical condition of the system. Detailed information related to the physical condition should be evaluated with a Risk Management approach to prioritize which portions of the system are repaired first. The City will need to take a proactive role in the management of the system. Opportunities for private cleaning and maintenance of sewer lateral systems should be considered.

Recommendations - Capacity Projects

The capacity analysis reveals a need to set aside money to fund just over $1.5 Million dollars worth of capacity increasing projects over the next 20 years. An additional $340,000 dollars is identified for miscellaneous replacements that are scattered throughout the City. Funding for these locations should be set aside and expended through the replacement or repair of other capital facilities.

Table 2-9 Near Term CIP

Rancho Palos Verdes Collection System CIP				Near Term				
Category		Total Cost	Years	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015
Administrative								
	Abalone Cove Analysis	$ 50,000	1	$ 50,000				
	CCTV Program Management	$ 93,132	5	$ 18,626	$ 18,626	$ 18,626	$ 18,626	$ 18,626
System Evaluation								
	CCTV-Cleaning	$ 465,659	5	$ 93,132	$ 93,132	$ 93,132	$ 93,132	$ 93,132
General Projects								
	Abalone Cove Upgrades	$ 150,000	3		$ 50,000	$ 50,000	$ 50,000	
Capacity Projects								
Ironwood Street		$ 202,275	3	$ 67,425	$ 67,425	$ 67,425		
PV Drive S. ,Conqueror to Schooner		$ 516,998	3		$ 172,333	$ 172,333	$ 172,333	
PV Drive S., Sea Cove to Abalone Cove S		$ 162,690	3			$ 54,230	$ 54,230	$ 54,230
Basswood Avenue		$ 98,136	3					
Parallel to Basswood Avenue		$ 334,950	3					
West General Street		$ 97,400	3					
Ginger Root Lane		$ 165,648	3					
Miscellaneous 12"		$ 339,474	10	$ 33,947	$ 33,947	$ 33,947	$ 33,947	$ 33,947
	Total	$ 2,676,361	**Period Total**	$ 263,131	$ 435,463	$ 489,693	$ 422,268	$ 199,936

The complete recommended CIP is shown in Table 7-3.